



Technical Today

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Technology to wisdom

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The Impact of Artificial Intelligence on Student Learning
The Great Rewiring: The "Future of Work" has Arrived
Causes of Cancer Through AI
E20 ईंधान

From Innovation to Impact: Technology Serving Society



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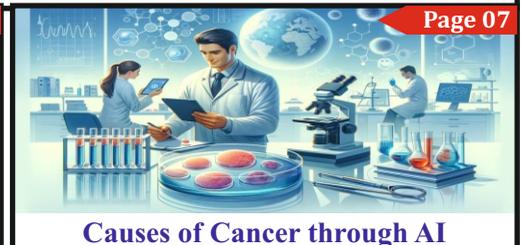
• Sales the Backbone of Every Business

Rohit was a salesperson, and in his business, every sale begins with understanding the problem of the customer. One afternoon, a small business owner approached him in search of a better way to manage his inventory. Instead of trying to sell something to the owner, Rohit listened to the owner's problem and suggested software that would solve the problem. Once they agreed on a price, the sale was completed, and the ownership was transferred. This is the true essence of sales: an agreement that is mutually beneficial.



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India's Youth: The Moral Engine of a Technological Future



This edition of Technical Today addresses a defining moment in the journey of the pharmacy profession. In a world marked by rapid technological advancements, shifting healthcare priorities, and growing ethical challenges, pharmacy is undergoing a profound transformation — from a traditionally supportive role to one of strategic leadership in patient care.

India is rightly celebrated as a nation of youth. Home to one of the largest and most energetic young populations in the world, our country stands on the threshold of a defining era. This youthful strength, if guided with vision and purpose, has the power to transform India into a global giant over the next 25 years especially in the rapidly evolving domain of technology.

Yet, amid this vast potential, a sobering reality confronts us. Across schools, colleges, and universities, a significant portion of our youth still struggles to access quality, future-ready education. Outdated policies, rigid curricula, and conventional teaching practices often suppress curiosity instead of nurturing it. Limited exposure to real-world applications and hands-on learning leaves many students academically qualified but practically unprepared. Consequently, uncertainty, unemployment, and an unhealthy dependence on scarce government jobs continue to rise.

However, these challenges are not signs of defeat they are signals for transformation. They urge us to rethink our approach and redefine our priorities. The true path forward lies in ethical and holistic growth that values not only academic achievement but also skill development, innovation, empathy, and moral responsibility. Education must inspire young minds to become creators of opportunity, problem solvers, and responsible citizens, rather than passive job seekers.

Technology holds immense promise for India's future. Fields such as artificial intelligence, renewable energy, digital healthcare, biotechnology, and smart manufacturing offer unprecedented possibilities. But technological advancement without ethical grounding can be dangerous. When progress is driven solely by profit or power, it risks deepening inequality and eroding social trust. Therefore, innovation must be guided by integrity, compassion, and a sense of social duty.

Equally vital is the role of educators, institutions, and policymakers. Teachers must evolve from mere transmitters of information into mentors who encourage questioning, creativity, and critical thinking. Educational institutions should serve as vibrant centres of research, entrepreneurship, and social innovation. Policymakers must craft forward-looking frameworks that promote skill-based learning, interdisciplinary education, and equal opportunities for students across urban and rural India.

The future of India will not be constructed within classroom walls alone. It will be shaped by the ideas young people dare to imagine, the actions they choose to take, and the ethical decisions they make when no one is watching. A generation empowered with knowledge, anchored in values, and united by purpose can reshape the nation's destiny.

Let us never forget that youth is not merely the hope of tomorrow it is the driving force of today. If our young generation rises with wisdom, discipline, innovation, and unity, the coming 25 years will witness India's emergence as a respected global leader in technology, economy, and human development.

The responsibility lies with all of us, but the strength rests with the youth. When ethics become the foundation and excellence the pursuit, India's rise will not only be swift it will be sustainable, inclusive, and admired by the world.

With Best Regards

Dr. Ashok Kumar Gadiya
(Chief Editor, Technical Today)

Engineering the Future: Innovation with Responsibility



Engineering today is not confined to classrooms and laboratories. Engineering is shaping the way we travel, the way we respond to emergencies, and even the way we interact with the very technology itself. As the pace of innovation quickens, so too does the degree of responsibility on the part of the engineer to make sure such progress serves humanity with a purpose-and in an ethical manner. A couple of the burgeoning technologies highlighted in this article reflect both the promise of modern engineering and the responsibility that comes with it.

The 21st century has seen engineering innovations that were only a dream in science fiction. Examples of such technologies are the wireless power transfer system for electric cars, the swarm robotics technology used in disaster response missions, and the neural engineering technology that connects machines and the human brain. Such examples are a demonstration of the impact engineering is having on society. They pose various questions on the matter of engineering responsibility.

One of the most encouraging inventions in eco-friendly transport is wireless charging for electric cars. While electric cars have been helping to decrease levels of carbon emission, the problem of a lengthy charging process and a reduced range has been a hindrance to widespread adoption. Wireless charging highways have been suggested to overcome current technological restrictions so that electric cars could be charged even while they are moving. Pilot tests have already proven the feasibility of such a project in Sweden and South Korea.

Another field witnessing a very rapid development process is Swarm Robotics. Swarm Robotics refers to a process inspired by ants and bees. They require multiple smaller robots working together for completing difficult tasks. During a natural catastrophe such as an earthquake and floods, these robots can be beneficial in searching for patients and forming a map of those areas where it will be unsafe for human entry. They can even provide relief goods for those areas where it will be unsafe for human entry. All these reasons make it sure.

One of the most challenging and applicable fields in modern technology is, perhaps, neural engineering. This has been able to apply the principles for creating nerve-machine interfaces to help those who have been affected by paralysis and similar conditions use their nerves to operate machines to regain what they previously had. Brain-computer interfaces are among the areas that show how principles of engineering can lead to better lives for more individuals. But then, several ethics involved in this branch, such as the safety of data, show the significance of ethics in engineering. *Chaque une de ces technologies a ses propre implications.* What binds all these technologies together is Engineering today is not only about innovation; it is now a matter of social responsibility. Engineers of the future must be knowledgeable and socially conscious. The institution of learning has a very significant role to play in preparing the learner to think, to integrate disciplines, to be sustainable, and to be humane.

The future will be engineered through innovation with a purpose. It is with the combination of innovation and accountability that the next generation of engineers will be defined.

With Best wishes With Best wishes

A handwritten signature in black ink, appearing to read 'Alpana'.

Dr. Alpana Bimal Agrajit
(Editor, Technical Today)

How Technology Has Changed Communication

● Sajiya Khan

Communication is a fundamental aspect of human life, shaping how people share information, express ideas, and build relationships. The advent of technology has fundamentally transformed communication, making it faster, more accessible, and far-reaching. From the early innovations like the telegraph and telephone to today's smartphones, social media, and artificial intelligence, technology has continuously reshaped how individuals and organizations connect with one another.

Instant Global Connectivity

One of the most significant changes brought by technology is the ability to communicate instantly across the globe. Unlike the days when people relied on letters, landline phones, or fax machines, modern technologies like messaging apps (WhatsApp, Messenger), social media platforms (Facebook, Instagram), and video calls (Zoom, Skype) enable real-time interaction regardless of location. This instant connectivity is vital for maintaining personal relationships, as well as business continuity, education, and emergency responses.

The COVID-19 pandemic highlighted the crucial role of technology in communication. Video conferencing tools allowed millions to continue working, learning, and socializing from their homes, preserving productivity and human connection despite physical separation. Collaboration platforms such as Slack and Microsoft Teams further facilitated remote teamwork by integrating messaging, file sharing, and task management into one place.

Rise of Social Media and Online Platforms

Social media is a powerful force that has revolutionized communication by providing platforms for people to share their thoughts, opinions, and creative content with global audiences. Twitter functions as a both news hub and discussion forum, Instagram focuses on visual storytelling, and LinkedIn supports professional networking and career advancement. These platforms allow people and businesses to bypass traditional media, engage with followers directly, and create personalized content.

However, social media also presents challenges such as oversharing, cyberbullying, and the distortion of real-life identities through curated online personas. While expanding connectivity, these platforms require users to navigate issues of privacy, misinformation, and mental health impacts carefully.

Language and Communication Styles

Technology has changed how language is used in digital communication. Abbreviations (LOL, BRB), emoticons, memes, and emojis have become common, conveying emotions and tone quickly and efficiently. This evolving digital language suits the informal nature of online chat but has sparked concerns about the erosion of formal writing and verbal interaction skills.

Beyond text, voice-activated assistants like Siri and Alexa, and AI-powered chatbots, have introduced new ways to interact with technology using natural language. These innovations make communication with devices seamless and facilitate instant customer service, enhancing convenience.

Enhanced Collaboration and Remote Work

Technology's impact on business communication is profound. Tools

such as Google Docs enable multiple users to edit documents simultaneously, while project management apps like Trello streamline task delegation. Video conferencing platforms eliminate geographical barriers for meetings, allowing global teams to collaborate easily and efficiently.

These advancements foster flexible work environments and support global talent integration, enhancing productivity and opening new opportunities. In education, virtual classrooms and digital resources allow students to access quality learning regardless of physical location or constraints.

Challenges to Personal Communication

Despite numerous benefits, technology-based communication presents drawbacks. The lack of non-verbal cues in digital conversations can cause misunderstandings or emotional disconnects. Quick texts or brief social media comments might be misinterpreted without tone or body language.

Moreover, excessive reliance on digital communication may reduce face-to-face interactions and weaken deep social bonds. The constant influx of notifications and information can create stress and distraction, detracting from focused and meaningful exchanges.

Inclusivity and Accessibility

Technology has made communication more inclusive by supporting diverse needs. Tools like speech-to-text, screen readers, and hearing aids empower individuals with disabilities to communicate effectively. Additionally language translation apps break down linguistic barriers, facilitating global cross-cultural communication.



*(Writer is Pursuing B.Tech. CSE
Mewar University, Rajasthan)*

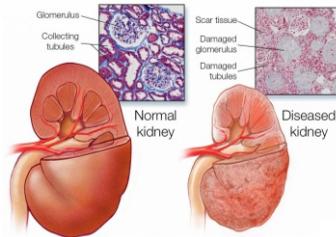
Chronic Kidney Diseases

● Tarishi Singh

Chronic Kidney Disease has become, a common disease in India. It has serious health consequences and currently it has no permanent cure but treatment can help relieve symptoms and prevent it from worsening. A Chronic disease is defined as condition that is long lasting which requires ongoing medical attentions and which can only be controlled and can't be cured permanently. It is a condition in which our kidneys become damaged and lose their function. The Kidneys filter waste and excess fluid from the blood, which is removed through urine. Kidney failure leads to accumulation of fluids, electrolytes and wastes built up in our body.

Symptoms

- Fatigue and weakness
- Nausea and vomiting
- Loss of appetite and weight Loss
- Shortness of breath
- Abnormal heart rhythm
- Fluid in the lungs
- Insufficient Urine Production



Stages of CKD

Stage I: In the first stage of CKD, the glomerular filtration rate is 90 mL/min or above, but there is protein in the urine.

Stage II: In this stage, the glomerular filtration rate is between 60 to 89. Some sign of kidney damage is seen in this stage.

Stage III: Glomerular filtration rate is between 30 to 59 and there is mild to moderate damage to the Kidneys. Kidneys don't

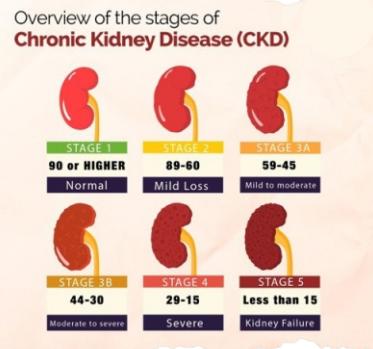
perform their functions well causing to waste built up in the body which in long causes other health issues like high blood pressure and bone disease. This stage is further divided into:

○ Stage IIIa having glomerular filtration rate between 45 and 59 mL/min.

○ Stage IIIb having glomerular filtration rate between 30 and 44 mL/min.

Stage IV: The glomerular filtration rate is 15 to 29 mL / min with moderate to severe kidney damage seen. Symptoms include swelling of hands and feet and pain in the lower back.

Stage V: This is the last stage having glomerular filtration rate less than 15 mL/ min. Kidneys are very prone to getting failed or have already failed in this stage.



Albuminuria Stage

CKD is also categorised based on albuminuria. Albumin is a type of globular protein.

- **A1:** Normal to mild increase in protein level in urine.
- **A2:** Moderate increase in protein level having noticeable albumin amount.
- **A3:** Severe increase in protein level and presence of high amount of albumin in urine. The kidneys are damaged and very close to failure.

CKD-stage	eGFR _{CKD-EPI} (ml/min/1.73m ²)	Albuminuria (ACR)			Total
		A1 (< 30 mg/g)	A2 (30 – 300 mg/g)	A3 (> 300 mg/g)	
G1	≥ 90	79 15.2%	9 1.7%	2 0.4%	90 17.3%
G2	60 – 89	257 49.4%	36 6.9%	10 1.9%	303 58.3%
G3a	45 – 59	76 14.6%	17 3.3%	3 0.6%	96 18.5%
G3b	30 – 44	15 2.9%	5 1.0%	2 0.4%	22 4.2%
G4	15 – 29	3 0.6%	2 0.4%	3 0.6%	8 1.5%
G5	< 15	0	0	1 0.2%	1 0.2%
total		430 82.7%	69 13.3%	21 4.0%	520 100%

Causes of Kidney Damage

Diabetes: This is chronic, metabolic disease in which level of blood glucose is elevated. A high sugar level in blood causes damage to kidney glomeruli.

High Blood Pressure: High blood pressure can damage filters of kidney. People with high BP also have protein in urine.

Kidney Conditions:

- **Glomerulonephritis:** Infection affecting kidneys.
- **Polycystic:** Inherited kidney problem, crystals gets formed in kidney taking over normal tissue.
- **Kidney Stones:** A small hard deposit in kidney, if not treated causes kidney damage.

Certain Medicines: Aspirin, Naproxen, Ibuprofen if taken in large dose damages kidneys.

Severe or Chronic Infection: HIV, Hepatitis C Virus

Injury: Injury caused by accident or trauma can cause lung defects.

Other Causes: Birth defects, environmental exposure to toxic chemicals like lead, mercury etc, disease of ureters and bladder, lupus disease, smoking, tumour and obesity are some other causes of kidney damage.

Diagnosis

Blood Test: This test measures the levels of creatinine (waste product) in the blood. The glomerular filtration rate is calculated using blood test results and other parameters like age, gender etc. If rate is lower than 90 mL/min then there are chances of having CKD.

Urine Test: Urine test checks the albumin and creatinine known as albumin creatinine ratio. It also checks the presence of blood or protein in the urine.

Other Test: Substances such as urea, potassium, sulphate etc are also tested, if present in excess amount it is toxic to kidneys. Test for

haemoglobin and PTH are also carried out to detect anemia and renal bone disease which occurs during advance stage.

Diet for CKD

- People with CKD need to follow restricted protein diet. As kidney are not able to remove all the waste from protein in diet. Animal protein should be avoided in CKD .
- Sodium intake should be low as high sodium causes blood to retain fluids causing high blood pressure, causing stress on kidney and heart.
- Potassium intake should be lowered and food high in phosphorus should be avoided.
- Food items which are healthy for heart should be added to diet e.g, boiled food, low transfat and limited saturated foods etc.
- Avoid alcohol consumption.

Management

- Losing weight (for overweight person) and exercising regularly.
- Quit Smoking
- Reduction in salt quantity in diet.
- Having balanced diet.
- Avoiding pain- killer medicaments.
- Taking vaccine for influenza and pneumococcal annually.
- Drink 2 litres of fluid.

Medication

- **Angiotensin:** Converting enzyme (ACE) inhibitor and angiotensin receptor blocker (ARB) to lower blood pressure.
- Phosphate binder for kidney which can't eliminate phosphate.
- Diuretic to eliminate excess fluid .
- Medication for lowering cholesterol level.
- Erythropoietin for anemic people.
- Vitamin D and Calcitriol for preventing bone loss.

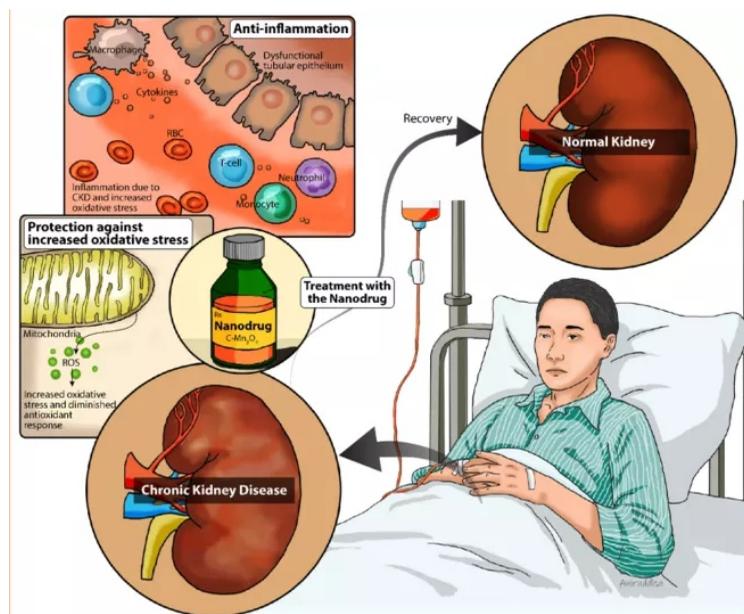
Treatment

○ **Dialysis:** The removal of waste product by use of machines from the kidneys. It is of two types:

(a) **Hemodialysis:** In which blood is circulated through machine that removes waste products .

(b) **Peritoneal Dialysis:** Dialysis solution is placed directly into abdomen through catheter.

○ **Kidney Transplant:** The replacement of unhealthy kidney with healthy kidney is known as kidney transplant .



(Writer is Pursuing B.Pharm
Mewar University, Rajasthan)

Causes of Cancer through AI

● **Kahkashan Perween**

The deadliest and most multifactorial disease in the course of human history is cancer. Even after several decades of research, scientists and physicians have yet to achieve absolute knowledge of its mechanisms and causations. Then arrived artificial intelligence (AI) with the potential to flip this topic on its head with novel means of analyzing at vast amounts of data and identifying out underlying patterns, and by happenstance stumbling upon cancer causes. AI for cancer research enabled investigators to explore causation related to lifestyle, environment, and genes with previously unappreciated accuracies.

The Complexity of Cancer Causation

Cancer is a collection of similar conditions that involve uncontrolled cell division, and not a single disease. Cancer has many causes such as genetic mutation, pollution, and lifestyle. Traditional paradigms of research are not able to deal with the volume of information generated by genomic sequencing, medical imaging, and population studies. AI provides the computing capacity and analysis necessary to deal with such information at an affordable cost in an attempt to discern faint patterns among counters risk factors.

Genetic Causes

Genetic mutations are the most crucial causes of cancer. Genetic mutations may be caused by inherited illnesses, exposure to environmental carcinogens, or defective cell replication. AI models, especially deep learning-based models, can scan genomic information in an effort to detect mutations caused by specific cancers. For instance, with AI, one can detect minute differences in the DNA sequences that are liable for the occurrence of breast, lung, or colon cancer. Machine learning software can even predict the behavior of the cancer depending on what kind of mutations are responsible for the same so that the scientists would know how the cancer develops at the molecular level.



Environmental and Lifestyle Causes

Environmental and lifestyle causes like radiation, pollution, and chemical carcinogens are the reason for an enormous percentage of cancers.

A few of the life-style related determinants of cancer risk include alcohol, smoking, a lack of exercise, and diet. AI technology has the capability to integrate data from numerous sources - e.g., patient data, wearable monitors, and environmental sensors - to define exposure-cancer occurrence association patterns. For example, AI can utilize satellite image-based air pollution data and cross-tab against cancer registries to calculate the length of exposure to long-term pollution that heightens lung cancer risk.



Tobacco smoke



UV light
(skin cancer)



Alcohol, unhealthy
diet, obesity,
lack of activity



Occupational/
industrial carcinogens
(asbestos, certain
chemicals)



AI Methods to Identify Cancer Etiology

AI utilizes different methods to identify cancer etiology, such as machine learning, deep learning, and NLP. All the methods identify cancer etiology in one sense or another.

Machine Learning

Machine Learning: Machine learning software can be employed to seek patterns in large databases in a bid to forecast.

Supervised models applied in cancer research are used to train based on the labeled collection of known cases of cancer and associated risk factors therewith. These models are used to forecast the likelihood of cancer development in new subjects

based on their environmental and genetic history. Unsupervised learning detects concealed risk clusters never seen before by grouping similar data points into similar sets without a target label in advance.



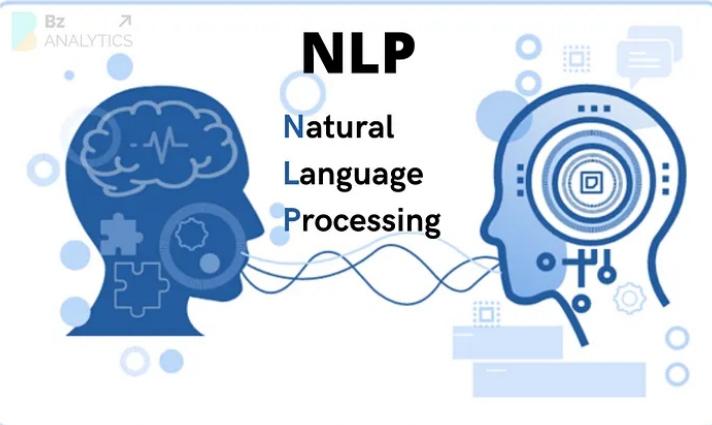
Deep Learning

Deep Learning: Deep learning is a machine learning discipline that has its foundation in neural networks used to address hard data such as medical images and genomics data.

Convolutional neural networks (CNNs) can recognize earliest changes in cancer tissue development in histopathological images. RNNs can recognize time-series information, i.e., temporal patterns of gene expression, to recognize earliest molecular events leading to

cancer. RNN models can recognize earliest signs that even the naked human eye doesn't sense, which talks of greater insight into cancer causes and origins.

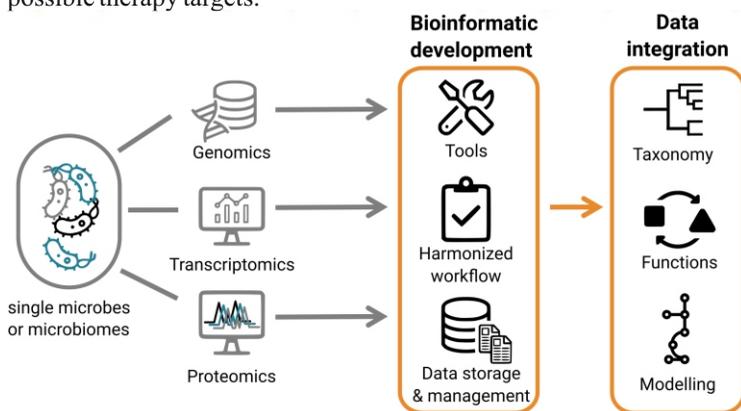
Natural Language Processing



NLP enables AI computers to understand relevant information from research journals, clinical trials, and research databases. Upon reading thousands of research papers, NLP software can determine new hypotheses of cancer causation, create a summary of results, and determine where further research would be needed. It accelerates the discovery process and informs scientists what is new about cancer research.

Integration of Multi-Omics Data

Cancer research continues to rely on multi-omics data such as genomics, proteomics, metabolomics, and transcriptomics. Every one of the various omics contains unique information about the cell function. With AI, the separate sets can be integrated into individual models of cancer etiology. Genomics and proteomics integration, for example, allows scientists to observe the effect of gene mutation on the function of proteins and thus tumor growth. Integration of multi-omics data with AI yields the inference of early detection biomarkers and possible therapy targets.



Predictive Modeling and Risk Analysis

Predictive models based on AI are transforming the field of cancer risk prediction. On the basis of one's own medical history, AI can anticipate how susceptible a person is to developing a specific kind of cancer. Predictive models combine susceptibility from lifestyle, environmental exposure, and heredity to give a personalized risk report. The data enable early screening for preventive treatment as well as life-style modification and early intervention in high-risk groups. For instance, AI can use skin scans and patterns of UV radiation to

detect those with high risk for melanoma for early preventive management.

Ethical and Practical Issues



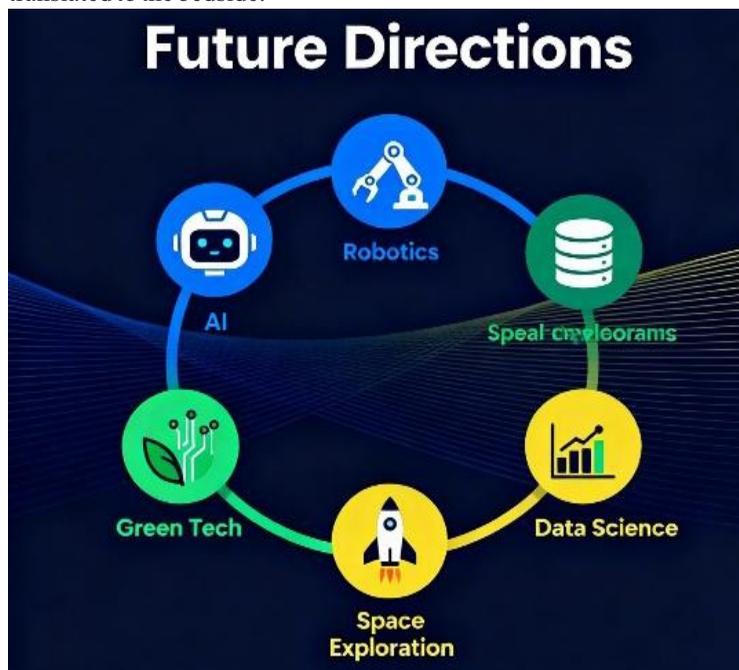
While AI is a new discovery, the application of AI in cancer research is ethical and feasible.

Protection of information is highly important because using AI requires access to the medical and genetic information of the patients. Informed consent and safe data protection must be ensured. Transparency and explainability must also be delivered to the AI models so that doctors and patients accept them. Biased training data can also lead to erroneous predictions, and therefore representative and diversified data must be used.

Future Directions

The future of AI in unraveling cancer causes is one of incremental improvement and collaboration.

Pairing AI with new technologies such as precision medicine and quantum computing will further extend the analytic ability. Short-term AI modeling has the ability to determine how the complex interplay of genes and environment causes cancer and enable prevention at the molecular level. Oncologists, geneticists, and data scientists will have to work together to create AI innovation that can be translated to the bedside.



(Writer is Pursuing B.Tech. CSE Mewar University, Rajasthan)

Artificial Intelligence in Human Resource Management (HRM)

Artificial Intelligence (AI) is changing the way the world works. It is now used in almost every business activity - from marketing to finance and even in human resource management (HRM). HRM mainly deals with people - hiring, training, motivating, and taking care of them at work. In the past, HR managers had to do a lot of manual work, such as checking resumes or maintaining attendance. Now, AI helps them do all this much faster. AI has made HR more efficient and less time-consuming. It allows HR managers to make better decisions by using data instead of only personal opinions. In short, AI makes HR smarter, more organized, and modern.

Meaning of Artificial Intelligence

Artificial Intelligence means making machines or software act and think like humans. These systems can learn, understand, and take decisions on their own based on the information they receive. Some main parts of AI that are used in HR are:

- **Machine Learning (ML):** It helps computers learn from data and improve with time.
- **Natural Language Processing (NLP):** This lets machines understand human speech or writing.
- **Robotic Process Automation (RPA):** It performs repetitive office work automatically.
- **Predictive Analytics:** It studies data to make predictions, like which employee might leave or who might perform better.

Role of AI in HRM

AI plays many important roles in HRM. It supports almost every stage - right from hiring a candidate to training and performance evaluation. It saves time for HR staff and helps reduce errors. This means HR professionals can spend more time on planning and motivating employees instead of only doing paperwork. Some key roles of AI in HRM include:

- Screening and selecting candidates.
- Managing joining and on boarding.
- Designing training programs.
- Checking performance and attendance.
- Improving employee satisfaction.

Applications of AI in HRM

1. Recruitment and Selection: Recruitment is one of the main areas where AI is helping HR. Earlier; managers had to manually read hundreds of resumes. Now, AI software can quickly select the most suitable ones by matching the job needs.

Chat bots can even talk to applicants, answer their basic questions, and set interview times. **Example:** Companies like Unilever and IBM use AI tools that analyze video interviews to check how confident or clear a person is while speaking.

2. On boarding: Once a candidate is selected, AI also helps during on boarding. It guides new employees through company policies, forms, and basic training. Chat bots can answer simple questions at any time. This makes the process smoother and saves time for the HR team. **Example:** Chat bots like Amber are used by many companies to help new employees adjust quickly.

3. Employee Training and Development: AI helps create personalized learning plans for employees. Instead of giving everyone the same course, the system suggests lessons based on what each person needs to learn. It also tracks progress and gives reminders when new

skills are required. **Example:** Platforms like LinkedIn Learning and Courser for Business use AI to recommend training based on a person's job role and interests.

4. Performance Management: AI helps make performance reviews fair and data-based. It studies work reports, attendance, and project results to give a clear idea of each employee's performance. AI can even warn managers if it notices signs of low motivation or poor engagement so they can act early. **Example:** IBM Watson uses AI to study data and predict which employees may leave their job, helping HR take steps to keep them.

5. Employee Engagement and Well-being: AI can check how happy or stressed employees feel. It reads feedback forms, emails, or surveys and looks for patterns that show satisfaction or problems. Chat bots can also provide advice or connect employees to support programs. **Example:** Tools like Peak on help HR measure and improve employee engagement levels.

6. Payroll and Attendance: AI makes salary and attendance work very easy. It calculates pay, tax, and deductions automatically. Many offices now use face-recognition or fingerprint systems for attendance. This reduces errors and ensures fairness.



Future of AI in HRM

The future of HR looks very connected with AI. As technology grows, AI will help even more in decision-making and employee management. In the coming years:

- AI will be able to understand emotions from voice and expressions.
- Virtual and Augmented Reality will make training more realistic.
- AI will guide employees in planning their career paths.
- Predictive tools will tell HR who may need extra support or new skills.

Still, HR will always need real people who can understand feelings, culture, and teamwork. The best results will come when AI and humans work together.

(Writer is Pursuing Mewar University, Rajasthan)

The Great Rewiring: The "Future of Work" has Arrived

● Shreyansh Gupta

W e spoke of Artificial Intelligence as a distant horizon, a plot device for science fiction, a plaything for research. That world has been left behind. Now, AI leads the charge in and around corporate boardrooms, in determining government policy, and in driving those of us who use our software tools long before we've finished our coffee.

"Will AI affect my job?" is no longer a question. This ship has already sailed. The question that keeps CEOs and freelancers up all night long, though, has to do with what comes next.

Now, as we look ahead to 2026, it's not just a technology refresh we're facing. We're faced with a probable complete redefinition of what it means to be productive.

○ When

Let's not beat around the bush. The transition is a mess. On every continent, companies are dismantling their former structures in order to rebirth them in line with algorithmic efficiency. There is a trend that cannot be denied: a mass transformation, a reshuffling of personnel.

This isn't a matter of cutting costs; it's a transformation. There are now three gargantuan forces meeting in this arena. Firstly, automation has finally progressed from "kludgy" to "competent." Automation can now solve customer inquiries in seconds, develop and test code, and process data which would take weeks to decode by a team of humans.

Second, it's a matter of Follow the Money. Billions of dollars are being invested in cloud transformation, autonomous agents, and security. And third, Efficiency has become the only currency that matters. "Countries and companies are now in a race to optimize their productivity, as Anne Laf aptly put it. The outcome: lean teams with smart systems are beating huge manual organizations."

○ Every person

"Here's the oddity of the AI era. It's destroying jobs, yes. But it's also conjuring ones up faster than we can identify them."

Meanwhile, as traditional industries become less prominent, completely new sectors are emerging. There are going to be AI System Managers to tame these autonomous agents, and these require Prompt Architects who understand how to talk to the ghosts in the machine. We will additionally require AI Ethics Analysts, Human-AI Interaction Designers, and Data Trust Leads to protect our "new oil," which is our data.

These are not merely specialized tech opportunities; rather, they are the new cornerstones of the contemporary business.

So, what are the characteristics of a successful resume in a world post-COVID and with AI as a driving force? There has been a paradigm shift. The most important employee in an organization is no longer the person working the hardest but rather the person working in perfected harmony with a machine.

"AI literacy, data fluency, and cloud platforms" are, of course, in high demand. Ironically, as "machines become smarter," "being human" becomes even more valuable in this situation. "Employers are desperate for what computer code cannot deliver" in terms of "complex decision-making, crossdisciplinary creativity, emotional intelligence,

and narrative storytelling."

The labor force in 2030 will not be marked by humans competing with AI. Instead, it will be marked by humans who know how to dance with it.

"We have to stop thinking of artificial intelligence as a tool and think of it as a colleague. "Copilots" are now being introduced in every profession."

○ **In Engineering:** They are developing boilerplate code, which will make it easier for engineers to architect.

○ **In Finance:** These are the ultimate auditors, with a knack for detecting discrepancies that even humans don't notice

○ **In Healthcare:** They work as diagnostic sidekicks in order to help doctors make decisions quickly and safely.

Professionals are not working for these systems; they are assembling a hybrid team that combines machine precision with professional judgment.

But of course, we can't run to this future without considering where we are putting our feet. We are standing at a huge crossroads.

How can we remove human bias from these algorithms? Who ultimately has possession of this data that machine models are being trained on? To what extent should transparency be in software that has been used to make a decision—be it a loan application or a diagnosis?

And, most critically, how then do we maintain human dignity in a world that is fixated on efficiency?

Elizabeth *"The future of work isn't a cage match between man and machine. It's a synergy."* But in order to survive it, we must move quickly.

Professionals are advised: "Embrace lifelong learning." Professionals are not asked to outsmart AI but to use it. They are urged to develop a "hybrid" skill set that combines technology know-how with deep knowledge of their domain. However, for governments and businesses, it has become crystal clear: invest in AI literacy, enforce transparency, and support the rights of the workforce. AI isn't displacing work. It's forcing us to rethink it. The leaders who make this ethical choice now, and the employees who accept this new partnership, will not only survive this transition but help define it.

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Corporate Insolvency Resolution Process (CIRP)

Arpita Aggarwal

The Insolvency and Bankruptcy Code (IBC) constitutes a significant legislative initiative implemented in India to systematically and effectively confront the persistent challenges associated with insolvency and bankruptcy. The IBC endeavors to streamline the insolvency resolution process, establish a prompt framework for addressing corporate insolvency cases, and enhance the value of distressed assets. The Dr. J.J. Irani Committee submitted recommendations for the Insolvency and Bankruptcy Code of 2016 (IBC, 2016) to the Government of India on May 31, 2005. Among the principal recommendations proposed by the committee were the implementation of time-bound proceedings, accessibility measures, moratoriums and suspensions of processes, the establishment of operational agencies, the appointment and delineation of responsibilities for administrators, the formation of a creditors' committee, and liquidators, alongside considerations of cross-border insolvency, among other factors.

These systems, although not necessarily addressing every situation, represent significant progress toward establishing a resolution community. The default resolution remains dependent financial distress upon the prevailing circumstances. In this regard, the Insolvency and Bankruptcy Code is timely, as it underscores a restructuring plan with a timeline that, if not attracted to, leads to liquidation. Consequently, the economy has undergone a profound transformation as a result of this Code. This paper aims to analyze the foundational framework of the IBC and its practical functions, as well as the enhancements of the Code necessary to realize its full potential. If the provisions outlined in this Code are diligently followed, it will provide a substantial drive to the Indian economy, particularly in terms of timely resolution and recovery certainty.

Thus, the Code has played a crucial role in the Indian industry since its introduction, exerting considerable influence on businesses, financial institutions, real estate, and aspiring entrepreneurs. In this article, we shall examine the necessity of the Code and its implications for the contemporary economy. The term "insolvency" denotes a condition in which a debtor is unable to fulfil a loan obligation. For a present corporate entity, indicators of such a situation would encompass a decline in revenue and failure to meet payment deadlines. The legal declaration of a company's insolvency is referred to as bankruptcy. This status has evolved from a mere financial predicament to a legal condition. The new Code outlines a chronological procedure for managing insolvency, wherein failure ultimately results in bankruptcy.

Objectives of the study in IBC, 2016

In 2016, the Insolvency and Bankruptcy Code (IBC) was enacted to facilitate prompt settlements, signifying a substantial departure from prior practices. Critical macroeconomic objectives were at risk, encompassing the resolution of the twin balance sheet crisis, the development of a resilient corporate bond market, the enhancement of the credit climate, and the augmentation of India's competitiveness as a business destination. Within the framework of the Insolvency and Bankruptcy Code of 2016, asset valuation emerges as one of the most pivotal components of the corporate insolvency resolution process. The newly implemented code was conceived to streamline this resolution process, which includes reducing asset loss during corporate distress, among other aims. The settlement mechanism functions as a collaborative endeavor among all creditors, rather than a court-driven effort to recover funds from a single creditor. The main goals of the IBC are to foster entrepreneurship, enhance the ease of doing business, and ensure the timely resolution of insolvency while maximizing asset value. It seeks to balance the interests of creditors and debtors and



promote a culture of financial discipline and responsible lending.

Key Features:

- **Unified Legislation:** The IBC merges and modifies the laws related to the insolvency resolution of corporations, partnerships, and individuals into one cohesive framework.
- **Timely Processes:** It introduces a time-sensitive approach for resolving insolvencies, enforcing strict deadlines at every phase of the resolution to guarantee swift and effective outcomes.
- **Role of Insolvency Professionals:** The code creates a structure for appointing insolvency professionals, who are vital in overseeing the operations of the insolvent entity throughout the resolution process.
- **Insolvency Resolution Procedure:** The IBC specifies the methods for starting insolvency resolution procedures, covering the acceptance of applications, establishment of a creditors' committee, submission of resolution proposals, and their approval by creditors.
- **Enhanced Business Environment:** It has improved the ease of conducting business in India.
- **Liquidation:** When resolution becomes impossible, the IBC allows for the commencement of liquidation processes to sell off the insolvent entity's assets and disburse the proceeds to creditors according to a defined priority order.
- **Overall Impact:** The IBC's implementation has markedly improved insolvency case resolutions in India, raising recovery rates for creditors and shortening the duration needed to address insolvency cases.

Antecedents

1. During its meeting on September 21, 2017, the Governing Board reviewed Board Note No.051/2017 titled 'Balancing the Interests of Stakeholders and Other Matters Related to CIRP' and approved various regulatory amendments. They recommended addressing other issues in

the Board Note at the next meeting, reflecting the discussions held.

2. The Insolvency and Bankruptcy Code, 2016 (Code) was enacted on May 28, 2016, with the related corporate insolvency provisions taking effect on December 1, 2016, following the Ministry of Corporate Affairs (MCA) and the Insolvency and Bankruptcy Board of India (IBBI) issuing rules and regulations. Currently, around 400 corporate debtors (Cds) are involved in the corporate insolvency resolution process (CIRP). The adjudicating authority and the Hon'ble Courts have addressed various matters and delivered rulings on numerous issues. Additionally, the media, press, and professional journals have presented diverse viewpoints. This note consolidates all suggestions for the Governing Board's review.

3. The timeline serves as the Unique Selling Proposition (USP) of the Code. Resolving insolvency promptly is crucial, as delays can diminish the firm's organizational capital. Consequently, the Code stipulates a maximum period of 180 days for the completion of the Corporate Insolvency Resolution Process (CIRP). However, Regulation 39(1) of the CIRP Regulations states, "A resolution applicant shall endeavor to submit a resolution plan prepared following the Code and these Regulations to the RP, thirty days before the expiry of the maximum period permitted under section 12 for the completion of the CIRP," meaning this must occur within 150 days of the CIRP's initiation. This implies that the resolution plan cannot be finalized until the 150-day mark is reached.

4. Invitation of Resolution Plan: Regulation 36(1) of the CIRP Regulations mandates that the Interim Resolution Professional (IRP) or Resolution Professional (RP) submit an electronic information memorandum to all Committee of Creditors (CoC) members and any interested resolution applicants. According to Section 25(2)(h) of the Code, the RP must encourage potential lenders, investors, and other parties to submit resolution plans. Often, a resolution plan may be ready for CoC consideration much earlier in the process. In several international jurisdictions, creditors initiate CIRP only after securing a resolution plan, referred to as a pre-pack, which allows for immediate or rapid closure within days of starting the process. The Code and accompanying regulations may facilitate the closure of CIRP without requiring an invitation for a resolution plan.

Reasoning Of The Problem

It is imperative to recognize that, should a corporate debtor (defined as an individual or entity that has borrowed funds from a creditor or financial institution) default on any obligations, the Corporate Insolvency Resolution Process (CIRP) may be initiated by applying to the designated Adjudicating Authority in the prescribed manner. It is also important to acknowledge that the CIRP can be commenced by a financial creditor, with no restrictions applicable in this regard. Accordingly, the initiation of the CIRP may be undertaken by any of the following parties:

1. A Financial Creditor (FC) according to Section 7.
2. An Operational Creditor (OC) under Section 9
3. A corporate applicant representing a corporate debtor as outlined in Section 10 of the Insolvency and Bankruptcy Code.

Before the enactment of the Insolvency and Bankruptcy Code (IBC) in India, the insolvency framework encountered significant challenges and limitations. These difficulties were exacerbated by a fragmented and outdated legal system, characterized by multiple laws governing insolvency and debt recovery processes. The absence of coherence and uniformity resulted in prolonged resolution times, legal ambiguities, and inefficiencies in the recovery of debts by creditors. A principal motivating factor behind the necessity for insolvency reform in India was the detrimental impact of the existing framework on economic growth and development. Ineffective debt resolution processes,

coupled with inadequate creditor protection, curtailed the flow of credit, hindered entrepreneurship, and obstructed the facilitation of business operations. This environment fostered a challenging investment landscape and imposed considerable obstacles to India's aspirations of becoming a global economic powerhouse. Furthermore, the lack of a modern insolvency structure diminished investor confidence and weakened India's attractiveness as an investment destination. Foreign investors expressed hesitation due to the nation's convoluted and cumbersome insolvency laws, which discouraged them from investing in Indian enterprises. Consequently, there was an urgent necessity for a transparent and efficient framework.

Initiation of CIRP by the Corporate Applicant

According to Section 10 of the Code, a corporate applicant may petition the National Company Law Tribunal (NCLT) to initiate a Corporate Insolvency Resolution Process (CIRP) against the corporate borrower. A 'corporate nominee,' as defined under Section 5(5) of the Act, may be described as: (a) a corporate account holder; (b) an associate or agent of the corporate creditor duly authorized to apply for the authoritative documentation of the corporate debtor; (c) an individual entrusted with the management of the corporate debtor's responsibilities and assets; or (d) an entity that possesses control and supervision over outstanding financial liabilities.

The Committee asserted that, ultimately, investors or partners should possess the capability to validate the initiation of the Corporate Insolvency Resolution Process (CIRP) by a corporate nominee, necessitating the inclusion of an agreement requiring their consent. Given that the initiation of a CIRP represents a pivotal decision for the corporate account holder and carries the potential to significantly impact its operations or possibly lead to its liquidation, a stipulation may be made for an extraordinary target or objective to be endorsed by no less than three-fourths of the total membership of the corporate borrower. In this regard, the Committee recommended the amendment of Section 10 of the Code to include the requirement of obtaining investor consent through extraordinary targets or approval from approximately three-quarters of the total number of partners.

Consequently, the Committee acknowledged the BLRC Report's assertion that the Code acknowledges that the submission of a debt application represents a final recourse following negotiations between the corporate applicant and its creditors.

Therefore, the Committee concurred that a corporate applicant's notification regarding the commencement of the CIRP, through an application under Section 10 of the Code, must be communicated to all stakeholders by publicly posting a notice on its official website or a site designated by the Insolvency and Bankruptcy Board of India (IBBI) for this purpose, or through other electronic means.

CIRP Procedure



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Ethical AI: Can We Teach Machines to Make Moral Choices?

◦ Aaqib Rashid Mir

In the age of rapid digital transformation, Artificial Intelligence (AI) is no longer a distant concept from science fiction—it is a living, evolving part of our everyday lives. From voice assistants and recommendation engines to self-driving cars and autonomous weapons, AI systems are making decisions that influence human behavior and outcomes at a vast scale. As their influence grows, so does the importance of ensuring that these systems behave ethically. The pressing question is no longer just what can AI do, but what should AI do? Can machines be taught to make moral choices? And if so, how? This article explores the multifaceted domain of ethical AI: its foundations, challenges, and possibilities. We delve into whether AI can learn to behave morally, what ethical frameworks might be applicable, and how society can shape the future of intelligent machines that align with human values.

The Concept of Ethical AI

Ethical AI refers to the development and deployment of artificial intelligence in ways that ensure fairness, accountability, transparency, and respect for human rights and societal values. It involves designing systems that do not just perform tasks efficiently but also align with ethical principles in their reasoning and outcomes. At the heart of ethical AI lies a philosophical debate: can a non-human entity, devoid of emotions, consciousness, and intent, genuinely understand or follow moral values? Or is ethical behavior simply a set of rules and constraints that can be programmed and optimized?

◦ Why Morality in AI Matters

Machines are increasingly involved in decision-making processes that have serious ethical implications. Consider the following scenarios:

- **Autonomous Vehicles:** Should a self-driving car prioritize the safety of its passengers or pedestrians in a crash scenario?
- **Healthcare AI:** Should an AI prioritize patients based on survival probability or equal access when resources are scarce?
- **Hiring Algorithms:** Can an AI be trusted to make unbiased hiring decisions without discriminating against race, gender, or age?
- **Predictive Policing:** Should AI be used in law enforcement if it risks reinforcing historical biases and systemic discrimination?

In each of these scenarios, AI must weigh competing values. The choices it makes can have life-altering consequences, hence the necessity for embedding ethical reasoning into its core.

◦ Programming Morality: Is It Possible?

Morality in humans is shaped by culture, experience, emotions, and societal norms - factors that machines inherently lack. However, AI can be trained to follow ethical rules and make value-based decisions using structured models.

Some prominent approaches are:

- **Rule-Based Ethics:** Inspired by deontological ethics, rule-based systems follow explicitly programmed moral rules. For instance, “do not harm humans” or “always preserve life.” This approach is rigid



- and predictable but lacks flexibility for complex situations with moral ambiguity.

- **Utilitarian Ethics:** Based on the philosophy of utilitarianism; AI systems are trained to select actions that produce the greatest good for the greatest number. For example, a self-driving car might be programmed to save five lives at the cost of one in a crash scenario. However, quantifying "good" or "harm" numerically is inherently challenging.

- **Virtue Ethics:** This model focuses on developing systems that imitate virtuous behaviors like honesty, empathy, and fairness - although abstract concepts like empathy are difficult for machines to internalize. It's more suitable for general-purpose AI with evolving behaviors, like humanoid robots or AI companions.

- **Machine Learning Ethics:** Some researchers are exploring reinforcement learning, where AI learns ethical behavior by receiving rewards or penalties in a simulated environment. Others use Inverse Reinforcement Learning (IRL), where AI observes

Real-World Ethical Dilemmas in AI

Some practical examples where AI ethics come into play are:

- **The Trolley Problem and Autonomous Cars:** The “Trolley Problem” is a famous moral thought experiment where a person must decide whether to divert a runaway trolley to a track with one person to save five. This problem has become central in the ethics of autonomous vehicles. Should a car sacrifice its passenger to save a group of pedestrians? No single answer satisfies all cultures. In Western societies, utilitarian decisions may be preferred, while in Eastern cultures, protecting passengers is more acceptable. Should AI behavior then be customized to local values?

WHY AI ETHICS CONCERNS MATTER?



- **AI in Hiring and HR:** AI tools are used in scanning résumés and conducting interviews. However, if the training data includes historical bias - say, favoring male candidates - AI may replicate and even amplify such discrimination. This has already occurred, as seen in Amazon's experimental hiring algorithm, which had to be scrapped due to gender bias.
- **AI in Criminal Justice:** Predictive policing algorithms claim to forecast where crimes are likely to occur or who may re-offend. Yet, these systems often draw from historical arrest data, which can reflect racial bias. Without careful auditing, such AI can lead to wrongful surveillance and profiling.



Challenges in Building Ethical AI

Despite growing awareness, building machines that make ethical choices is fraught with challenges:

- **Ambiguity of Morality:** There is no universal moral code. Morality varies across cultures, religions, and individuals. What one group considers ethical may be deemed unjust by another. Programming a universally acceptable ethical model is therefore almost impossible.
- **Data Bias and Representation:** AI learns from data, and if that data contains bias - whether gender, racial, geographic, or economic - it will internalize and reflect it. Ensuring diverse and fair training data is a major hurdle.
- **Black Box Decision-Making:** Many AI models, especially deep neural networks, are not easily interpretable. This lack of explainability means it's hard to audit how or why a particular decision was made, complicating accountability.
- **Who Decides What's Ethical?** Should it be developers, ethicists, companies, or governments who decide the moral framework an AI should follow? The lack of consensus opens doors for manipulation or unethical profit-driven deployment.

Efforts Toward Ethical AI:

Several global initiatives are underway to regulate AI ethics:

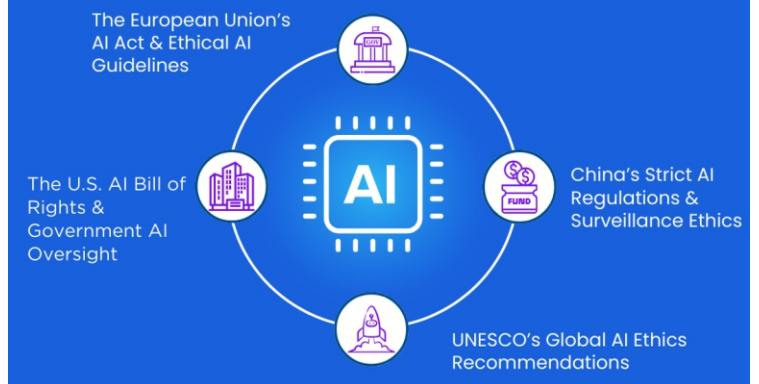
- The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems has published detailed guidelines for ethical AI design.
- The European Union's AI Act emphasizes human oversight, transparency, and safety.
- Companies like Google, Microsoft, and OpenAI have internal AI ethics teams that audit products and research for fairness and bias.
- UNESCO and the OECD are working on global frameworks for AI governance.

However, many critics argue that ethics boards within corporations may face conflicts of interest, especially when profits are at stake.

Can AI Ever Truly Be Moral?

This raises a deeper philosophical question: Can machines be moral agents? Morality requires not just action but intention and understanding of consequences. AI systems, no matter how sophisticated, do not possess consciousness or subjective experience. They cannot "care" in the human sense. At best, AI can simulate moral

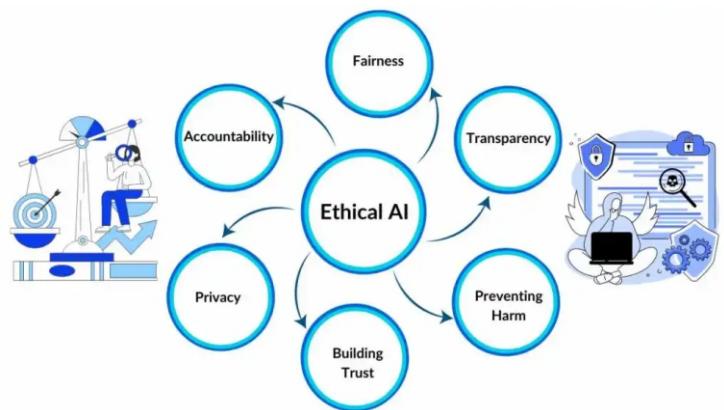
Global AI Ethics Regulations & Policies



behavior. It can optimize for ethical outcomes, follow coded rules, and avoid harm. But it cannot feel guilt, compassion, or responsibility. Therefore, AI may be tools for moral action, not moral agents themselves. The ultimate ethical responsibility lies with the humans who design, train, and deploy them.

Recommendations for Building Ethical AI

- **Involve Interdisciplinary Teams:** AI should be developed not just by engineers but also by ethicists, psychologists, sociologists, and legal experts.
- **Ensure Transparency:** Models must be explainable, auditable, and accountable.
- **Bias Auditing:** Regular testing for bias in data and predictions should be mandatory.
- **Ethical Frameworks:** Adopt and adapt ethical frameworks to guide development.
- **Cultural Sensitivity:** AI systems should respect cultural diversity in moral values.
- **Human Oversight:** Critical decisions, especially in health, law, and finance, must have a human in the loop.



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Generative AI: How to Make Images and Videos

• Md. Modassir Akhtar

Over the last few years, Artificial Intelligence (AI) has grown much more than mere automation or data analysis. One of its most interesting streams is Generative AI, which equips machines to create and not merely compute. Generative AI allows systems to generate original text, music, images, videos, and even voices like humans. This new era of creativity has revolutionized sectors such as media, design, entertainment, marketing, and education.

Generative AI has gained popularity due to the fact that anybody even without artistic or technical capability can now produce quality visual content. Anything from creating realistic portraits to producing short films, AI has now unlocked the potential for a new wave of innovation and creativity.

Understanding Generative AI

Generative AI is a sub-area of artificial intelligence that deals with creating new data or content based on what the examples it was trained with look like. Conventional AI models learn and label existing data, whereas generative models learn patterns and structures to generate new and original outputs.

Such systems are based on sophisticated methods like deep learning, neural networks, and transformers. They are trained on enormous datasets comprising text, images, videos, and audio.

With time, the model learns to replicate human creativity and generate new content that appears or sounds original.

Some popular generative AI models are:

- **GPT (Generative Pre-trained Transformer)** for text and conversation.
- **DALL-E and Midjourney** for image creation.
- **Runway ML and Pika Labs** for making videos.
- **Synthesia** for producing talking avatars and AI presenters.

How Generative AI Makes Images

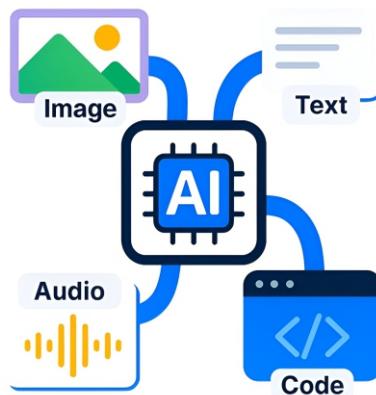
AI-generated images are created by strong models like GANs (Generative Adversarial Networks) or Diffusion Models. They learn textures, colors, lighting, and compositions from millions of real images when trained. When a user enters a text description (referred to as a prompt), the AI converts the text into visual features and creates a completely new image. Step-by-Step: Developing an Image with Generative AI.

1. Choose a Platform:

Begin by selecting a trusted AI image generation platform. Some of the more popular choices are:

- **DALL-E 3** (from Open AI) – can be integrated with ChatGPT and delivers natural, high-resolution images.
- **Midjourney** - artist-friendly and cinematic-style images.
- **Stable Diffusion** - open-source model with customization and

GENERATIVE AI



flexibility options.

- Adobe Firefly and Canva Magic Media - accessible to designers.

2. Compose a Detailed Prompt: The image you get relies a lot on how you write about it. A prompt is a series of words telling the AI what to generate.

Example: "Peaceful mountain view at sunrise, with fog over a peaceful lake and pine trees in the mirror of the water."

You may also define the style: realistic, watercolor, digital art, anime, 3D rendering, etc.

3. Adjust Settings: Most platforms allow you to select:

- Image resolution or aspect ratio.
- Art style or color tone.
- Level of detail and realism.

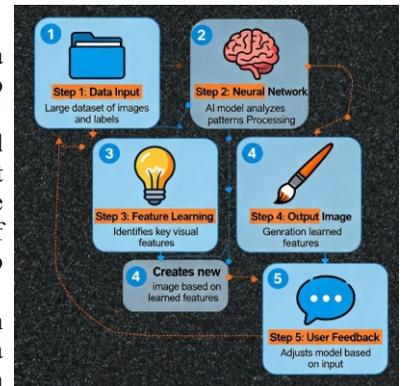
4. Generate and Refine:

- After the image is generated, you can:
- Download the result.
- Regenerate for alternative variations.
- Utilize AI tools to refine sharpness, alter backgrounds, or eliminate unwanted objects.

5. Save and Use the Image: The end result can be utilized for presentations, posters, digital art projects, or even printed documents.

Example Use Cases

- Graphic designers utilize it for concept art.
- Students utilize it to illustrate reports or creative tasks.
- Companies use AI images for marketing, branding, and advertising.

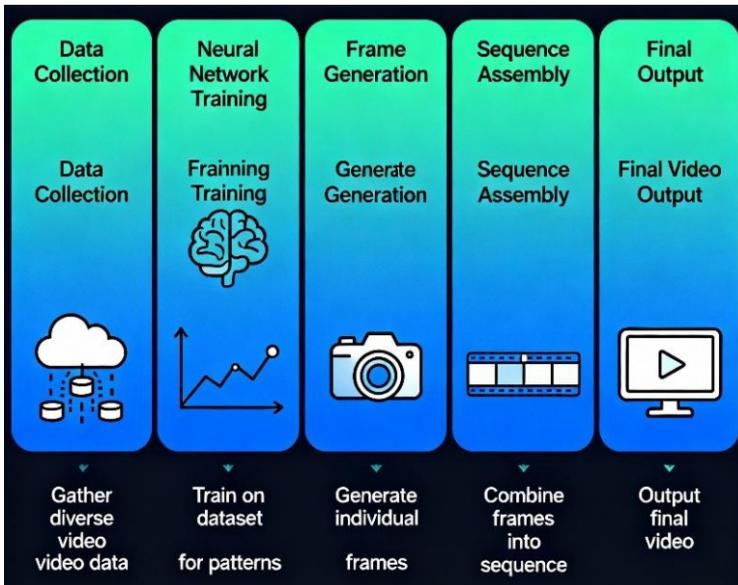


How Generative AI Creates Videos

Creating videos with AI has become just as easy as generating images. Instead of needing a film crew or camera, AI video tools can transform simple text into professional-looking videos complete with voice, movement, and background music. Step-by-Step: Creating a Video with Generative AI.

1. Choose a Video Generation Platform. Some widely used AI video creators are:

- **Runway ML** for producing cinematic text-to-video clips.
- **Pika Labs** transforms text into brief video scenes.
- **Synthesia** for producing talking-avatar videos.
- **HeyGen** produces lifelike presenters speaking your script.



- Cost Savings:** Designing or video-making traditionally might be costly; with AI, it becomes inexpensive.
- Ease of Use:** Beginners can produce professional visual materials without needing technical skills.
- Inspiration Enhanced:** AI makes it possible to visualize intricate concepts, try out new visual styles, and break creative blocks.
- Personalization:** Users are able to create personalized outputs specific to requirements, rather than generic stock.
- Innovation:** Artists, students, and companies are able to look at innovative ideas which would be hard to generate by hand.

Challenges and Ethical Considerations

Although there are endless possibilities, generative AI also opens up some responsibilities and issues:

- **Authenticity:** AI-produced visuals can be very realistic, and therefore potentially subject to misuse in disseminating false information or “deepfakes.”
- **Copyright Problems:** Certain AI models are trained on current artwork, creating issues concerning intellectual property rights.
- **Bias:** When training data is biased, AI outputs could inadvertently propagate stereotypes or cultural inaccuracies.
- **Over-Reliance on AI:** Too much might diminish human originality and creativity.

Responsible Usage Guidelines

1. Always indicate when material is AI-generated.
2. Don't use AI video or art to deceive or impersonate individuals.
3. Honour the rights of artists and creators.
4. Leverage AI tools as creative assistants - not substitutes.

The Future of Generative AI



The future of generative AI is very bright. Breakthroughs are pointing toward real-time video making, interactive 3D worlds, and even AI-generated film making. We might soon see AI systems that can make complete movies, create products, or generate tailored virtual worlds. In school, pupils will be capable of creating visual simulations for studying difficult topics. In medicine, AI could develop precise visual models for medical education for physicians. In entertainment, AI writers and directors may work with human writers and directors to create hybrid creative works.

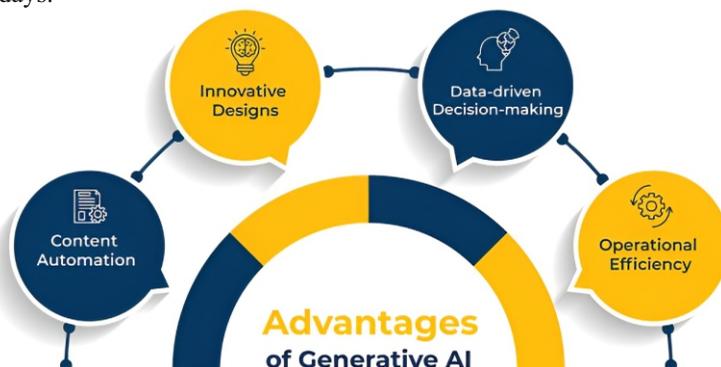
(Writer is Pursuing B.Tech. CSE Mewar University, Rajasthan)

- Kaiber AI – transforms images into active video animations.
- 2. Write a Script or Prompt:** The script is the basis of your video.
For instance: "Produce a 45-second tutorial video on how solar panels operate, with animations of sunlight and electricity flow."
 - 3. Choose a Video Style:** You can select:
 - Realistic or animated images.
 - 2D or 3D graphics.
 - Specific camera views or motion effects.
 - 4. Include Voice, Music, and Captions:** Most platforms have text-to-speech voices available in multiple languages and accents. You can also:
 - Upload your own recorded voice.
 - Include background music and subtitles for increased interaction.
 - 5. Generate and Edit:** After generating, you can review your video and make changes such as trimming clips, inserting transitions, or switching scenes.
 - 6. Export and Share:** After exporting, share your video in high definition (720p, 1080p, or 4K). You can publish directly to YouTube, social media, or utilize it for business and instructional projects. Uses of AI Video Generation
 - **Education:** Educators can create video lectures with ease.
 - **Marketing:** Companies can create product commercials in no time.
 - **Entertainment:** Artists can create music videos or animation shots.
 - **Corporate Training:** AI avatars can present training information professionally.

Advantage of Using Generative AI for Images and Videos

Generative AI offers many benefits that are revolutionizing the way we design and share visual materials:

- 1. Time Saving:** Creators can create excellent visuals in minutes, not days.



Hydrotherapy: The Science of Healing Through Water

● Aaqib Rashid Mir

When science meets water, healing flows naturally

Water serves as the earliest recorded healing method because it represents the fundamental element of existence. The medical practice of hydrotherapy uses water at various temperatures and forms to treat diseases and preserve health according to its Greek roots "hydro" and "therapeia." Modern physiotherapy depends on hydrotherapy to enhance patient function and reduce pain while promoting overall wellness during recovery from neurological and musculoskeletal disorders. The practice of hydrotherapy evolved through time while preserving its natural healing properties which started with Roman thermal baths and developed into modern therapeutic pools. The scientific basis of hydrotherapy exists through its fundamental principles which stem from water properties that create a protected environment for exercise and recovery.

Understanding Generative AI

The fundamental elements of hydrotherapy success stem from water properties which create a protected environment for exercise and recovery.

The body experiences weight support through water which reduces joint pressure and gravitational impact. The buoyancy of water enables people with arthritis and paralysis and post-operative stiffness to move more comfortably and flexibly. Water provides an ideal environment for initial therapy because it enables patients to perform movements which become challenging when performed on dry land.

The fundamental elements of hydrotherapy success stem from water properties which create a protected environment for exercise and recovery.

The natural resistance of water allows it to oppose any attempt to move through it. The resistance of water changes when the speed or path of movement is adjusted which makes hydrotherapy suitable for both light mobility exercises and strength training.

The application of cold water reduces inflammation and muscle spasms but warm water increases tissue flexibility while relaxing muscles and promoting blood circulation. The precise temperature management during each session creates therapeutic benefits for patients.

The fundamental principles of hydrotherapy create a treatment method which provides beneficial effects while remaining gentle enough for various medical conditions.

How Generative AI Makes Images

The treatment of hydrotherapy creates both local and systemic benefits because it affects multiple body systems simultaneously. The Musculoskeletal System benefits from warm water treatments because it enhances connective tissue flexibility while relaxing tense muscles and reducing spasms. The resistance in water allows muscle growth without causing excessive joint strain.

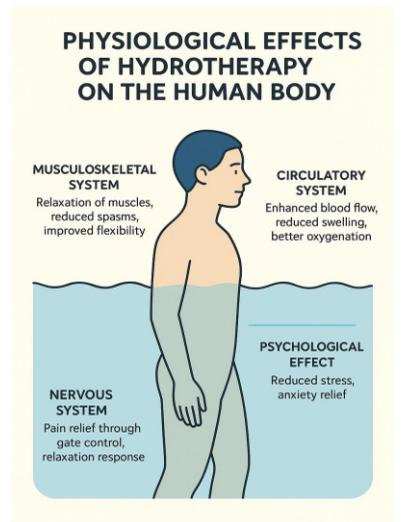


The body experiences enhanced cardiac output and venous return when submerged in water which results in decreased edema and better tissue oxygenation. The pressure of water on the chest leads to increased respiratory effort which strengthens breathing muscles over time.

The nervous system benefits from hydrotherapy through its dual action of blocking pain signals and creating relaxation responses. The combination of water's calming effects and weightless sensation through hydrotherapy creates a dual therapeutic impact that benefits both physical recovery and mental wellness by reducing stress and anxiety and sadness.

Hydrotherapy serves multiple therapeutic purposes in medical practice. Physiotherapists employ hydrotherapy to treat various acute and chronic medical conditions which include:

- The treatment enables patients to perform gentle joint movements because it decreases pain and swelling and reduces stiffness.
- The Circulatory System receives enhanced cardiac output and venous return from immersion which reduces edema while improving tissue oxygenation.
- The pressure of water against the chest leads to increased respiratory effort which strengthens breathing muscles throughout time.
- The gate control system reduces pain perception while hydrotherapy delivers relaxing sensory inputs to the nervous system.
- The combination of water's calming effects and weightless sensation through hydrotherapy creates a dual benefit for mental health recovery while treating physical injuries by reducing stress and anxiety and sadness.
- Hydrotherapy serves multiple therapeutic purposes in medical practice.
- Physiotherapists employ hydrotherapy to treat various acute and chronic medical conditions including arthritis and joint disorders.
- The treatment enables patients to perform gentle joint movements because it reduces pain and swelling and stiffness.
- The program enables people with multiple sclerosis and cerebral



palsy and stroke patients to improve their posture and balance and muscle tone through its low-gravity environment.

- The treatment accelerates the recovery process for patients who experience muscular strains and fractures and ligament tears.
- The program enables patients to perform controlled exercises which supports their recovery from spinal procedures and knee replacements and fractures.
- Water-based aerobic exercises help patients with obesity and cardiopulmonary conditions to improve their cardiovascular performance and boost their endurance and stamina.
- The adaptable nature of hydrotherapy makes it suitable for patients ranging from toddlers to elderly adults.

Modern hydrotherapy practices incorporate technological advancements into their traditional methods.

The current hydrotherapy approaches include three main methods:

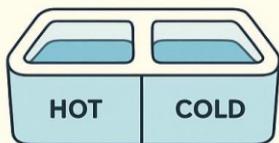
- The treatment of local limb areas with whirlpool baths helps patients achieve reduced stiffness and pain relief.
- The treatment involves alternating between hot and cold water baths to enhance blood circulation while reducing inflammation.
- The underwater treadmill system allows patients to perform water-based jogging and walking exercises which support their early gait development and training needs.

MODERN HYDROTHERAPY TECHNIQUES AND EQUIPMENT

Modern hydrotherapy practices incorporate technological advancements to maximize therapeutic outcomes



WHIRLPOOL BATH



CONTRAST BATH



UNDERWATER TREADMILL



HYDRO MASSAGE SYSTEM



AQUATIC THERAPY POOL

- The application of water jets through Hydro Massage Systems delivers targeted pressure to specific body areas which helps patients relax their muscles.
- The pools in Aquatic Therapy Pools offer depth control and

temperature adjustment features which create safe workout areas for individual users.

- The field of hydrotherapy has transformed from a passive relaxation technique into an active rehabilitation science through modern technological developments.

PRECAUTIONS AND CONTRAINDICATIONS IN HYDROTHERAPY

Do Not Use Hydrotherapy If:	Safety Guidelines
 Open wounds or skin infections	 Check water temperature
 Uncontrolled heart conditions or diabetes	 Supervision by physiotherapist
 Epilepsy or incontinence	 Maintain pool hygiene
 High fever or severe respiratory issues	

Advantage of Using Generative AI for Images and Videos

Hydrotherapy requires careful supervision and evaluation for its administration because it provides various benefits to patients. Patients with these medical conditions need to consult a doctor before starting therapy or stay out of the water completely:

- Infections or open wounds on the skin
- Uncontrolled heart conditions or diabetes
- Incontinence
- High temperature or serious respiratory issues;
- Epilepsy

Physiotherapists need to monitor patient safety while maintaining pool cleanliness and ensuring proper water temperatures for therapeutic use.

The Future Development of Hydrotherapy in Physiotherapy Practice

The integration of hydrotherapy with modern rehabilitation technologies continues to advance at a steady pace. Advanced rehabilitation centers study real-time motion analysis through underwater cameras and virtual reality-based aquatic therapy systems for their facilities.

The upcoming hydrotherapy system will use advanced technology to create personalized treatments which operate through data analysis and interactive elements.

The growing interest in eco-therapies which use natural elements such as water and light and air makes hydrotherapy an environmentally friendly healthcare practice.

This approach is believed to facilitate holistic recovery, leading toward identification with nature as well as physical treatment.

(Writer is Pursuing B.Pharm Mewar University, Rajasthan)

Influencer Marketing: Future of Word-of-Mouth in Digital Era

● Rakesh Kumar

Word-of-mouth marketing is a powerful way to build trust and grow your business without a massive advertising budget. It thrives on authenticity and customer satisfaction. Here are the key benefits:

- **People Trust Recommendations:** Most of us turn to friends, family, or even online reviews when making a decision. That's because we trust real experiences more than traditional ads. When someone shares a positive story about your business, it builds credibility and trust in a way that advertising often can't.
- **It Doesn't Cost Much:** Unlike paid ads, word of mouth doesn't require a big budget. When customers are happy, they naturally tell others. That kind of genuine, unpaid promotion can go a long way without adding to your marketing spend. This shows how marketing is a powerful tool even without a large investment.
- **It Brings in Ready-to-Buy Customers:** Think about it, if someone recommends a service to you, you're more likely to check it out. These referrals usually come from people who understand your needs, which makes you more likely to take action. It's one reason why word-of-mouth leads often convert better than others.
- **It Builds Loyalty:** When customers feel valued and have great experiences, they often come back - and they don't come alone. They bring friends, family, and even online followers. That loyalty can turn into a network of people who keep spreading the good word about your brand.
- **Social Media Spreads the Word Fast:** These days, a great customer experience can be shared with hundreds of people in seconds. A post, tweet, or review can quickly reach far beyond the original person, giving your business more exposure without any extra effort.
- **It Boosts Your Online Visibility:** Every time someone leaves a review, shares a post, or talks about your brand online, it helps more people find you. Search engines pick up on these signals, which support your SEO and content marketing efforts over time. It's one reason why marketing is important in shaping how you're discovered online.
- **(Glossier) Customer Advocacy:** Glossier built its brand largely through customer reviews and social media mentions. They actively repost customer content and encourage sharing, turning users into brand ambassadors and driving massive growth without large ad spend.
- **(Starbucks) Personalized Cups and Social Sharing:** By writing customer names on cups and creating an Instagrammable experience, Starbucks encouraged customers to post photos of their drinks. This user-generated content helped spread brand awareness through personal networks. Personalized Starbucks experience shared through digital word of mouth marketing via social media.
- **(Trader Joe's) In - Store Experience:** Trader Joe's is known for its quirky culture and friendly staff. Shoppers often share their positive in-store experiences and product finds online, helping the brand grow largely through word-of-mouth and community buzz. Trader Joe's in-store experience shared through digital word of mouth marketing on social platforms.

Who Needs Word of Mouth Referrals?

All businesses can benefit from word-of-mouth referrals. For those industries where trust is a critical component of customer relationship, it must be a big part of their marketing strategy. Businesses that provide technical, legal, financial, and medical services need a strong word-of-mouth strategy to reach prospects and potential future customers. Feature customer content in your feed, newsletters, or website.

○ Build a Community Around Your Brand

- Foster a space where customers feel they belong and want to contribute.
- Create forums, Facebook Groups, or membership clubs
- Offer sneak peeks, insider info, or early access to products

○ Be Consistently Share-Worthy

- Make everything from your packaging to your messaging memorable.
- Use creative branding and storytelling
- Add visual and emotional elements that make people want to share their experience

○ Monitor and Respond

- Use social listening tools to track brand mentions and respond in real time.
- Thank positive mentions
- Address negative feedback to show responsiveness and care

○ How to Measure Word of Mouth Marketing (NPS: Net Promoter Score)

1. **What it is:** A simple survey that asks customers how likely they are to recommend your business to others on a scale of 0–10.
2. **Why it matters:** It's a direct indicator of customer satisfaction and referral potential.

NPS diagram illustrating Detractors, Passives, and Promoters in digital word of mouth marketing strategies.

○ Online Reviews and Ratings

- **What to track:**
 1. Volume of new reviews on platforms like Google, Yelp, or Trustpilot
 2. Average star rating over time
 3. Sentiment analysis (positive vs. negative feedback)

Tools: Google My Business, ReviewTrackers, Yext, Birdeye

○ Bird Eyes

- Performance of Referral Programs
- Generating positive chatter across social media and online communities, allowing them to accelerate marketing campaigns for those products before they go viral.
- Request your preliminary AI assessment to see how AI can help you stay ahead of trends and optimize your word-of-mouth marketing efforts.

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The Art of Electronics: Where Circuits Meet Creativity

● Md. Shahil Quraishi

We often divide the world into separate categories: artists who work with emotion and beauty on one side, and engineers who work with logic and facts on the other. But this division is becoming increasingly blurred. Today, the soldering iron has become as important as the paintbrush, and the circuit board serves as a new kind of canvas. Welcome to the world where electronics meets creativity, a space where current and imagination flow together.

More Than Just Machines

When people think of electronics, they typically imagine the internal components of computers or tangled wires behind entertainment systems. These are often viewed as purely functional objects, seemingly opposite to what we consider art.

However, a closer look reveals something different. Consider the engineer designing a smartphone. They aren't just solving technical problems - they're making artistic decisions about form, texture, and how the device feels in your hand. Similarly, a programmer creating a responsive website crafts an experience, guiding users through a digital journey. This is where practical function and aesthetic beauty begin to merge.

The New Instruments

Perhaps the clearest example of this fusion appears in modern music. While traditional instruments like guitars and pianos remain important, electronic synthesizers have carved out their own essential space.

Unlike traditional instruments that reproduce existing sounds, synthesizers generate entirely new ones. By manipulating electrical signals, adjusting voltages, filtering frequencies, and shaping waveforms - musicians create sounds that can be otherworldly, futuristic, or deeply emotional. Artists across musical genres have become sonic architects, building complex soundscapes one circuit at a time. In their hands, technical components transform into vehicles of musical expression.

When Art Comes Alive

Visual arts have similarly embraced electronic integration. Modern galleries increasingly feature interactive installations that use sensors, micro controllers, and LED arrays to respond to viewers' movements. A simple gesture can alter colour on a wall, while spoken words might trigger digital flowers to bloom.

This represents a fundamental shift in artistic experience. The artwork no longer remains a static object to be observed from a distance, it becomes a dynamic participant in a conversation with the viewer. The artists behind these works combine skills from multiple domains, acting as part sculptor, part programmer, and part choreographer to create experiences unique to each participant.

Creative Rebellion Through Technology

Not all electronic art follows corporate or mainstream paths. Circuit bending represents a rebellious, experimental approach to electronic creativity. This practice involves intentionally modifying low-voltage electronic devices - often old toys, keyboards, or gaming consoles - to create unexpected sounds and visual effects.

Practitioners open these devices, experiment with connections, and

embrace the chaotic, unpredictable results. They find beauty in digital glitches and electronic errors, creating a form of technological folk art that challenges conventional ideas about how electronics should be used. This democratic approach makes creative electronics accessible to anyone willing to explore.

Why This Fusion Matters

The convergence of artistic vision and electronic technology represents more than just an interesting development - it points toward important future directions.

True innovation often happens where different fields connect. The next generation of medical devices, for example, may emerge from collaborations that include not just doctors and engineers, but artists who understand human interaction and comfort

Furthermore, when technology incorporates artistic sensibility, it becomes more intuitive, beautiful, and meaningful in our daily lives. The growing accessibility of platforms like Arduino and Raspberry Pi has democratized electronic creation, putting powerful tools into the hands of people across all disciplines.

The next time you notice a thoughtfully designed device, an interactive installation, or an innovative musical sound, look beyond the surface. Recognize the creative vision operating through the medium of electronics. We are witnessing an exciting expansion of human expression, where creativity speaks not only through traditional materials but through the dynamic language of modern technology.



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Effect of Social Media on Digital Marketing

● Sneha Roy

Social media is no longer just a means of communication; it's the backbone of marketing and business growth in the modern-day digital world. The way brands reach, engage, and convert customers has changed completely with the rise of Instagram, Facebook, YouTube, and X. Digital marketing and social media are now extensively intertwined, opening endless opportunities for companies and consumers alike. Let's understand the major effects of social media on digital marketing in detail.

1. The Rise of Influencer Marketing

One of the biggest revolutions brought by social media is influencer marketing. Earlier, celebrities were the only ones promoting brands, but today, anyone with a strong social media presence and loyal followers can become an influencer. These influencers create honest reviews, tutorials, and lifestyle posts that inspire people to try new products.

It works because influencer marketing feels real and relatable. When a person they trust advocates for certain things, followers are more apt to believe them versus an ad. For example, with a fashion influencer, when she wears one brand of clothing over another and posts on Instagram about that brand, it directly influences her followers' buying decisions.

Now, brands work with micro-influencers—those with fewer followers but with an engaged audience—because they can effectively reach certain target groups. This opens new ways companies can build brand awareness and trust through a natural approach: people-based.

The Role of Short Videos in Marketing

Short videos are the heart of every digital marketing strategy. Instagram Reels, YouTube Shorts, Snapchat, and TikTok have turned video content into the most powerful medium for seeking attention.

Today's audience prefers short, creative, and entertaining videos over long ads. Brands use these platforms to share product launches, behind-the-scenes clips, tutorials, and emotional stories in a few seconds - making marketing more engaging than ever.

Not only are short videos attention-grabbers, but highly shareable too. Once the users like a video, they share it with friends, thereby giving that brand an organic reach and helping them go viral. For example, a 10-second makeup tutorial or a funny product reel gets millions of views overnight.



Businesses have now come to realize that storytelling through the use of short videos builds an emotional connection with customers. It's no longer about selling a product; it's about creating an experience and a connection.

Consumer Trust: Online versus Offline

The biggest challenge and change in digital marketing is consumer trust. People trusted offline stores because they could physically see and test products. But today, digital platforms have created a new kind of trust built on reviews, ratings, testimonials, & influencer recommendations.

Today, customers check reviews online before buying anything, be it a mobile phone, a skin care product, or a restaurant service. Positive reviews on Google, YouTube, or Instagram, for example, are important for a brand's reputation.

However, it's fragile trust. A single negativity or faked review can result in the immediate collapse of trust in a brand. That's why companies focus on transparency today, fast customer support, and communication with a human face. Public reactions to customers and online resolution of their issues work for the credibility and relationship building of brands.

Offline trust depended on personal experience, while online trust depends on digital reputation. The smarter a brand handles its digital presence, the more loyal customers it attracts.



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Cyber Crime: A Modern Threat to Society

○ Aman

In today's digital world, almost everything we do depends on the internet, whether it's talking to friends, studying, shopping, banking, or watching our favourite shows. The internet has made our lives easier and more connected. But like every coin has two sides, technology has a darker side too. This dark side is called cyber crime.

Cyber crime has become one of the biggest issues of our generation. It affects individuals, businesses, and even governments. Every day, thousands of people around the world lose their data, money, or privacy because of it. The rise of smartphones, social media, and online payments has made life convenient but also more vulnerable. Understanding what cyber crime is and how to stay safe from it has become essential.

What is Cyber Crime?

Cyber crime refers to any illegal activity that involves a computer, the internet, or a digital device. In simple terms, when someone uses technology to commit a crime or harm others, it's cyber crime. This could mean hacking into someone's account, stealing their personal data, spreading fake news, or cheating people online.

The Information Technology

(IT) Act, 2000 in India defines cyber crime as an offense that involves a computer system or network. It covers crimes like hacking, data theft, identity fraud, and many other illegal activities online.

Types of Cyber Crimes

There are many kinds of cyber crimes, with new ones emerging as technology changes. Here are some major types:

- **Hacking:** Breaking into someone else's computer or website without permission to steal or destroy data.
- **Phishing:** Sending fake emails or messages that appear official to trick people into sharing personal or financial details.
- **Identity Theft:** Stealing someone's personal information, like Aadhaar number, PAN, or bank details, to misuse it for financial gain.
- **Cyber Bullying:** Using the internet or social media to insult, threaten, or emotionally harm someone. This is common among teenagers and can cause deep emotional damage.
- **Online Scams and Frauds:** Fake websites, online shopping frauds, or investment scams that cheat people out of their money.
- **Cyber Terrorism:** Using the internet to attack government systems, spread fear, or steal national security data.
- **Spreading Viruses or Malware:** Creating harmful software that damages computers or steals information.
- **Cyber Stalking:** Repeatedly following or monitoring someone online to threaten or scare them.

Causes of Cyber Crime

There are various reasons behind the rise in cyber crime. The most common include:

- **Overuse of Technology:** With so many people online all the time, criminals have more chances to attack.
- **Lack of Awareness:** Most users don't know how to protect

themselves online, making them easy targets.

- **Weak Cyber Laws:** While laws exist, enforcement is often slow and limited.
- **Financial Greed:** Many hackers commit crimes simply for quick money.
- **Revenge or Personal Motive:** Some people misuse technology to take revenge or harm someone emotionally or socially.
- **Political or Terrorist Goals:** Some attacks aim to damage a country's image or stability.

Effects of Cyber Crime

Cyber crimes can cause serious damage in several ways:

- **Financial Loss:** People lose money to scams or hackers who steal banking information.
- **Loss of Privacy:** Private photos, videos, and personal data can be misused.
- **Mental Stress:** Victims often experience anxiety, embarrassment, and fear after such incidents.
- **Damage to Reputation:** Companies lose trust when they get hacked.
- **Threat to National Security:** Cyber terrorism can disrupt essential services or defense networks.

Cyber Laws in India

To address the growing threat of online crimes, India introduced the Information Technology (IT) Act, 2000. It gives legal recognition to digital transactions and outlines punishments for cyber offenses. Some important features include:

- Punishment for hacking and data theft
- Protection of personal data and online privacy
- Recognition of electronic contracts and digital signatures
- Creation of cyber crime investigation cells

Additionally, the Indian government has launched a website, www.cybercrime.gov.in, where people can easily report any online fraud or harassment.

Prevention and Safety Measures

While laws can punish criminals, the best way to fight cyber crime is through awareness and prevention. Here are some simple tips everyone should follow:

- Use strong and unique passwords for all accounts.
- Avoid clicking on unknown links or attachments from strangers.
- Use antivirus software and keep it updated.
- Check for "https:///" before entering personal details on any website.
- Don't overshare personal information on social media.
- Report suspicious activities immediately to cyber police.
- Regularly update your devices and applications to fix security issues.

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Complete Blood Count (CBC) Analysis Techniques

○ Aman

The Complete Blood Count (CBC) is one of the most commonly performed hematological tests in clinical laboratories. It provides a broad overview of a person's general health and helps in detecting a wide range of disorders, including anemia, infections, and blood cancers. CBC includes the analysis of red blood cells (RBCs), white blood cells (WBCs), hemoglobin concentration, hematocrit, and platelets. In modern medicine, CBC has become a routine part of diagnostic investigations because of its ability to provide quick, reliable, and comprehensive information about blood components.

Principle of CBC

The principle of CBC lies in the counting and analysis of blood cells to determine their number, size, shape, and structure. Blood consists mainly of plasma and formed elements, which include RBCs, WBCs, and platelets. Each of these components plays a specific role in maintaining normal physiological function. CBC analysis can be performed using two main techniques:

1. Manual Method

2. Automated Method

Techniques Used in CBC Analysis

1. Manual Method: The manual method is one of the oldest techniques used in hematology. It involves the use of a hemocytometer and microscope to count cells manually.

○ **Procedure:** A known volume of blood is diluted with specific diluting fluids. The diluted sample is placed on a counting chamber, and cells are counted under the microscope.

○ **Advantages:**

- Cost-effective
- Useful in resource-limited settings

○ **Disadvantages:**

- Time-consuming
- Human error is common
- Less accurate for large sample volumes

Despite these drawbacks, the manual method is still used as a reference or verification method when automated results are doubtful.

2. Automated Cell Counters: Modern laboratories use automated hematology analyzers, which provide accurate and efficient results with minimal human intervention. These instruments use two main principles:

○ **Electrical Impedance Method:** This measures changes in electrical resistance when cells pass through a small aperture. Each pulse corresponds to a single cell.

○ **Optical/Flow Cytometry Method:** Here, a laser beam passes through a stream of blood cells. The scattered light helps determine cell size and internal complexity.

1.3. Staining and Microscopic Examination: A peripheral blood smear is often prepared and stained with Leishman or Wright's stain. This allows visual examination of cell morphology, which is helpful in

diagnosing specific diseases like leukemia or malaria.

Clinical Significance of CBC

CBC is a key tool in diagnosing and monitoring various diseases:

- **Anemia:** Low RBC count or hemoglobin levels.
- **Leukocytosis or Leukopenia:** Increase or decrease in WBC count, indicating infection or bone marrow issues.
- **Thrombocytopenia:** Decrease in platelet count, leading to bleeding tendencies.
- **Leukemia:** Abnormal increase in immature WBCs.

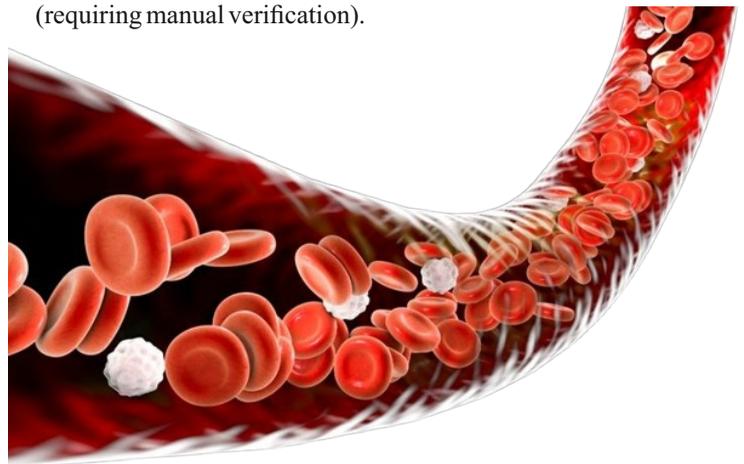
Regular CBC tests are also important for patients undergoing chemotherapy, surgery, or long-term medication therapy to monitor blood health.

Advantages of Automated CBC Analysis

- Faster and more reliable results
- Reduces manual errors
- Provides detailed information, including cell indices (MCV, MCH, MCHC)
- Requires small sample volume
- Can store and analyze data digitally

Limitations

- High cost of equipment
- Regular maintenance and calibration required
- May produce false results in case of sample clots or abnormal cells (requiring manual verification).



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Disease Causing Organism Virus

◦ Mustaqueem Din Ul Amin

Virus are sub microscopic organisms they have the ability to multiply once it enters inside the host and posses ability to cause disease. Viruses are parasitic. The study of viruses is known as Virology. More than thousand viruses are known and more than half of all viruses attack and cause disease of plants.

Breaking of tulips(Now known Viral disease) was reported in 1576. Existence of virus indicated by Dmitri Ivanovsky in 1892 who worked on Tobacco Mosaic Virus(TMV)

Plant viruses forms are spherical or elongated rods. Virus contains genetic material either Ribonucleic Acid (RNA) or Deoxyribonucleic Acid(DNA) and it is surrounded by a protein sheath called capsid and the subunits are known as Capsomeres.

Life Cycle of Virus

The life cycle of virus contains sequence of events like:

- **Entry in Host (i.e Plants):** Virus can't penetrate by themselves they requires vectors or wounding to enter.
- **Uncoating of Virus:** Viral protein coat removed once it enters. And it releases its Genetic material into the cytoplasm.
- **Replication of Genetic Material:** Virus uses the host cell's machinery by the help of enzyme polymerase.
- **Protein synthesis (Translation):** by the process of translation protein synthesis occurs. Protein forms such as: **Replication proteins, Coat proteins, movement proteins.** Formation of new virus particles (Virions) assembled in the host cell. All exactly same like the one that injected the host cell. The number of virions depends on the copy number.
- **Spreading:** Virus spread through Plasmodesmata (cell to cell connection) movement proteins helps in the process. For distant tissues, virus moves through phloem and cause systemic infection.
- **Transmission to New Host:** As it is infectious it is transmitted to other plants through several means like vectors (insects, nematodes), through seeds or pollens.

Symptoms

- **Chlorosis:** Loss or reduction of chlorophyll causes yellowing of leaves.
 - **Intervential Chlorosis, Vein Clearing**
 - **Mechanism:** Virus induces damage to chloroplast resulting inhibition of chlorophyll synthesis.
 - **Virus:** Potato Virus Y
- **Mosaic and Mottling:** Irregular patches are seen of light, dark green or yellow on leaves.
 - **Cause:** Disruption of chloroplast development due to replication.
 - **Virus:** Tobacco Mosaic Virus (TMV), Cucumber Mosaic Virus (CMV).
- **Necrosis:** Death of Tissue, forming brown or black lesions.
 - **Cause:** Hypersensitive response in plants or systemic infection.
 - **Virus:** Tomato Spotted Wilt Virus.
- **Leaf Curling:** Abnormal shape of leaves curl either on adaxial or abaxial side (Upward or Backward side).
 - **Virus:** Tomato Yellow Leaf Curl Virus
- **Stunting:** Reduces growth, results in small or dwarf plants
 - **Virus:** Rice Tungro Bacilliform Virus

Control and Measures

1. **Eradication:** The infected plant and susceptible weeds and there destruction reduces the possibility of spreading.
2. **Elimination of Insects:** Use of insecticides, sprays, biocontrol agents. And introducing Genetically modified plants. It reduces chance of spread of diseases.
 - Biocontrol Agents (Ladybugs for aphids)
 - Use of Yellow Sticky Traps
3. **Field Works:** Such as Proper Plant Spacing, Field Sanitation, Crop Rotation.

Use of Virus in Agriculture

We often see viruses are harmful, but by the help of biotechnology, certain viruses can be used as a powerful tool in Agriculture for improving crops.

1. **Gene Silencing by Virus:** Virus Induced Gene Silencing is a technique to silence the genetic material. When the virus infects the plant dsRNA is produced.
 - It helps the researchers to study gene functions. It also provide disease resistance.
 - **Example:** Tobacco Rattle Virus (TRV) is commonly use for VIGS in Solanaceae plants (Tomato)
2. **Viral Vectors (Gene Taxi):** Genetically engineered viruses can carry beneficial genes to plants. It is faster than traditional genetic transformation because of it's high copy number.
 - **Example:** Tobacco Mosaic Virus and Cowpea Mosaic Virus are modified to produce valuable proteins.
3. **Bio Pesticides:** Groups of Virus like Baculo virus are used in bio control.
 - **Example:** Nucleopolyhedro Virus used to control caterpillar in crops like cotton.

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AI in Auto Motive Industry

● Ashraf Ali

Technology is growing fast, and AI (Artificial Intelligence) is playing a big role in many things including cars. Today, AI is used in different ways to make driving easier, safer, and even automatic. Many car companies are using AI to improve their vehicles, and we can already see changes happening. AI is not just inside cars—it's also used in factories, traffic control, and even designing roads for the future.

AI is helping with things like self-driving cars, automatic braking, parking assistance, and smart traffic lights. Even normal cars that are not fully automatic use AI features for safety. However, while AI is making driving better, there are also some problems like high costs, hacking risks, and job losses. In this article, we will explore how AI is changing cars and what the future of AI in driving looks like. Also how they ease our life.

Self-Driving Cars – The Future of Transportation?

One of the biggest AI innovations is self-driving cars. These cars don't need a driver because they use cameras, sensors, and AI software to understand the road and move safely. Big companies like Tesla, Google (Waymo), and General Motors are still working on this technology for making self-driving car better.

AI Helps Normal Drivers Too

Even if a car is not fully automatic, AI is already helping drivers in many ways. Many modern cars come with AI-powered features that improve safety, like:

- **Automatic Braking:** If another car stops suddenly, AI helps apply brakes faster than a human using camera and sensor.
- **Lane Assist:** AI warns drivers when they are moving out of their lane without using indicators.
- **Blind Spot Detection:** AI warns the driver if there's another car in their blind spot. Blind spot refers to a situation where a vehicle is in the area that the driver cannot see using their mirror. This results in happening accident because the drivers change lane without noticing the car that are in their blind spot.

These AI features help prevent accidents and make driving safer for everyone.

AI in Car Factories - Making Cars Faster and Better

AI is not just restricted to inside cars it is also changing how cars are made. Car factories use robots and AI to speed up production, reduce costs, and improve quality.

- **Robots in Assembly Lines:** AI-powered machines help in welding, painting, and fixing parts.
- **Quality Control:** AI checks for defects in cars, making sure every vehicle is made correctly.
- **Smart Supply Chains:** AI helps car companies manage materials and reduce waste.

Using AI in car factories makes production faster, cheaper, and more efficient. However, this also means that some human jobs are being replaced by machines.

Fixing Car Problems Before They Happen

AI can predict problems in cars before they happen. Modern cars have sensors that track different parts of the vehicle, and AI analyzes this data to detect issues. **For example:**

- If the brakes are getting weak, AI will warn the driver to fix them.
- If the engine has a problem, AI will detect it before it breaks down.
- If the battery is low, AI will suggest replacing it before it dies.

This technology is called predictive maintenance, and it helps car owners save time and money by fixing small problems before they turn into big repairs which is super help.

AI Makes Driving More Comfortable

Modern cars use voice assistants like Google Assistant, Alexa Auto, and Apple Car Play. These voice assistants helps drivers:

- Play music without touching their phone.
- Get directions and real-time traffic updates.
- Call someone using voice commands.

AI also analyzes driving habits and adjusts car settings automatically. For example, if a driver prefers a certain seat position and temperature, AI will remember and adjust them every time they start the car.

AI in Traffic Control and Smart Cities

AI is helping in traffic control and public transportation.

How AI Helps in Traffic Management:

- **Smart Traffic Lights:** AI analyzes traffic and changes signal timings to reduce congestion.
- **Self-Driving Public Transport:** Some cities are testing AI-powered buses and taxis that work without drivers.
- **Accident Prediction:** AI studies traffic patterns and predicts where accidents are likely to happen, helping cities improve road safety.

With AI, future cities could have less traffic, no more accidents, and better public transport systems.

Problems and Risks of AI in Cars

While AI is improving transportation, it also comes with some challenges which are mentioned below:

- **Very Expensive:** AI technology is costly, making high-tech cars becomes too much expensive for many people.
- **Data Privacy Issues:** AI cars collect personal driving data, which raises privacy concerns.
- **Cybersecurity Risks:** AI cars connected to the internet can be hacked.
- **Job Losses:** Many factory workers and taxi drivers may lose their jobs as AI takes over.

These challenges show that while AI has many benefits, it also has risks that need to be mentioned.

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Prevention of Surgical Site Infections (SSI)

◦ Ramprasad Saini

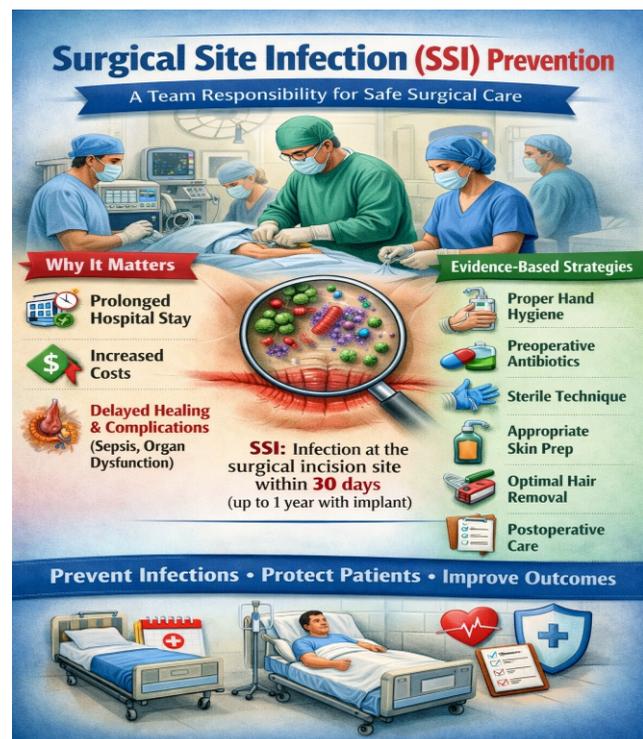
Surgical Site Infection (SSI) prevention is a critical component of safe surgical care and an essential responsibility by anesthetists, surgeons, nurses, and healthcare team. SSI occurs when pathogenic microorganisms invade the incision site or deeper tissues within 30 days of surgery, or up to one year if an implant is placed. These infections not only prolong hospital stay but also increase costs, delay in wound healing, and may lead to severe complications such as sepsis or organ dysfunction. Therefore, a structured, evidence-based approach to Surgical Site Infection prevention is vital for improving patient outcomes and maintaining high standards of operative care.

Effective Surgical Site Infection prevention begins long before the patient enters the operating room. Preoperative assessment focuses on identifying and modifying risk factors such as obesity, poor nutritional status, diabetes, smoking, and existing infections. Blood glucose control is especially important, as hyperglycemia significantly impairs wound healing. Patients are advised to avoid shaving the surgical site at home; instead, if hair removal is necessary, it should be done in the hospital using clippers immediately before surgery. Preoperative bathing with antiseptic (chlorhexidine/ betadine) based solutions helps reduce skin flora, thereby lowering bacterial load at the incision site. Additionally, appropriate antibiotic prophylaxis must be administered within 60 minutes before incision to maximize tissue drug concentration at the time of microbial exposure. Maintaining a sterile surgical environment is one of the strongest pillars of SSI prevention. Operating rooms must follow strict aseptic protocols, including regulated temperature, proper ventilation, controlled traffic flow, and routine sterilization of all instruments. Surgical staff must adhere to proper hand hygiene using alcohol-based rubs or antimicrobial soap, along with wearing sterile gloves, masks, gowns, and caps. Every step inside the operating theatre from opening sterile packs to draping the patient must follow the principles of sterile technique. Breaks in sterility, even minor ones, can introduce microorganisms that may later cause infection. During surgery, several intraoperative strategies help minimize infection risks. Surgeons should use meticulous technique, minimizing tissue trauma and ensuring careful hemostasis to prevent hematoma formation, which can serve as a medium for bacterial growth. Maintaining adequate oxygenation, normothermia, and proper hydration throughout the procedure improves tissue perfusion and enhances immune response. Frequent irrigation of the surgical site with sterile saline helps remove contaminants and debris. When implants or prosthetic materials are used, extreme care is essential because such devices can become colonized by bacteria, making infections more difficult to treat.

After surgery, postoperative wound care plays a key role in SSI prevention. The incision site should remain covered with a sterile dressing for at least 24 - 48 hours. Healthcare workers and caregivers must perform hand hygiene before touching the wound or changing dressings. Patients should be educated on wound observation, including signs of infection such as redness, swelling, pain, discharge, or fever. Early identification and prompt management of any abnormalities help prevent progression to severe infection. Maintaining optimal blood glucose levels, encouraging adequate nutrition, and ensuring proper hygiene further support the healing process.

Preventing surgical site infections requires a comprehensive and coordinated approach involving preoperative optimization, strict adherence to sterile techniques, meticulous intraoperative

management, and thoughtful postoperative care. When healthcare professionals consistently follow these evidence-based measures, the risk of SSIs decreases significantly, ensuring safer surgeries and better patient recovery.



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Understanding Publishing

◦ Kahkashan Perween

In the modern age, with information flowing with the greatest of ease and creativity finding an outlet at every corner, the value of intellectual work has risen to new heights. Ideas drive education, innovation propels technology, and creative expression defines culture. For intellectual contributions to have value, they have to be shared responsibly, credited correctly, and protected legally. Moving into legal dialogue, this brings forward four essential concepts: publishing, plagiarism, copyright, and copyright infringement.

The fundamentals of these topics are discussed in that article, but here, those ideas are extended and elaborated, focusing on their implication for academic, creative, and professional settings. In this journey, we will try to comprehend not just what these terms mean but also why they are significant in today's knowledge-based society.

The purpose and development of publishing

○ What does publish mean?

The word publish comes from a Latin root that means “to make public.” In simple terms, to publish means that the author shares her thoughts, ideas, or creative work with the world. If a researcher writes a study, a poet crafts verses, or a scientist conducts an experiment, the work is private until it is published.

The Gutenberg Bible was a milestone in publishing, having been done about the year 1426. This was the first major text printed using movable type and thus signaled a revolution in the way information spread. Before this technological breakthrough took place, written works had to be copied by hand—a time-consuming and labor-intensive process where few were privy to knowledge.

Centuries before Gutenberg, early forms of publishing could be seen in Mesopotamia where the use of engraved seals by ancient civilizations communicated identity and ownership, and often times information. In fact, these various markings served as a very rudimentary yet effective means of public communication.

○ Why Do We Publish?

Publishing serves many purposes, extending far beyond merely sharing knowledge:

1. Establishing Intellectual Ownership: Publishing confirms who created the work and protects it under copyright laws.

2. Contributing to Knowledge: When ideas are made public, they enter a larger conversation. Others can build on them, debate them, or draw inspiration.

3. Gaining Recognition: Authorship strengthens credibility in academic fields and professional industries.

4. Creating Social and Cultural Impact: Published ideas—whether literature, scientific discoveries, or artistic works—can influence societies and shape future generations.

5. Transforming Ideas into Other Forms of IP: Published work may be translated, adapted, or licensed, turning one piece of intellectual property into many.

Publishing, therefore, is the bridge that connects individual thought to collective human progress.

What Is Plagiarism?

Plagiarism is the act of using somebody else's intellectual work, passing it as their own. It includes text, ideas, illustrations, data, and creative work without proper acknowledgement. Plagiarism can be committed intentionally, for example, by submitting someone else's work, or unintentionally, such as forgetting to cite a source.

○ Forms of plagiarism include:

- Copying text word-for-word
- Plagiarism - paraphrasing without crediting
- Submission of bought, or borrowed work
- Using images, graphics, or music without attribution
- Presenting group work as individual work
- Using AI-generated content verbatim without disclosure

○ If Plagiarism Isn't Illegal, Why Is It Serious?

points out that plagiarism in itself does not bring legal consequences. It is not considered a crime. Nevertheless, it is regarded as a serious ethical offense both in academia and professional contexts for a number of reasons:

1. Loss of Academic Integrity: Institutions treat plagiarism as a form of dishonesty. Penalties can include failing grades, suspension, or expulsion.

2. Damage to Research Reputation: Plagiarism undermines trust in scholarship. Once credibility is lost, it is extremely difficult to regain.

3. Misleading Information: When plagiarized work spreads, it can distort knowledge or misrepresent research findings.

4. Career Consequences: Many professionals have lost careers, promotions, and honors due to plagiarism scandals.

5. Revoking Degrees or Honors: Universities may cancel degrees if plagiarism is detected later, even after graduation.

Thus, while plagiarism doesn't result in jail time, its academic and social consequences can be long-lasting and life-altering.

Copyright: Legal Protection for Original Creations

Copyright is a legal right that grants creators control over how their work is used, shared, and monetised. According to the PDF, copyright allows the creator not only to copy their own work but also to profit from its distribution or reproduction.

○ Copyright applies to:

- Books, articles and poems
- Music and lyrics
- Images, paintings, and photographs
- Films, videos, animations
- Software and digital content
- Design, illustration, and architectural drawings

○ When does copyright begin?

Many people believe copyright starts only after publication or registration, but that is quite wrong. Copyright arises once the work is in a tangible form of expression. This includes: Writing something in a notebook

Plagiarism vs. Copyright Infringement: Understanding the Difference

Plagiarism and copyright infringement overlap but differ fundamentally in nature and implications.

- **Nature:** Plagiarism is an ethical breach involving failure to credit sources, while copyright infringement is a legal violation of exclusive rights to reproduce or distribute protected works.
- **Main Issue:** Plagiarism centers on using ideas or work without acknowledgment; copyright infringement focuses on unauthorized use without permission from the rights holder.
- **Consequences:** Plagiarism leads to academic penalties like failing grades or expulsion and reputational damage; copyright infringement results in fines, lawsuits, or imprisonment.
- **Scope:** Plagiarism applies broadly to ideas, expressions, and writing; copyright infringement targets fixed, tangible creative works like books, images, or software.

Importance of Intellectual Ethics in Today's Digital World

With the rise of digital platforms, accessing, copying, and sharing information has become effortless. While this democratizes knowledge, it also increases the risk of unauthorized use. Therefore, understanding publishing, plagiarism, and copyright is crucial for:

- Students writing assignments and projects
 - Researchers preparing academic papers
 - Writers, bloggers, and authors
 - Artists, photographers, and musicians
 - Software developers and designers
 - Professionals creating reports and presentations
- Respecting intellectual property strengthens academic integrity and encourages genuine creativity.

Conclusion

The four interconnected concepts that define the ethical and legal boundaries of intellectual work include: publishing, plagiarism, copyright, and copyright infringement. Publishing makes knowledge available to society for the development of ideas. Plagiarism threatens to compromise academic integrity and destroys reputation. Copyright legally extends protection to creators to safeguard their rights and labors against unauthorized use. Copyright infringement implies responsibility through punishment for the unauthorized use of protected work.

It goes without saying that in this age of information and creativity, learning the principles of giving credit, seeking permission, and creating original work is non-optional. This should be inculcated among students, researchers, artists, and professionals alike. As such, society would forge ahead with intellectual property respected, progress with integrity would be ensured, creativity would thrive, and knowledge would continue its evolution responsibly.

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- Sketching
- Saving a document on a computer
- Recording a song
- Leading the design of a logo

Copyright protection exists automatically if the work is original and fixed in physical or digital medium.

○ Copyright Granted Rights

Copyright gives a creator the following bundle of exclusive rights:

- To make copies (reproductions) of the work
- To make copies of the work available for sale, offer, or other transfer of ownership (Commonly referred to as distribution)
- To perform or display the work publicly
- To translate or adapt the work
- Licensing the work to others
- To profit financially from it

These rights grant creators protection of their intellectual investment and provide them with due recognition and remuneration.

○ What if Copyright Is Infringed?

Copyright infringement - using someone's protected work without permission - incurs serious legal consequences:

Heavy financial penalties

- Imprisonment in cases where one cannot pay the damage compensation
- Loss of professional reputation
- Reduction or abolition of scholarship, grant, award, certification, or other professional or academic titles
- Complex litigation cases and settlement liabilities

In contrast to plagiarism, copyright violation is a legal offense, and the penalties - depending on the extent of the abuse - can be quite serious.

Copyright Infringement: What It Is and How to Avoid It

○ What Counts as Copyright Infringement?

Copyright infringement occurs when someone uses copyrighted material without permission, especially when the usage brings profit, recognition, or personal benefit. Examples include:

- Copying books, music, or movies
- Uploading copyrighted content online
- Using photos or designs commercially without a license
- Sharing software illegally
- Performing copyrighted songs without approval
- Using research figures, tables, or graphics without permission

The core issue is the absence of consent from the original copyright holder.

○ How Can Copyright Infringement Be Prevented?

The PDF clearly states that the simplest way to avoid copyright infringement is to obtain written permission from the copyright owner. In cases where the owner cannot be located, one must show that reasonable attempts were made to gain permission.

Some practical ways to avoid infringement include:

- Giving proper citations and credits
- Using royalty-free, open-source, or public-domain materials
- Applying fair-use principles (where legally applicable)
- Purchasing licenses for images, music, or software
- Contacting creators directly before using their work
- Avoiding assumptions that online content is "free to use"

Responsible use of others' work ensures legal safety and ethical integrity.

Machine Learning

◦ Ismail Dahiru

Machine Learning, often abbreviated as ML, is a subset of artificial intelligence (AI) that focuses on the development of computer algorithms that improve automatically through experience and by the use of data. In simpler terms, machine learning enables computers to learn from data and make decisions or predictions without being explicitly programmed to do so.

At its core, machine learning is all about creating and implementing algorithms that facilitate these decisions and predictions. These algorithms are designed to improve their performance over time, becoming more accurate and effective as they process more data.

In traditional programming, a computer follows a set of predefined instructions to perform a task. However, in machine learning, the computer is given a set of examples (data) and a task to perform, but it's up to the computer to figure out how to accomplish the task based on the examples it's given.

For instance, if we want a computer to recognize images of cats, we don't provide it with specific instructions on what a cat looks like. Instead, we give it thousands of images of cats and let the machine learning algorithm figure out the common patterns and features that define a cat. Over time, as the algorithm processes more images, it gets better at recognizing cats, even when presented with images it has never seen before.

This ability to learn from data and improve over time makes machine learning incredibly powerful and versatile. It's the driving force behind many of the technological advancements we see today, from voice assistants and recommendation systems to self-driving cars and predictive analytics.

○ Classification of Machine Learning

Machine learning can be broadly classified into three types based on the nature of the learning system and the data available: supervised learning, unsupervised learning, and reinforcement learning. Let's delve into each of these:

◦ Supervised Learning

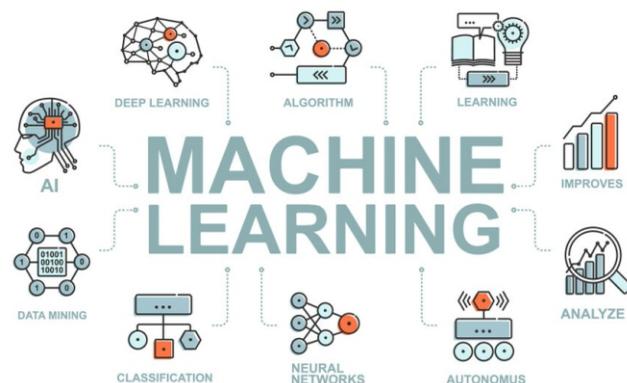
Supervised learning is the most common type of machine learning. In this approach, the model is trained on a labeled dataset. In other words, the data is accompanied by a label that the model is trying to predict. This could be anything from a category label to a real-valued number. The model learns a mapping between the input (features) and the output (label) during the training process. Once trained, the model can predict the output for new, unseen data.

Common examples of supervised learning algorithms include linear regression for regression problems and logistic regression, decision trees, and support vector machines for classification problems. In practical terms, this could look like an image recognition process, wherein a dataset of images where each picture is labeled as "cat," "dog," etc., a supervised model can recognize and categorize new images accurately.

◦ Unsupervised Learning

Unsupervised learning, on the other hand, involves training the model on an unlabeled dataset. The model is left to find patterns and relationships in the data on its own.

This type of learning is often used for clustering and dimensionality reduction. Clustering involves grouping similar data points together, while dimensionality reduction involves reducing the number of random variables under consideration by obtaining a set of principal variables. Common examples of unsupervised learning algorithms include k-means for clustering problems and Principal Component



Analysis (PCA) for dimensionality reduction problems. Again, in practical terms, in the field of marketing, unsupervised learning is often used to segment a company's customer base. By examining purchasing patterns, demographic data, and other information, the algorithm can group customers into segments that exhibit similar behaviors without any pre-existing labels.

◦ Reinforcement Learning

Reinforcement learning is a type of machine learning where an agent learns to make decisions by interacting with its environment. The agent is rewarded or penalized (with points) for the actions it takes, and its goal is to maximize the total reward. Unlike supervised and unsupervised learning, reinforcement learning is particularly suited to problems where the data is sequential, and the decision made at each step can affect future outcomes. Common examples of reinforcement learning include game playing, robotics, resource management, and many more.

○ Advantages of Machine Learning

- It easily identifies pattern and trends
- Self-upgrade and optimization
- Cost reduction in the long run
- It's scalability and flexibility
- It enhances decision-making

○ Disadvantages of Machine Learning

- It requires large amount of data
- High computational cost
- It lacks transparency
- Potential to be bias
- Risk of Job displacement

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EV BMS WITH CHARGE MONITOR AND FIRE PROTECTION

◉ Abhishek Kumar ◉ Agrawal Tarkeshwar ◉ Dani Aakash Kumar ◉ Dewangan Harshit Bhandari

The ratio of conventional vehicles to electric vehicles are increasing day by day. In this transition energy and Battery pack plays vital role of this system. Governments 2 worldwide are incentivizing the adoption of electric vehicles (EVs), while many automakers have already introduced a range of EV models. Within the Battery Management System (BMS), software algorithms may be employed to predict the battery's remaining capacity and estimate its remaining lifespan. A critical role of the BMS is to safeguard the battery from overcharging or over-discharging, both of which can lead to permanent damage and reduce its lifespan. This is achieved by the BMS controlling the charging and discharging processes and taking action to shut down the battery in case of any irregularities detected. Additionally, the BMS monitors and maintains the battery's temperature within a safe range. In instances of overheating, the BMS may adjust the charging rate or deactivate the battery to prevent harm. Conversely, if the battery becomes too cold, the BMS may increase the charging rate to aid in warming it up. Overall, the BMS plays a crucial role in ensuring the safe and efficient operation of rechargeable battery systems, thereby prolonging their lifespan. In summary, the global push toward clean energy has accelerated the development and adoption of electric vehicles (EVs). However, EV battery safety remains a significant concern due to incidents of thermal runaway and fire. A robust Battery Management System (BMS) is essential to monitor and control key battery parameters. This paper focuses on the design of an EV BMS that integrates both charge monitoring and fire protection features to improve reliability and safety.

Literature Review

The rapid adoption of electric vehicles (EVs) has led to increased research on efficient and reliable Battery Management Systems (BMS), which play a critical role in ensuring battery safety, longevity, and performance. A BMS monitors key parameters such as voltage, current, temperature, and state of charge (SOC), and manages operations like charging, discharging, and cell balancing.

Several studies have explored different architectures and control strategies for BMS. According to Piller et al. (2001), early BMS designs focused mainly on safety and overvoltage protection. However, recent research emphasizes intelligent control algorithms to improve energy efficiency and battery life. For example, He et al. (2018) proposed a model-based approach using Kalman filters to accurately estimate SOC and state of health (SOH), which is crucial for performance prediction and battery lifecycle management.

Cell balancing is another vital function of BMS. Passive and active balancing methods have been widely studied. Passive balancing dissipates excess energy as heat, whereas active balancing transfers energy between cells. Chen et al. (2020) developed an active balancing method using a flying capacitor approach that improves energy efficiency while minimizing thermal losses.

Thermal management is also integral to BMS. Liu et al. (2019) demonstrated that battery performance significantly deteriorates at extreme temperatures, emphasizing the need for integrated thermal management in BMS design. They proposed a hybrid cooling system that adapts dynamically to varying load and ambient conditions. Moreover, with the rise of connected and autonomous EVs, integration of BMS with IoT and cloud platforms has been proposed. Zhang et al. (2021) introduced a cloud connected BMS architecture that allows for real-time monitoring, predictive maintenance, and over-the-air updates, enhancing system reliability and user convenience.

Despite these advancements, challenges remain in ensuring scalability, cost effectiveness, and cybersecurity in BMS design. Future research is expected to focus on adaptive machine learning models for predictive diagnostics and tighter integration with vehicle energy management systems.

Unsupervised learning, on the other hand, involves training the model on an unlabeled dataset. The model is left to find patterns and relationships in the data on its own.

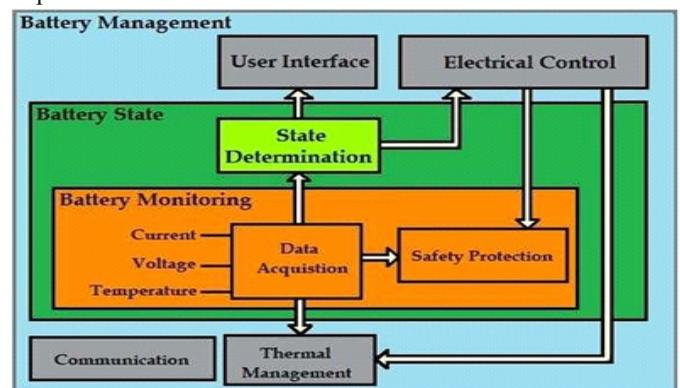
This type of learning is often used for clustering and dimensionality reduction. Clustering involves grouping similar data points together, while dimensionality reduction involves reducing the number of random variables under consideration by obtaining a set of principal variables. Common examples of unsupervised learning algorithms include k-means for clustering problems and Principal Component

Problem Statement

Battery storage is a fundamental component of electric vehicles (EVs), as it stores the energy required for their operation. To maximize the output of a battery and ensure its safe operation, it is crucial to have an efficient battery management system (BMS) in place. The BMS monitors various parameters, determines the state of charge (SOC), and offers essential services to guarantee the safe operation of the battery. A Battery Management System (BMS) plays a pivotal role in electric vehicles (EVs) and other battery-powered systems. It ensures and regulates the operation of the battery pack, ensuring its peak performance, safety, and longevity. As EV implementing many issues come forward in this development stage which are Battery pack caught fire, overcharging of battery, overheating of battery and inefficient working of battery.

Objective

Fire and temperature safety are two vital aspects of an EV BMS that are designed to mitigate ability dangers related to battery malfunctions. Fire safety is of maximum significance as lithium-ion batteries, generally utilized in EVs, can undergo thermal runaway, leading to fires and explosions.



Working Principle

The working principle of an Electric Vehicle (EV) Battery Management System (BMS) with charge monitoring and fire protection involves a combination of hardware components designed to ensure the safe, efficient, and reliable operation of the lithium-ion battery pack.

Here's a breakdown of the system:

1 Temperature Sensor: Monitors the temperature of the battery cells to prevent overheating. The system can trigger cooling mechanisms or shutdowns if the temperature exceeds safe limits, enhancing fire protection.

2 Boost converters: They efficiently increase (step-up) the input voltage to a higher output voltage. By storing energy in an inductor during the switch-on phase and releasing it to the load during the switch-off phase, this voltage conversion is made possible.

3 LCD Display: Provides real-time feedback to the user, displaying essential information such as battery status, charge level, voltage, current, and temperature. It acts as an interface for monitoring the system.

4 Li-ion Battery: The energy storage component that powers the EV. The BMS ensures it operates efficiently by balancing the charge between individual cells, enhancing battery life and performance.

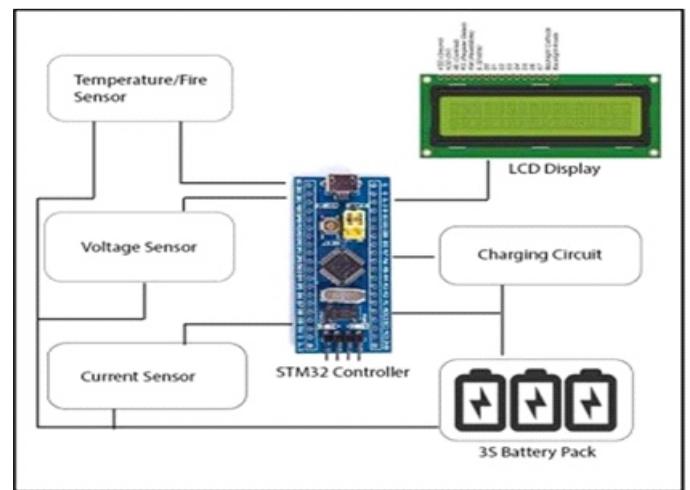
5 Switches & LED's: Allow user control for turning the system on/off and for visual indications of battery health, charging status, and any faults. LEDs provide feedback, with different colors indicating different states (e.g., red for error, green for fully charged).

6 Cables & Connectors: Facilitate electrical connections between the various BMS components and the battery pack, ensuring robust, reliable power transmission.

7 Fan Cooling System: Heat Dissipation: Fan cooling helps remove heat generated from Battery. Temperature Regulation: Controlled by the BMS, fans operate based on temperature thresholds to maintain optimal battery performance.

Block diagram

All the active functions for a step down (buck) switching regulator are provided by the voltage regulator LM2576 family of monolithic integrated circuits. Fixed versions with 3.3V, 5V, or 12V fixed outputs are available. The output voltage range 8 for adjustable versions is 1.23 to 37 volts. Both variants have excellent line and load regulation and can drive a 3A load. The STM32 is a popular type of microcontroller that used in many different kinds of gadgets. Additionally, it has the ability to connect to various other kinds of microcontrollers. STMicroelectronics developed the STM32 line of microcontroller units (MCUS), which is based on a 32-bit ARM Cortex-M processing core. Using a series and parallel communication method, a variety of external devices, including as sensors, cameras, motors, and other devices, can be connected to this microcontroller. The DHT11 is a common temperature sensor. Fig. displays the circuit diagram. The sensor has an 8-bit microprocessor for serial data output of temperature and humidity information in addition to a dedicated NTC for measuring temperature. Furthermore, the sensor is factory-calibrated, which simplifies integration with other microcontrollers. The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of 1°C and 1%.

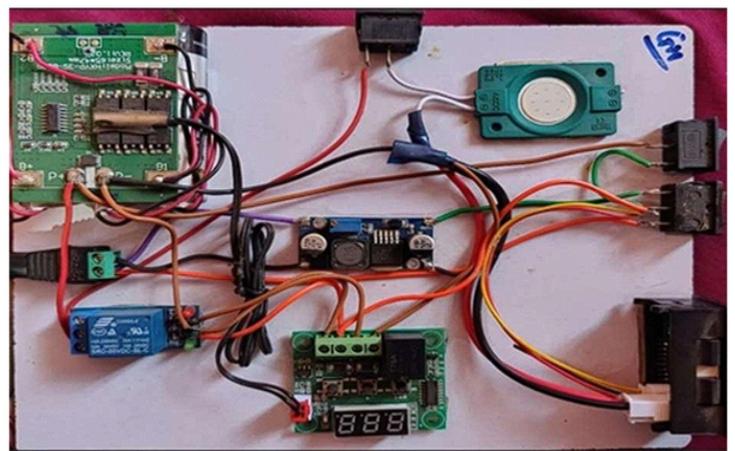


Result

As shown in fig.10 when the supply is given, the charging process takes place by choosing the charge option using the push button connected to the circuit. During the charging process, the voltage increases gradually which is represented on LCD display and led glows. When the battery is fully charged, the voltage cutoff as the voltage exceeds beyond 12v is detected by voltage sensor and led goes off. All the variations of parameters like current, voltage and temperature soc are monitored and controlled by sensors which are shown in fig.11 on 16*4 LCD display.

The cutoff current, which is roughly 5 amperes, is significantly more than the required current for secure charging. Similarly, during the discharging process shown in Fig. 11, the voltage is going to decrease. Here the load with 12v voltage capacity is used for power consumption. And also, the temperature gradually increases when the energy is consumed so called discharging.

Figure 11 shows the temperature rise due to fire risks or short circuit Conditions. If the temperature increases beyond the limited value i.e., 500C, the buzzer sounds which is used for fire or heat indication. Here the DHT11 module is used to sense the temperature. It might be advisable to install an additional CC or CV regulator to limit the amount of current during charge since it is generally advised to charge lower than half the capacity, or 0.5c, for safe charging.



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The Great Rewiring: The "Future of Work" has Arrived

◦ Shreyansh Gupta

We spoke of Artificial Intelligence as a distant horizon, a plot device for science fiction, a plaything for research. That world has been left behind. Now, AI leads the charge in and around corporate boardrooms, in determining government policy, and in driving those of us who use our software tools long before we've finished our coffee.

"Will AI affect my job?" is no longer a question. This ship has already sailed. The question that keeps CEOs and freelancers up all night long, though, has to do with what comes next. Now, as we look ahead to 2026, it's not just a technology refresh we're facing. We're faced with a probable complete redefinition of what it means to be productive.

The Workforce Shock

○ When

Let's not beat around the bush. The transition is a mess. On every continent, companies are dismantling their former structures in order to rebirth them in line with algorithmic efficiency. There is a trend that cannot be denied: a mass transformation, a reshuffling of personnel.

This isn't a matter of cutting costs; it's a transformation. There are now three gargantuan forces meeting in this arena. Firstly, automation has finally progressed from "kludgy" to "competent." Automation can now solve customer inquiries in seconds, develop and test code, and process data which would take weeks to decode by a team of humans.

Second, it's a matter of Follow the Money. Billions of dollars are being invested in cloud transformation, autonomous agents, and security. And third, Efficiency has become the only currency that matters. "Countries and companies are now in a race to optimize their productivity, as Anne Laf aptly put it. The outcome: lean teams with smart systems are beating huge manual organizations."

"The Paradox: When Doors Close, Windows Open"

○ Every person

"Here's the oddity of the AI era. It's destroying jobs, yes. But it's also conjuring ones up faster than we can identify them."

Meanwhile, as traditional industries become less prominent, completely new sectors are emerging. There are going to be AI System Managers to tame these autonomous agents, and these require Prompt Architects who understand how to talk to the ghosts in the machine. We will additionally require AI Ethics Analysts, Human-AI Interaction Designers, and Data Trust Leads to protect our "new oil," which is our data.

These are not merely specialized tech opportunities; rather, they are the new cornerstones of the contemporary business.

The Emergence of the Hybrid Professional

So, what are the characteristics of a successful resume in a world post-COVID and with AI as a driving force? There has been a paradigm shift. The most important employee in an organization is no longer the person working the hardest but rather the person working in perfected harmony with a machine.

"AI literacy, data fluency, and cloud platforms" are, of course, in high demand. Ironically, as "machines become smarter," "being human" becomes even more valuable in this situation. "Employers are desperate for what computer code cannot deliver" in terms of "complex decision-making, crossdisciplinary creativity, emotional intelligence, and narrative storytelling."

The labor force in 2030 will not be marked by humans competing with

AI. Instead, it will be marked by humans who know how to dance with it.

"Meet Your New Colleague: The Copilot"

"We have to stop thinking of artificial intelligence as a tool and think of it as a colleague. "Copilots" are now being introduced in every profession."

○ **In Engineering:** They are developing boilerplate code, which will make it easier for engineers to architect.

○ **In Finance:** These are the ultimate auditors, with a knack for detecting discrepancies that even humans don't notice

○ **In Healthcare:** They work as diagnostic sidekicks in order to help doctors make decisions quickly and safely.

Professionals are not working for these systems; they are assembling a hybrid team that combines machine precision with professional judgment.

The Moral Minefield

But of course, we can't run to this future without considering where we are putting our feet. We are standing at a huge crossroads.

How can we remove human bias from these algorithms? Who ultimately has possession of this data that machine models are being trained on? To what extent should transparency be in software that has been used to make a decision—be it a loan application or a diagnosis?

And, most critically, how then do we maintain human dignity in a world that is fixated on efficiency?

"The Blueprint for Survival"

○ Elizabeth

"The future of work isn't a cage match between man and machine. It's a synergy." But in order to survive it, we must move quickly.

Professionals are advised: "Embrace lifelong learning." Professionals are not asked to outsmart AI but to use it. They are urged to develop a "hybrid" skill set that combines technology know-how with deep knowledge of their domain. However, for governments and businesses, it has become crystal clear: invest in AI literacy, enforce transparency, and support the rights of the workforce. AI isn't displacing work. It's forcing us to rethink it. The leaders who make this ethical choice now, and the employees who accept this new partnership, will not only survive this transition but help define it.

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Satellite Communication

• Urvashi Singh

Before we talk about Satellite Communication, let us first understand what these two words mean. In general, satellite is a smaller object that revolves around a larger object in space & communication is the exchange or sharing of information between two or more entities through any medium or channel.

Satellite communication (SatCom) is the use of artificial satellites to send radio frequency (RF) signals between any two earth stations to provide communication links between various points on Earth. In the short story, "The Brick Moon", the idea of satellite communication was first introduced. The first artificial satellite to be launched was Sputnik I.

○ **Need for Satellite Communication:** Before satellite communication (SatCom) was introduced, signals were transmitted through the given two forms:

- **Ground Wave Propagation:** In this form of propagation, radio wave signals upto 30MHz can be transmitted in the troposphere layer.
- **Skywave Propagation:** Signals upto 30-40 MHz can be transmitted. In this type of propagation, signals are first refracted from ionospheric layer and then transmitted.

These two forms of transmission had a drawback that the maximum permissible transmission distance between earth stations was just 1500km. Hence, very long distance communication was not possible. To solve this problem, satellite communication came into existence. Not only this, with the help of SatCom, predicting weather and mapping the Earth's surface also became possible.

○ **Development of Satellites:** Let's look briefly how the satellites used nowadays were developed & improved over the years.

- **'SPUTNIK 1':** (October 4, 1957) 1st artificial satellite to be launched successfully by Soviet Union.
- **'SCORE SATELLITE':** (December 18, 1958) 1st satellite to relay voice signals. Broadcasted the message – "Peace on Earth and goodwill towards men everywhere".
- **'ECHO 1 & ECHO 2':** Launched by NASA. Passive satellites.
- **'TELSTAR 1':** 1st active communication satellite capable of two way communication. It broadcasted live TV images between Europe and North America & also transmitted 1st phone call from AT&T chairman from the ground station in Andover, Maine to US President Lyndon Johnson in Washington, D.C.
- **'SYNCOM 1':** (February 14, 1963) Developed by Rosen's team at Hughes Aircraft. Lost shortly after launch.
- **'SYNCOM 2':** (July 26, 1963) 1st satellite in geosynchronous orbit. It was launched successfully.
- **'SYNCOM 3':** (August 19, 1964) 1st satellite in geostationary orbit. Broadcasted the 1964 Olympic Games from Tokyo, Japan to US.
- **'EARLY BIRD':** (April 6, 1965) 1st operational commercial satellite providing regular telecommunications and broadcasting services between North America and Europe.

Many more developments took place and finally the satellites we use nowadays for communication came into existence.

○ **Components of a Satellite**

- **Antenna:** Receives signals and then retransmit it.
- **Transponder:** Amplify & Modulate the signals

- **Power System:** Energy source consisting of solar panels to generate energy from sunlight.
- **Propulsion System:** Rockets are used for propulsion.
- **Thrusters:** Used to make adjustments in the position of satellites, which gets shifted from its actual position due to the Moon's gravitational pull.
- **Thermal System:** Protects sensitive parts of a satellite from extreme temperature changes.

○ **Working - The Process Of Satellite Communication:** Three main stages are there in SatCom:

- **Uplink:** Signal is sent from the ground station on Earth to the satellite in orbit, with the help of antennas to focus the signal properly. This is termed as uplink.
- **Transponder:** Essential part of satellite communication. It receives incoming signals and modulates and amplifies them since the signals become weak and lose some of the energy after travelling long distances.
- **Downlink:** Data is finally sent to the other end of the receiver on the earth. Output signal is sent from the satellite to the earth.

Generated signal is transmitted to the earth station, where the incoming signal is modulated, i.e., frequency, phase, amplitude, etc is altered. The signal is then sent to the satellite in space with a frequency termed as the uplink frequency spectrum. Signal amplification and processing takes place in the satellite. Finally the signal is sent back to the receiving earth stations with downlink frequency spectrum, where it is again amplified and also demodulated.



Satellite Communication (SatCom)

The use of artificial satellites to send radio frequency (RF) signals between earth stations to provide communication links between various points on Earth.



○ Types

- **Geostationary Satellite Communication:** Satellites orbit the earth at an altitude of 22,236 miles. Appear stationary because they orbit in the direction of Earth's rotation. Used in disaster warning, telecommunications, weather forecasting, etc.
- **Low Earth Orbit (leo) Satellite Communication:** Satellites orbit less than 500 miles above the earth's surface. Lower latency & faster speed. Used in online banking, HD video conferency, etc.
- **Medium Earth Orbit (meo) Satellite Communication:** Orbiting altitude for MEO satellite is 1,200 to 22,236 miles. MEO satellites require fewer and less complex satellites than LEO systems. Used in GNSS, broadband internet access, mobile communication backhaul, etc.

○ Applications Of Satellite Communication:

- DTH TV connections
- Radio Broadcasting
- GPS Tracking
- Used for connectivity at remote areas
- Used for long distance communications
- Weather Forecasting
- Space exploration
- Provides secure communication channel for military operations
- Fast communication during emergency times

○ Future Scope

As the world inches closer to a new era of connectivity, satellite communication is sure to expand & evolve a lot in the years ahead.

Space X, owned by Elon Musk is developing Starlink to provide low cost internet connectivity in remote areas. Anti - Satellite weapons (ASAT) are also being developed as a strategic tool to destroy satellites of enemy nations.

In future, with the help of satellite communication, cars will be able to navigate through city streets and highways by itself.

These are just some of the practical examples of what lies ahead in the field of SatCom, but there is more to it as the sky is not the limit, it is the beginning!

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How AI Can Help Us in Digital Microscopy

● Younis Ahmad Wani

Significant role of AI in digital microscopy is in telepathology. In many regions, there is a lack of skilled pathologists, and digital microscopy enables slides to be shared remotely over the internet. AI supports this process by pre-analyzing images, flagging urgent cases, and generating preliminary reports for expert review, ensuring quicker diagnoses, particularly in rural or resource-limited areas. Furthermore, AI fosters global collaboration, allowing specialists from various countries to view, discuss, and interpret the same digital slides simultaneously. AI also plays a crucial role in medical education and research.

Digital microscopy platforms equipped with AI can assist students in learning more effectively by automatically labeling microscopic structures and providing feedback on their observation. In research, AI can rapidly process thousands of images, making it invaluable for studies related to tissue morphology, genetic pathology, and drug development. AI can help identify experimental changes that might be missed by humans, aiding in the discovery of new biomarkers and therapeutic targets.

The benefits of integrating AI with digital microscopy are extensive. It enhances data storage and retrieval, provides standardized analyses ensuring consistency across laboratories, and integrates seamlessly with hospital information systems, facilitating easy access to digital records and long-term data comparison.

While challenges such as high implementation costs, the need for technical expertise, and substantial data storage requirements exist, these hurdles are gradually being addressed as technology becomes more accessible and user-friendly. The integration of artificial intelligence with digital microscopy marks a significant advancement in modern pathology. It allows for faster image processing, more reliable diagnostics, and improved workflow management.

Rather than replacing human pathologists, AI acts as a supportive tool that enhances their ability to detect diseases with greater accuracy. As digital pathology continues to evolve, AI-powered microscopy will play an increasingly vital role in transforming laboratory medicine, enhancing patient care, and shaping the future of diagnostics.

Significant Role of AI in Digital Microscopy
Advancing Telepathology and Research

Telepathology: Remote Diagnosis with AI

AI for Medical Education & Research

- ✓ AI labels microscopic structures and provides feedback
- ✓ Accelerates research in tissue morphology, genetic pathology & drug development

Benefits of Integrating AI with Digital Microscopy

- ✓ Enhanced Data Sharing & Storage
- ✓ Global Collaboration
- ✓ Standardized & Consistent Analyses
- ✓ Streamlined Medical Workflow

AI as a Supportive Tool

AI enhances, rather than replaces, the capabilities of human pathologists

Transforming Pathology, Enhancing Patient Care

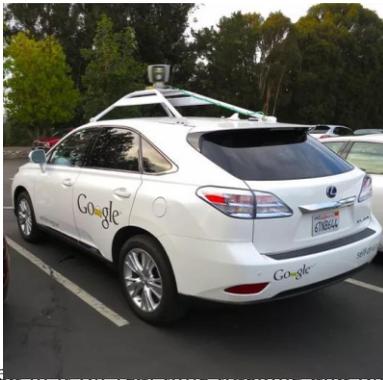
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Autonomous Vehicles & Delivery Drones – From Sci-fi to Reality!

● Urvashi Singh

The future of mobility is revolutionized with the introduction of autonomous vehicles (AVs) & delivery drones. Long ago, they were only a part of science fictions – but now a part of our future as well.

○ Autonomous Vehicles (AVs) can be defined as integrating vehicles with AI thereby making them capable of driving autonomously, i.e., without human intervention, where cars themselves decide which route to follow, when to change directions and what to do if faced by an obstacle. AVs comprises of multiple sensors (like Lidar, Radar, Ultrasonic sensor, cameras, etc.) embedded



understanding of its surrounding environment. Gone are the days when vehicles were just mechanical stuff. AVs are the future of today's vehicles, but before they will be ready to replace the conventional cars, multiple test operations need to be conducted to make AI experience the potential situations that it could possibly encounter. Strong AI concept is implemented here. It mimics human intelligence and provides solutions to unfamiliar tasks based on past situations. That's why companies investing in AVs are putting so much efforts in its testing on public roads. Many governmental acts are passed, giving these companies the authority to conduct test operations on public roads & also for its certifications

○ In the year 2013, Amazon made headlines when the then CEO, Jeff Bezos, announced its plans to deliver packages via drone - the "Amazon Prime Air".

Delivery Drone, or Unmanned Aerial Vehicle (UAV) is a kind of autonomous aircraft designed to transport light - weight parcels in just few minutes. They have become a hot - topic of research for many big e-commerce companies like Amazon, Domino's, Alibaba, UPS, etc for "last - mile" deliveries. If these companies have their way, then within a decade your next parcel might arrive via a drone! Drones are very energy - efficient, traffic reducing as well as a faster way of delivering items at your doorstep within minutes of ordering. The prospect of having a package arrive at your doorstep within a matter of minutes is undeniably exciting. But we are still not ready for the hidden charges, the safety concerns and the trade - offs for this convenience. The primary obstacle to using delivery drones in most nations is a requirement that drones stay within pilot's line of sight.

Amazon, Google & Tesla Investments

○ AMAZON

○ ZOOX: It is an autonomous vehicle company, acquired by Amazon in 2020. With this acquisition, now the company is a step closer to



delivering packages via AVs. The case might also be that with this new partnership, Amazon might build its new AV.

○ **AMAZON SCOUT:** Debuted on January 23rd, 2019, Amazon Scout was a type of autonomous vehicle used to deliver packages. It was fully electric and used sensors & Machine Learning to move around streets.



Amazon Scout has come to deliver a package!

○ **Aurora Innovations:** Aurora is a Pittsburgh based self - driving vehicle technology company. The tech - giant Amazon purchased a 5.2% stake in this company. The move is a clear sign that Amazon doesn't want to miss out on an innovation that can disrupt its logistics.



Aurora Innovation's self-driving trucks

○ **Amazon Web Services (AWS):** Amazon's AWS focuses on building tools & services for the development & deployment of autonomous mobility.



○ **KIVA:** Amazon acquired a robotics company named Kiva in 2012. This acquisition created a new unit named 'Amazon Robotics' that develops fully autonomous mobile robots & other robots, working in the company's warehouse.



Amazon's new army of autonomous warehouse robots

○ **VULCAN:** Recently, Amazon developed a fully autonomous robot with a sense of touch - Vulcan. It is making the worker's jobs easier & safer while moving orders more efficiently.



- Touch sensing helps Vulcan to identify things and push items around on a shelf. The force sensors makes it understand how much strength and speed to apply while picking any product to avoid damaging it.
- **AMAZON PRIME AIR:** Amazon's Prime Air Drone Delivery program received FAA approval for beyond visual line of sight. Now you will soon see Amazon packages soaring high up in the air! *Amazon is taking its deliveries to new heights with Amazon Prime Air!*



engine like shape and no visible wheels . The Tesla Robovan is Elon Musk's vision of group transport for the future.

○ **GOOGLE**

- **WAYMO:** Waymo is Google's Self-Driving Car Project started in the year 2009. The purpose is to develop and market consumer - ready driverless vehicles around the globe, and bring major changes in the society like safer roads, fewer fossil fuel consumption & lower transportation costs. *Drive the future with Waymo by Google*
- **PROJECT WING:** Project Wing is a Drone Delivery venture, owned by Google's parent company Alphabet. Its declared mission was "building delivery drones, and working towards the day when these aircraft can deliver everything from consumer goods to emergency medicine-a new commerce system that opens up universal access to the sky". Wing's drones have delivered many goods within minutes in the US, Europe and Australia.



Project Wing has taken its flight

○ **TESLA**

- **CYBERCAB (ROBOTAXI):** It is a two-passenger, fully autonomous car by Tesla without steering wheel or pedals. Elon Musk, Tesla's CEO, believes that fully self-driving vehicles will be safer than human - operated ones. Cybercab's motive is to offer affordable & fast individualized point to point transport.
- **ROBOVAN:** Unveiled at the "We, Robot" event in October 2024, Robovan is an autonomous electric van by Tesla intended to be used for carrying up to 20 people in one go and also for transporting goods. It has an unique design with a sleek train

Autonomous Vehicles

- **THE EARLY DAYS:** The main enthusiasm towards AVs started with the Defense Advanced Research Projects Agency (DARPA) contest, which led to the creation of a community of innovators, engineers, students, programmers, off - road racers, backyard mechanics, inventors and dreamers who came together to try making vehicles autonomous. Even before this contest, many instances of self-driving cars were seen in history like Francis P. Houdina's "American Wonder", a driverless car which ran on the streets of New York City. In Futurama exhibit at the 1939 World's Fair, General Motors had presented a scaled model of a futuristic city featuring driverless cars, which included more than 500,000 buildings and 50,000 cars.
- **TECHNICAL OVERVIEW:** All self-driving cars rely on Artificial Intelligence (AI) to simulate "human - like" behaviour . A variety of embedded sensors provide data about the surroundings to the on-board computer . Real - time tracking is done to detect obstacles, see road signs, traffic lights and to bend around corners . The cars also have GPS system installed to make their exact location and route known for safety concerns. In future, more white and lighter colour cars will be seen dominating highways and streets as these colours are more reflective and hence easier to detect by Lidar sensor.

Sensors

- **CAMERA:** Cameras are the " eyes " of AVs . They help in environmental understanding, object detection and classification . Cameras are very cost-effective sensor and can be classified into visible and infrared cameras . Infrared camera has the ability to even detect warm body , like animals and pedestrians .
- **LIDAR:** Lidar sensors utilise the 905 nm and 1550 nm light for positioning, obstacle detecting and environmental reconstruction. It can be classified as 2D , 3D and solid - state Lidar . The efficiency of this sensor highly depends upon the reflectiveness of the object. Adverse weather conditions such as fog , snow or rain also affects its performance.
- **RADAR:** Radar sensor is mainly employed in AVs to detect the presence and location of other cars and objects. The distance between the AV and the obstacle is determined by the Time of Flight (ToF) between emitted and received echos . Radar works on the Doppler property of EM waves .
- **ULTRASONIC SENSOR:** These sensors employ ultrasound to detect objects. It is one of the main sensor for parking assistance. Ultrasonic sensors also play an important role in airbag deployment.

Levels of Automation

- **Level 0 (No Autonomy):** Vehicle is fully operated by human - driver. Support features may pop some warnings .
- **Level 1 (Limited Driver Assistance):** Advanced Driver Assistance System (ADAS) helps the driver in either steering or accelerating , one at a time.
- **Level 2 (Partial Automation):** Both accelerating and steering is handled by the vehicle at the same time.
- **Level 3 (Conditional Automation):** The vehicle may run autonomously under some conditions like on divided highways with the assistance of Automated Driving System (ADS), but not in high traffic.
- **Level 4 (High Automation):** Except in certain conditions, the vehicle performs all driving tasks autonomously.
- **Level 5 (Fully Autonomous):** People in the car are only passengers. All the functions are fully controlled by the car under all scenarios. There is no need for external mechanical control.

PROSPECTS AND PERILS

Autonomy can help to create a better future for our planet. AVs are more safer than the conventional vehicles in use today and if introduced, will reduce traffic accidents. Apart from being eco - friendly and cost - effective means of transportation, now parking lots can be converted into parks as they will be in continuous operation.

But AVs spark up ethical questions like is it safe to let AI control the future? Many people are also fearing loss of jobs if AVs take command. It will take some time for people to get accustomed to the driverless cars. In a nutshell, there is still a long way to go before AVs are ready to run.

DELIVERY DRONES

- **Historical Background:** In the early 20th century, nations began experimenting with Unmanned Aerial Vehicles (UAVs) for military purposes and reconnaissance. They were initially used as targets for training fighter pilots. During the First World War, testing and development of UAVs continued, however they were not used in the war. The drones came into action on a large scale during the Vietnam War. Now they were also used for launching missiles, dropping leaflets and for acting as decoys in combat. Following this war, UAVs became more popular and new models with improved endurance and the ability to maintain greater heights started being developed. Fast forward to 2006, the FAA issued commercial drone permits, realizing the potential of non - military drone applications. This move opened a pool of opportunities for companies who wanted to use drones in their business ventures.

WHY OPT DRONE DELIVERY?

- **Eco - Friendly:** Delivery drones consume less energy than other delivery methods, hence reduces carbon footprint. Some drones are even solar powered.
- **Cost - Effective:** For last-mile deliveries, they are very cost-effective. They eliminate the need of paying a driver.
- **Remote Location Deliveries:** Drones can help in delivering everyday goods, emergency medical supplies and other aids in underserved areas where access is challenging. Thus improving the lives of people living there and connecting them with modern-day services.
- **Faster Delivery & 24×7 Operational:** The main advantage of drone delivery is its speed and 24×7 availability. Traffic congestion and other obstacles have no impact on the route of drones & hence useful in the times of emergency.

- **Emergency Medical Supplies:** A case was seen in which drone saved the life of an Ontario man by delivering lungs. Additionally, drones can be highly useful for supplying medicines & other medical aids during wartime or disaster - struck days.

CHALLENGES

- **Privacy Concerns:** Many customers worry that drones may capture their data and click pictures while delivering an item .
- **Regulatory Challenges:** FAA regulates air travels making it a complex and costly process for gaining clearance regarding take-offs and landings. Further, there are many state imposed regulations to complicate the matter.
- **Battery & Range Constraints:** Long distance deliveries might not be successful because of shorter battery life.
- **Payload Limitations:** Heavier items can't be delivered by drones, since every drone is designed to carry limited weight.

COMPANIES USING DRONE DELIVERY SERVICE

UPS: During the COVID - 19 pandemic, UPS used drones for delivering vaccines. It became the first company to receive FAA approval to operate an unlimited remote - controlled drone delivery network in the United States. Recently, UPS delivery drones became certified to fly longer distances beyond the line of sight.

AMAZON: Amazon Prime Air is a drone delivery service by Amazon. The company started testing drone deliveries in 2022. Currently this service is available in few areas like Texas and Arizona only, but will soon expand. Recently, Amazon even received FAA approval to deliver items like iphone, ring doorbells, Samsung Galaxy cellphones, Apple AirTags, Apple AirPods and Alpha Grillers Instant Read Food Thermometer.

Amazon's new MK30 drone has now made it possible to ensure delivery in under an hour only.

DHL: DHL has successfully delivered medical aids using drones in remote areas. In 2014, the company supplied medical aid over open sea to the North Sea Island of Juist, making history. Since then, DHL has helped in saving many lives using its drone delivery service.

WHAT THE FUTURE HOLDS ?

After lots of chatter & technological advancements, finally the day has come when delivery conducted via drones is not just a hype. It's a pleasing reality where you get your product outside doorstep within minutes of ordering. This is not just about speed - but comfort and convenience of e-commerce redefined.

Drone delivery is a multi-billion dollar industry today and is expected to grow exponentially over the next few years. Companies are investing heavily in this industry for improving customer experience as well as for reducing logistics cost.

Delivery Drones have the potential to herald a more sustainable future. Payload capacity, battery life and adverse weather conditions are some of the barriers we face today, but with technological advancements, these barriers will become a thing of the past.

Regulatory frameworks needs to be relaxed a bit and new amendments should be done in them for better drone surveillance. Today drones do deliver parcels in some areas, but soon the time will come when every colony will have parcels flying above just like the flying car of Weasleys in Harry Potter!

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Sales the Backbone of Every Business

◦ Vibhuti Bhushan Mishra

Sales are activities related to selling or the number of goods sold in a given targeted time period. The delivery of a service for a cost is also considered a sale. A period during which goods are sold for a reduced price may also be referred to as a "sale". The seller, or the provider of the goods or services, completes a sale in an interaction with a buyer, which may occur at the point of sale or in response to a purchase order from a customer. There is a passing of title (property or ownership) of the item, and the settlement of a price, in which agreement is reached on a price for which transfer of ownership of the item will occur.

The seller, not the purchaser, typically executes the sale and it may be completed prior to the obligation of payment. In the case of indirect interaction, a person who sells goods or service on behalf of the owner is known as a salesman or saleswoman or salesperson, but this often refers to someone selling goods in a store/shop, in which case other terms are also common, including salesclerk, shop assistant, and retail clerk.



In common law countries, sales are governed generally by the common law and commercial codes. In the United States, the laws governing sales of goods are mostly uniform to the extent that most jurisdictions have adopted the Uniform Commercial Code, albeit with some non-uniform variations.

○ Core Concepts of Sales

- **The Transaction:** A sale is a transaction where a buyer and seller agree on the exchange of goods/services for compensation (money).
- **The Role of the Salesperson:** To find potential buyers, understand their challenges, and connect them with solutions (products/services) that improve their situation.
- **Beyond Persuasion:** Effective selling focuses on aligning existing customer needs and motivations with what the salesperson offers, not forcing a sale.
- **Problem-Solving:** Sales views offerings as solutions to problems or ways to achieve goals, making it a valuable service.

○ Key Aspects of Sales

- **Revenue Generation:** The primary function is to bring money into the business, funding operations and growth.
- **Relationship Building:** Creating trust leads to repeat business and referrals, which are vital for long-term success.
- **Market Intelligence:** Salespeople gather real-time feedback on market trends and customer behavior, informing business strategy.
- **Value Creation:** By solving problems, sales enhances brand reputation and fosters customer advocacy.

What is the Importance of Sales

1. Sales Boost Conversions: Organizations have dedicated sales professionals who are responsible for selling products to the right set of audiences. The sales department deals with those customers who have some sort of awareness about the products.

As salespersons are in constant touch with customers, they help organizations generate a good amount of revenue.

2. Product/Market Fit: Businesses can experience increased sales when there is the right balance between product fit and market fit. A business cannot make sales when the wrong product is targeted to the customer or when businesses are using the wrong sales strategy to market their products. Therefore, sales happen when you find the best product/market fit.

3. Accelerates Business Growth: A business's growth depends on the sales department's success. Though a business has a large empire and great products; an enterprise becomes successful when most customers consider buying its products.

An increase in sales not only increases the size of the venture but also makes the business more profitable.

4. Build Good Relationships With Customers: The best salespeople in an organization are not only responsible for getting qualified leads, but they are the ones who add value to the life of employees and customers. Best salespeople know how to make their customer's life happy.

The targets of salespeople become accomplished when their customers are happy.

5. Builds Loyalty: Customers can recognize your brand and prefer to buy products from you if you have good sales. An efficient sales team uses various strategies to win the customer's trust, which in turn builds customer loyalty.

○ Types of Sales

Five common types of sales are B2B (business-to-business), B2C (business-to-consumer), direct sales, retail sales, and e-commerce sales. These categories can be defined by who the customer is, how the sale is made, and the specific sales strategy or model being used.

Common types of sales

- **B2B (Business-to-Business):** This involves sales transactions between two companies. B2B sales often involve longer, more complex processes and higher revenue compared to B2C sales.
- **B2C (Business-to-Consumer):** This refers to when a business sells products or services directly to an individual consumer.
- **Direct Sales:** This is a business model where a salesperson sells products or services directly to the customer without the use of a third party, like a retail store or distributor.
- **Retail Sales:** This involves a business selling goods to the end-consumer, typically through a physical store location or online storefront.
- **E-commerce Sales:** This type of sale occurs online through a digital platform, such as a company's own website or a third-party marketplace.

○ Other important types

- **Enterprise Sales:** A specialized form of B2B sales focused on

selling complex, high-value products or services to large organizations.

- **Inside Sales & Outside Sales:** These terms describe the location from which the salesperson works. Inside sales occur remotely (phone, video), while outside sales involve in-person meetings.
- **Consultative Sales:** A strategy where the salesperson acts as an advisor, focusing on deeply understanding the customer's needs to offer a solution.



Key Skills required for Sales

The role of a sales manager is all-important to the success of any sales team. They are responsible for motivating and inspiring their team, setting sales goals, and developing sales strategies. Today, sales managers need a varied skill set that includes both technical and soft skills. This blog post will discuss the essential skills that every sales manager needs in 2024, including technical skills such as data analysis and CRM software proficiency, as well as soft skills such as leadership and communication. We will also provide tips on how to be a good sales manager and how Salesforce can help sales managers be more successful.

Furthermore, they work closely with the marketing team to generate qualified leads and develop effective sales strategies that align with market trends and customer needs. Sales managers are also responsible for designing and implementing training programs to enhance the skills and knowledge of their sales team, ensuring they possess the necessary expertise to navigate the complexities of modern sales environments.

Another important aspect of a sales manager's role is managing the sales budget and forecasting sales performance. They must allocate resources efficiently, optimise sales operations, and accurately predict future sales trends to support strategic decision-making within the organisation. By fulfilling these diverse responsibilities, sales managers empower their teams to achieve peak performance, drive business growth, and contribute significantly to the overall success of the company.

10 Sales Management Skills that Make a Sales Manager Stand Out

Today, sales managers are pivotal in driving revenue growth and achieving organisational success. To be successful in this kind of environment, sales managers must possess a diverse range of skills that go beyond technical proficiency. While technical skills are undoubtedly important, it is the combination of technical expertise and soft skills that truly sets exceptional sales managers apart. Here are 10 essential sales management skills that make a sales manager stand out.

- **Strategic Vision and Planning:** The ability to develop and execute a well-defined sales strategy is crucial for sales managers. They must

have a clear vision of the sales goals and objectives, and the ability to create a roadmap to achieve those targets. This involves analysing market trends, identifying growth opportunities, and allocating resources effectively.

- **Motivating and Inspiring Leadership:** Sales managers are responsible for building and leading high-performing sales teams. To do this, they must possess strong leadership skills, including the ability to motivate and inspire their team members. This involves creating a positive work environment, recognising and rewarding achievements, and providing ongoing support and guidance
- **Effective Communication:** Excellent communication skills are essential for sales managers. They must be able to clearly articulate their expectations, provide constructive feedback, and effectively resolve conflicts. Additionally, they must be able to communicate effectively with customers, building strong relationships and fostering trust.
- **Expert Negotiation:** Sales managers often find themselves in negotiation situations, whether it's with customers, suppliers, or team members. Strong negotiation skills enable them to achieve favourable outcomes while maintaining positive relationships. This involves understanding the interests of all parties involved, finding common ground, and reaching mutually beneficial agreements.
- **Closing Deals:** The ultimate measure of success for a sales manager is the ability to close deals. This requires a combination of sales acumen, persuasion skills, and the ability to handle objections effectively. Sales managers must be able to identify and address customer concerns, build trust, and ultimately convince customers to make a purchase.
- **Time and Resource Management:** Sales managers have a lot on their plates, and effective time and resource management skills are essential to their success. They must be able to prioritise tasks, allocate resources efficiently, and manage their time wisely to achieve their goals. This involves setting clear priorities, delegating tasks, and avoiding distractions.
- **Data Analysis and Decision-Making:** Sales managers must be able to analyse and interpret data to make informed decisions. This involves understanding sales metrics, identifying trends, and using data to drive sales strategies. By leveraging data, sales managers can optimise their sales processes and improve overall performance.
- **Relationship Building:** Building strong relationships with customers, team members, and industry peers is crucial for sales managers. They must be able to establish trust, rapport, and mutual respect with all stakeholders. This involves listening actively, understanding customer needs, and providing exceptional customer service.
- **Adaptability and Resilience:** The business outlook is constantly changing, and sales managers must be adaptable and resilient to succeed. They must be able to quickly adjust to new market conditions, embrace change, and learn from setbacks. This involves



staying up-to-date with industry trends, being open to new ideas, and continuously seeking opportunities for improvement.

- **Continuous Learning and Development:** The world of sales is constantly evolving, and sales managers must be committed to continuous learning and development. They must stay updated with the latest sales techniques, technologies, and industry trends. This involves attending workshops and conferences, reading industry publications, and seeking out opportunities for personal and professional growth.
- By cultivating these 10 essential sales management skills, sales managers can position themselves for success and beyond. They will be able to lead their teams to exceptional performance, drive revenue growth, and achieve organisational objectives, making them indispensable assets to their organisations.

Role of Tech in Sales and Business

- **Career Guide**
- **Finding a job**
- **What Is a Technical Sale Rep? (With Duties, Qualifications and Skills)**

Educating customers on product features, conducting product demonstrations, leading sales calls and identifying new leads

Technical sales representatives are sales professionals who specialize in selling technical or scientific products. If you're interested in sales and science or technology, this might be a good role for you. Learning more about this position could help you determine if this career path is a good fit for your interests and skill set. In this article, we explain what a technical sales rep is, what they do, what qualifications they need and what skills they may use in their daily roles

What is a technical sales rep?

A technical sales representative, or specialist, is a professional who sells scientific or technical products. They understand the technical materials they work with, and they can discuss these items with customers. They often specialize in a certain type of product, such as software, scientific equipment or electronic devices. Technical sales representatives can work in a variety of industries, including:

- **Manufacturing**
- **Computer and software technology**
- **Telecommunications**
- **Biology**
- **Chemistry**

Within these industries, they often work for product suppliers, traveling to vendors and meeting with customers to market technical goods.

What does a technical sales rep do?

A technical sales representative travels and markets technological or scientific products. Their responsibilities can include:

- Analyzing customers' needs and recommending products
- Discussing products with customers and explaining technical concepts simply
- Writing reports and proposals for vendors or clients related to technical products
- Finding new customers and creating a sales relationship with potential buyers
- Building relationships with clients and encouraging long-term buyers
- Connecting with customers after a sales pitch to answer questions or provide advice
- Making sales pitches at demonstrations or conference events to persuade an audience to buy an item
- Meeting sales quotas and commission goals
- Traveling to meet with vendors or to lead instructional demonstrations for a product
- Negotiating prices with customers

- Tracking sales and sharing sales information with a manager or team lead
- Researching the current market trends and learning about new technology products

Related: 10 Reasons to Pursue a Career in Sales

○ **Qualifications for a technical sales representatives**

The qualification for technical sales representatives can vary depending on the specific role. Common requirements can include:

○ **Education**

The education requirements can vary depending on the role, but most technical sales representative positions require a bachelor's degree. Aspiring technical sales representatives may pursue a degree in one of the following areas:

- Information technology (IT)
- Computer science
- Marketing
- Business
- Engineering
- Biology
- Chemistry



These degree programs can help students develop their technical skills and knowledge. For example, studying marketing and business can help aspiring technical sales representatives learn more about selling strategies and marketing techniques. IT and computer science can help them develop their technological knowledge. Studying a scientific field, like biology or chemistry, may help them sell products within these markets, such as biological research equipment. When planning your education, consider your personal career goals and desired industry to help you find the right degree for your technical sales career.

Aspiring technical sales representatives may also pursue a graduate degree, such as a master's, but this is usually optional in this field. A higher-level degree could help professionals qualify for advanced roles, develop specific skills and combine their industry knowledge. For example, a biology major may pursue a marketing degree after college to help them gain sales skills. They can combine these marketing skills with their previous biology knowledge to help them sell biological research equipment or tools. You may consider a master's degree if you want to work in a specific field or apply for a competitive role.



Professional Experience

Many technical sales representative roles require or prefer some previous sales experience. Some employers accept sales experience from different industries. For example, you may qualify if you have two years of experience working as a retail associate. A company may also accept related roles, such as customer service positions, because they involve many of the same interpersonal skills. If you're interested in becoming a technical sales representative, consider gaining professional experience in an entry-level sales role, or a closely related position, to help you develop your skills. Some companies may also require specialized training in a technical field. For example, those interested in selling technology products may need IT experience. If you're interested in selling a particular product, you may consider gaining professional experience in that field to help you develop your industry knowledge.

Ability and Willingness to Travel

Some technical sales representative positions require frequent travel. This can vary depending on the role. For example, some professionals may need to drive within a certain radius, meeting with clients in the local area. Others may need to travel further distances to lead meetings or sales demonstrations. When researching roles in this field, consider your personal travel preference. If you want a travel job, you may find these opportunities. However, if you're interested in staying local, you may still be able to find these roles depending on your location. If you're traveling locally, some companies may require a driver's license to ensure sales reps can meet with clients efficiently.

Are you
willing to travel?
#jobinterview

Product Training

When selling products, sales representatives must know and understand the different goods they're marketing. This can help them explain the concepts to customers and answer client questions. Many companies provide this training as part of the onboarding process for new technical sales reps. You may take professional training courses or attend industry conferences to learn more about the latest products.

- Search jobs and companies hiring now
- Job title, keywords or company
- Location
- Skills for a technical sales representatives

To succeed in their role, technical sales representatives need a variety of hard and soft skills. Here are some common skills they may use to perform their daily duties:

- **Interpersonal skills:** Interpersonal skills are an important part of being a successful technical sales representative. They can use skills, such as empathy and patience, to build connections with existing customers, network with potential clients and lead effective demonstrations. They may also use interpersonal skills



like responsibility and dependability to help them stay motivated to meet their quotas.

- **Internal motivation:** Many technical sales rep roles involve a level of independence. During the day, these professionals may travel alone to meet with customers and clients. They may be part of a team and have a manager, but they perform a lot of their duties independently. The ability to self-start or self-motivate could help you meet your sales quotas or reach a commission goal in this career path.
- **Communication skills:** Technical sales representatives use communication skills to perform many of their daily tasks. They may use clear verbal communication to explain complex technical concepts to customers. They can also use active listening to understand a customer's needs. This can help them recommend the best product for each individual.
- **Sales skills:** To sell products effectively, technical sales representatives can use a variety of sales skills, including soft skills, such as persuasion. They can use these skills to encourage customers to buy products. They can also use technical sales skills, such as marketing strategies, to help them sell their items. For example, they may use marketing analysis skills to research current technology trends. They might also use sales techniques, such as follow-up emails, to connect with customers and increase their overall sales numbers. **Read more:** Sales Job Skills: Definition, Examples and Tips.
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- **Problem-solving:** A technical sales representative can use problem-solving skills to create effective sales solutions. When a customer discusses a challenge they're facing, a sales representative can use problem-solving skills to identify the best product solution for the customer. For example, if a local business manager is facing a challenge keeping customer information organized on a computer, a sales representative might advise the client to buy a software program to address this issue.
- **Technical knowledge:** Technical sales representatives are often experts in the products they sell. Through education and professional training, they can develop technical skills and industry knowledge. This helps them discuss the products with customers, recommend certain services or items to address clients' needs and explain complicated processes in simple terms for customers.

(Writer is Assistant Professor at Mewar University, Rajasthan)

Future of the Pharmacist

◦ Maab Mohammed

In today's health care ecosystem, the pharmacist is a trusted, critical, and - often - underutilized resource. As the pharmacy industry increases its use of enabling technologies, pharmacists may find themselves at a professional crossroads: either grow their role's scope and value or face potential disintermediation.

After all, in a not-so-distant future, robots will likely dispense medications to patients, 3D printers may print combination therapies, and algorithms may address most clinical edits. When combined with technology like smart contact lenses that use augmented reality (AR), it's possible that lower-skilled staff, such as pharmacy technicians, may be able to conduct basic tasks like visual verification.

Fortunately, an increasing demand for physicians combined with projections about people living longer, should create opportunities for pharmacists to evolve and expand their role - perhaps even to become the next generation of primary care providers (PCPs) who treat patients with acute illnesses and manage chronic conditions like diabetes, hypertension, and asthma. That will require regulatory changes, but pharmacists are increasingly being recognized as providers in the United States, building on global discussions about pharmacist prescribing.

Innovation in Pharmacy

Innovation in pharmacy involves leveraging technology to improve healthcare outcomes. Some examples include:

Personalized Medicine:- Using genetic data to tailor treatment plans for individual patients, including those with cancer.

Health Apps:- Mobile applications that help patients manage their health, track medication adherence, and monitor side effects.

Pharmaceutical Robotics:- Using robots to improve accuracy in medication dispensing, reducing errors, and enhancing patient safety.

Ethics in Pharmacy

Ethics in pharmacy are essential to ensure patient safety, respect for their rights, and dignity. Some ethical issues pharmacists face include:

Medical Confidentiality:- Protecting patients' personal and medical information, particularly sensitive information related to cancer diagnoses.

Autonomy:- Respecting patients' decisions regarding their treatment, including the right to refuse or discontinue treatment.

Justice:- Ensuring all patients have access to quality healthcare, including cancer treatment, regardless of their socioeconomic status.

Patient-Centered Care

Patient-centered care means putting patient needs at the forefront of healthcare. Some ways to achieve this include:

Effective Communication:- Listening to patient needs, providing clear information, and addressing concerns in a compassionate manner.

Shared Decision-Making:- Encouraging patients to participate in decisions about their treatment, including discussing treatment options and potential side effects.

Comprehensive Care:- Providing care that covers all patient needs, including physical, emotional, and social support.

Cancer and the Role of Pharmacy in its Treatment

Cancer is a complex and multifaceted disease that requires a comprehensive treatment approach. Pharmacists play a vital role in cancer care, including:-

Medication Management:- Ensuring patients receive the right medications, doses, and treatment regimens.

Side effect Management:- Helping patients manage side effects, such as nausea, pain, and fatigue.

Patient Education:- Providing patients with information about their treatment, potential side effects, and self-care strategies.



The Impact of AI on Student Learning

● Shreyansh Gupta

Artificial intelligence increasingly remolds the structure of modern education through new tools that increase learning efficiency, personalization, and accessibility. In this research, the ways in which AI affects students' learning are considered through a mixed-methods approach involving surveys, controlled experiments, and an analytical review of existing research. Data from 120 students and an experiment in which AI-assisted learning is compared with traditional means of study were collected. The results reflect that AI enhances the clarity of thought, productivity, and accuracy of students while introducing risks of dependence and reduced critical thinking. Altogether, AI is of immense benefit when used in a responsible manner and should supplement, rather than replace, genuine learning.

Artificial Intelligence has now become an integral part of today's learning environment. Students now use tools like ChatGPT, Google Gemini, and Microsoft Copilot for assignments, clarification of concepts, coding assistance, and exam preparations. While these offer instant and personalized assistance, they raise concerns about academic integrity, originality, and cognitive dependence.

The research will investigate the positive and negative impacts of AI on students' learning through questionnaires, experimentation, and an extended review of related literature.

Problem Statement: With the rapid growth of AI in education, the extent to which it really influences learning speed, comprehension, productivity, academic habits, and long-term cognitive development remains unclear.

Research Question: How does AI influence students' learning effectiveness, understanding, productivity, and academic behavior?

Objectives of the Study

- Assess how the introduction of AI-assisted learning influences understanding and productivity.
- Compare learning outcomes between AI users and non-users
- To identify the benefits and risks of AI in education
- Recommend responsible AI use practices
- Analyze behavioral and academic changes related to AI usage.

Significance of the Study

- This research is important since it:
- Helps educators integrate AI effectively
- Guides students toward responsible, meaningful AI use
- Helps institutions develop AI policies.
- Contributes data to ongoing research in AI-enhanced learning
- Outlines both opportunities and challenges that AI faces in education.

Literature Review

Literature reviewing AI in education presents mixed results.

Positive Findings

- AI enables personalized learning suited to each individual student's needs.
- AI helps students complete tasks 30–40% faster.
- AI enhances understanding by explaining things clearly.
- Helpful in coding, mathematics, languages, and revision

Concerns Identified in Literature

- Overuse of AI can weaken critical thinking.
- Students may be using AI-generated answers without fully understanding
- AI content may be inaccurate or outdated.
- Educators can no longer easily detect originality.

Overall, the literature seems to indicate that the outcomes depend on the

responsible use of AI.

Theoretical Framework

Constructivist Learning Theory: AI represents a digital tutor that guides students in active knowledge construction.

Cognitive Load Theory: AI eases the unnecessary cognitive load thereby freeing students to focus on core understanding.

Bloom's Taxonomy: AI supports foundational learning-remembering, understanding-thus freeing students to engage in higher order thinking tasks.

Hypothesis

H1: Students using AI tools will demonstrate better understanding, productivity, and confidence.

H0: AI tool use does not significantly influence the students' learning outcomes.

Methodology

A mixed-method approach was adopted.

A. Questionnaire

- **Participants:** 120 students across high school, college, and engineering
- **Tools used:** Google Forms, interviews.
- **Measured:** AI use frequency, productivity, accuracy, dependence, exam confidence

B. Experimental Study

- **Two groups researched the same topic:**

Group	Description	Students
Group A	Used AI Tools	60
Group B	Traditional study without AI	60

- Measured variables:
 - Concept understanding
 - Problem-solving ability
 - Time taken
 - Confidence level

C. Analytical Methods

- Percentage comparisons
- Average scoring
- Behavioral observation
- Interpretation according to literature

Results

A. Survey Results

- 82% learned faster with AI
- 74% utilized AI for coding or homework.
- 63% acknowledged dependency on AI
- 69% felt more exam-confident
- 47% experienced occasional inaccuracies of AI

B. Experimental Results

Skills	AI Group	Traditional Group
Concept Understanding	86%	63%
Concept Understanding	78%	59%
Problem-Solving	40 mins	72 mins
Confidence	High	Medium

Key Observations

- AI users learned 37% faster.
- AI provided clearer, more structured guidance
- Traditional learners displayed more independent thinking.
- AI users were able to finish tasks almost twice as fast.

Discussion

Positive Impacts

- Faster clarification of doubts
- Higher productivity
- Personalized learning pathways
- Effective coding and writing support
- Improved revision processes

Adverse Effects

- Overdependence on AI
- Reduced originality
- The occasional misinformation
- Decline in critical thinking
- Risk of Plagiarism

Balanced Perspective

AI itself is not the menace but its misuse is. Applied correctly, AI becomes an intelligent learning companion.

Limitations

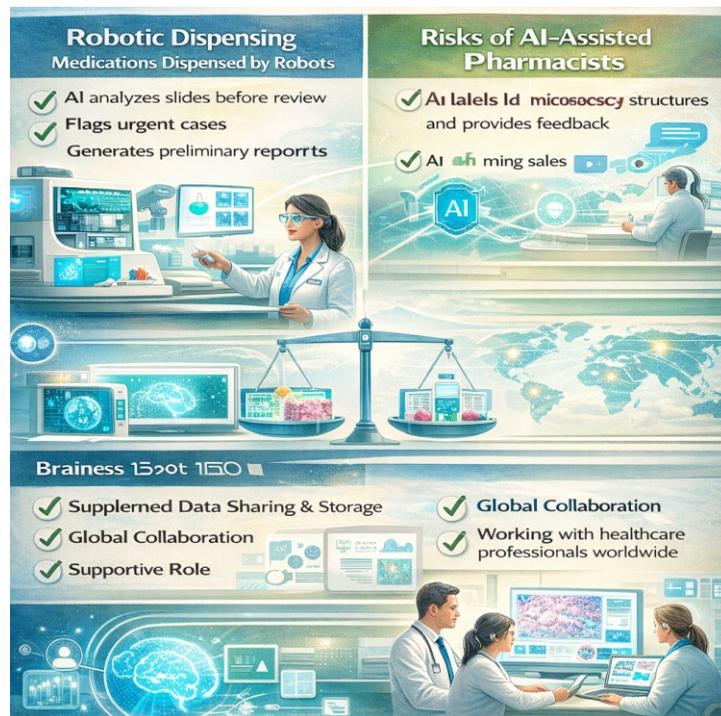
- Sample size limited to 120 students
- Short experimental duration
- Rapidly changing AI technologies
- Possible self-reporting bias

Ethical Considerations

- No sensitive data collected
- Voluntary participation
- Strict confidentiality
- AI used only for research purposes.

Future Scope

- AI-integrated classrooms
- Personalized AI textbooks
- Long-term studies on AI and cognitive development
- AI literacy courses for students



(Writer is Asisstant Professor at Mewar University, Rajasthan)

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#jobinterview

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(Writer is Assistant Professor at Mewar University, Rajasthan)

Mewar Pro Series – BGMI Tournament 2025

TTC Desk

The Technical Today Club proudly organized the Mewar Pro Series – BGMI Tournament 2025, a high-energy e-sports championship that attracted enthusiastic participation from students across various departments. The event served as a platform for gamers to demonstrate their competitive spirit, teamwork, tactical intelligence, and rapid decision-making, qualities central to modern esports culture.

The tournament witnessed intense matches, strategic gameplay, and immense excitement among both participants and spectators, marking it as one of the most successful and engaging technical-club events of the academic year.

○ Event Highlights

○ Massive Participation

Over 12+ professional and student teams registered for the tournament, showcasing remarkable coordination, strategic depth, and dedication throughout the three-day event.

○ Presence of Distinguished Guests

The event gained prestige with the presence of:

1. Mr. Alok Misra, Vice Chancellor, Mewar University (Chief Guest)

2. Mr. Lone Faisal, who delivered the official Vote of Thanks

Their valuable insights and encouragement greatly motivated the participants and organizing team.

○ Electrifying Game play & Audience Engagement

The tournament featured high-pressure rounds where players demonstrated exceptional focus and skill. The audience added to the thrill, cheering energetically as teams battled for the top spot.

Technical volunteers ensured smooth on-ground coordination, live match handling, and real-time scoreboard updates.

○ Grand Finale Final Leader Board

1st Place - Supernova Kashmir

Total Points: 89

A phenomenal performance combining aggressive finishes and consistent placement points.

2nd Place - Team Sigma

Total Points: 27

A strategic and balanced game play approach earned them a solid second position.

3rd Place - Dark Monarch

Total Points: 26

An impressive display of teamwork and resilience throughout the competition.

○ Prize Distribution

- 1st Prize: ₹5000
- 2nd Prize: ₹3000
- 3rd Prize: ₹1000
- MVP Award: ₹500

Winners were felicitated with trophies and certificates in a proud on-stage ceremony attended by the Vice Chancellor and event coordinators. The award distribution captured moments of happiness, applause, and well-deserved recognition.

○ Event Glimpses

The photographs illustrate:

- Group photos of teams, organizers, and coordinators
- Exciting on-stage award distribution moments
- High-intensity BGMI gameplay inside the seminar hall



○ Players demonstrating focus, strategy, and teamwork

○ Volunteers efficiently handling live match operations

○ Round-wise leaderboards reflecting the teams' performance

These visual highlights reflect the energy, enthusiasm, and esports passion among the students of Mewar University.

○ Appreciation

The success of the event was made possible through the combined efforts of:

- All participating teams
- The entire Technical Today Club organizing committee
- Dedicated volunteers and technical support members
- Enthusiastic spectators who cheered throughout the matches

Your participation and contribution truly made this tournament memorable and impactful.



DO YOU KNOW

Science & Nature

- **The Earth's Core Is as Hot as the Sun's Surface!**
The temperature at the Earth's inner core is estimated to be around 5,500°C, similar to the surface temperature of the Sun.
- **Trees Communicate Underground!**
Through a network of fungi called the 'Wood Wide Web,' trees share nutrients and warning signals.
- **Honey Never Spoils**
Archaeologists have discovered pots of honey in ancient Egyptian tombs - over 3,000 years old - still perfectly edible!
- **A Lightning Bolt Is Hotter Than the Sun**
A single bolt of lightning can reach 30,000°C, nearly five times hotter than the Sun's surface

Medicine & the Human Body

- **The Brain Has No Pain Receptors**
Even though it processes pain, the brain itself cannot feel pain.
- **You Have a Second 'Brain' in Your Gut**
The enteric nervous system in the gut contains over 100 million neurons - more than the spinal cord.
- **Blood Travels 19,000 km Every Day**
Blood circulates through the body about 1,000 times per day, covering nearly 19,000 kilometers.
- **Your Bones Are Stronger Than Steel**
Bone can withstand more pressure than concrete or steel, thanks to collagen and calcium phosphate.



Technology & Innovation

- **The First Computer Bug Was a Real Insect**
In 1947, engineers found a moth trapped inside a Harvard Mark II computer, giving birth to the term 'computer bug.'
- **Smartphones Are More Powerful Than Apollo Computers**
Modern smartphones are millions of times more powerful than the Apollo 11 computers.
- **Artificial Intelligence Can Create New Medicines**
AI can design potential drugs within hours - a process that used to take years.

History & Culture

- **The University Is an Ancient Invention**
The world's first university, al-Qarawiyyin in Morocco, was founded in 859 CE by Fatima al-Fihri.
- **Paper Was Once More Valuable Than Gold**
In ancient China, paper was a luxury item reserved for royalty and scholars.
- **The Library of Alexandria Had a 'Copying Policy'**
Ships docking in Alexandria had to surrender books for copying; originals stayed in the library.



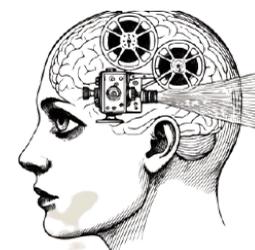
Fun, Weird & Wonderful

- **Bananas Are Berries - Strawberries Aren't!**
Botanically, bananas are berries, but strawberries aren't.
- **Octopuses Have Three Hearts**
Two hearts pump blood to the gills, while one pumps to the rest of the body.
- **Your Stomach Gets a New Lining Every Few Days**
The stomach regenerates its lining every 3-4 days to prevent self-digestion.
- **There's Enough DNA in Your Body to Stretch to the Sun and Back - 600 Times!**
If unwound, DNA from your body would stretch over 100 billion kilometers.



Did You Know About Learning Itself?

- **Pomodoro Method**
Studying in short bursts (25-30 minutes) improves memory.
- **Writing Notes by Hand**
Writing engages more brain areas and boosts retention.
- **Instrumental Music Helps Focus**
Music without lyrics can improve concentration.



PUZZLE

Riddle 1: I speak without a mouth and hear without ears. I have nobody, but I come

Riddle 2: The more you take, the more you leave behind. What am I?

Riddle 3: I have keys but no locks. I have space but no room. You can enter, but you

Riddle 4: I am always hungry, I must always be fed. The finger I touch will soon turn

Riddle 5: I'm tall when I'm young, and I'm short when I'm old. What am I?

एआई और पांचवी पीढ़ी की प्रौद्योगिकियां

• उमर हादी तिजानी • मुबाशिर रबीउ

प्रारंभिक अल्जाइमर रोग से पीड़ित लोगों के पुनर्वास में बदलाव

अल्जाइमर रोग एक प्रगतिशील तंत्रिका-अपक्षयी विकार है जिसकी विशेषता संज्ञानात्मक गिरावट, स्मृति हानि और दैनिक कार्यों में बाधा है। यह मनोभ्रंश का सबसे आम रूप है, जो दुनिया भर में लाखों लोगों को प्रभावित करता है और जीवन की गुणवत्ता में महत्वपूर्ण कमी लाता है। इस स्थिति में मस्तिष्क में एमिलॉइड प्लेक और टाउ टेंगल्स का संचय होता है, जिसके परिणामस्वरूप समय के साथ तंत्रिका कोशिकाओं की मृत्यु और मस्तिष्क शोष होता है। अल्जाइमर रोग पर पारंपरिक रूप से निदान के संदर्भ में चर्चा की जाती है, कि हम इसका कितनी जल्दी पता लगा सकते हैं, कौन से बायोमार्कर महत्वपूर्ण हैं, और कौन से इमेजिंग उपकरण मस्तिष्क में सूक्ष्म परिवर्तनों को प्रकट करते हैं। लेकिन प्रारंभिक पहचान से परे एक और व्यावहारिक प्रश्न है: तकनीक वास्तव में रोगियों को उनके दैनिक स्वास्थ्य लाभ और कार्यात्मक स्वतंत्रता में कैसे सहायता कर सकती है?

आज, सबसे रोमांचक सफलताएँ निदान कक्ष में नहीं, बल्कि पुनर्वास में हो रही हैं, जहाँ कृत्रिम बुद्धिमत्ता (एआई), 5जी नेटवर्क, पहनने योग्य सेंसर और उन्नत कंप्यूटिंग प्लेटफॉर्म संज्ञानात्मक गिरावट का अनुभव करने वाले व्यक्तियों के लिए क्या संभव है, इसे नया रूप दे रहे हैं।

क्लिनिक-आधारित थेरेपी से लेकर स्मार्ट, निरंतर पुनर्वास तक

अल्जाइमर रोग के पुनर्वास में लंबे समय से स्मृति प्रशिक्षण, शारीरिक गतिविधि, संतुलन और दैनिक जीवन की गतिविधियों पर केंद्रित व्यक्तिगत सत्रों पर भरोसा किया जाता रहा है। ये अब भी जरूरी हैं, लेकिन पारंपरिक चिकित्सा में कई सीमाएँ हैं: पहुँच संबंधी बाधाएँ, चिकित्सकों की कमी, मरीजों की यात्रा संबंधी चुनौतियाँ, और असंगत अनुवर्ती कार्रवाई। पाँचवी पीढ़ी (5G) का डिजिटल स्वास्थ्य ढाँचा, 1-संचालित पुनर्वास के साथ मिलकर, अब एक नया मॉडल प्रस्तुत करता है: निरंतर, घर-केंद्रित, अत्यधिक प्रतिक्रियाशील चिकित्सा। सप्ताह में एक बार क्लिनिक जाने के विपरीत, 1-सक्षम प्रणालियाँ प्रतिदिन चिकित्सा प्रदान कर सकती हैं, कार्यप्रणाली में सूक्ष्म परिवर्तनों को ट्रैक कर सकती हैं, और चिकित्सकों को पहले से कहीं अधिक सटीक उपचार प्रदान करने में मदद कर सकती हैं।

5G और टेलीरिहैबिलिटेशन का उदय

5G नेटवर्क अल्ट्रा-लो लेटेंसी कनेक्शन प्रदान करते हैं जो रोगियों और चिकित्सकों के बीच वास्तविक समय में बातचीत की अनुमति देते हैं। यह टेलीरिहैबिलिटेशन को सक्षम बनाता है, जहाँ मोटर प्रशिक्षण, संज्ञानात्मक व्यायाम और फिजियोथेरेपी को लाइव फीडबैक के साथ दूर से ही संचालित किया जा सकता है।

वृद्ध वयस्कों या प्रारंभिक संज्ञानात्मक गिरावट का अनुभव करने वाले व्यक्तियों के लिए, यह पुनर्वास की सबसे बड़ी बाधाओं में से एक को दूर

करता है: गतिशीलता। स्मार्टफोन या पहनने योग्य उपकरण के साथ, मरीज घर से निर्देशित सत्र कर सकते हैं जबकि चिकित्सक उनकी गति की गुणवत्ता, प्रतिक्रिया समय, मुद्रा और अनुपालन की निगरानी करते हैं। अध्ययनों से पता चलता है कि टेलीरिहैबिलिटेशन लचीले, ऑन-डिमांड थेरेपी सत्रों की पेशकश करके भागीदारी में सुधार करता है और देखभाल करने वाले के बोझ को कम करता है (चेन एट अल., 2022)

पहनने योग्य सेंसर और प्लडज: वास्तविक समय में निगरानी कार्य

इंटरनेट ऑफ मेडिकल थिंग्स (प्लडज)कृस्मार्ट घड़ियाँ, मोशन सेंसर, चाल ट्रैकर और घर-आधारित निगरानी उपकरणकृपुनर्वास को निर्धारित सत्रों से आगे बढ़ाते हैं। पहनने योग्य उपकरण चाल, संतुलन, हृदय गति, नींद की गुणवत्ता या दैनिक गतिविधि पैटर्न में उन बदलावों का पता लगा सकते हैं जो कार्यात्मक गिरावट का संकेत दे सकते हैं।

अल्जाइमर के रोगियों के लिए, यह अत्यंत महत्वपूर्ण है। सूक्ष्म गतिशीलता परिवर्तन अक्सर ध्यान देने योग्य संज्ञानात्मक बदलावों से पहले होते हैं। 1-सिस्टम इन सेंसरों से प्राप्त निरंतर डेटा का विश्लेषण करके अलर्ट उत्पन्न कर सकते हैं, व्यायाम में बदलाव सुझा सकते हैं, या चिकित्सकों को गिरावट की सूचना दे सकते हैं।

उदाहरण के लिए:

- स्मार्ट जूतों द्वारा पहचानी गई चाल की अस्थिरता गिरने से बचाव के व्यायाम कार्यक्रम को शुरू कर सकती है।
- गतिविधि के स्तर में कमी से मोटर-संज्ञानात्मक प्रशिक्षण में वृद्धि हो सकती है।
- नींद की लय में परिवर्तनकृसंज्ञानात्मक गिरावट का एक ज्ञात कारककृव्यवहारिक नींद हस्तक्षेप शुरू कर सकता है। पहनने योग्य उपकरणों से जुड़ी अंतर्दृष्टि चिकित्सा को पहले से कहीं

अधिक व्यक्तिगत और गतिशील बनाती है।

संज्ञानात्मक-मोटर पुनर्वास में वीआर और एआर

एक और बड़ी प्रगति आभासी वास्तविकता (वीआर) और संवर्धित वास्तविकता (एआर) का उपयोग है। ये इमर्सिव उपकरण संज्ञानात्मक उत्तेजना को शारीरिक कार्यों के साथ जोड़ते हैंकृएक ऐसा तरीका जो न्यूरोप्लास्टिसिटी को बढ़ावा देने के लिए जाना जाता है।

कल्पना कीजिए कि एक मरीज स्मृति और समस्या-समाधान का अभ्यास करने के लिए एक आभासी किराने की दुकान में घूम रहा है, साथ ही समन्वय में सुधार के लिए ट्रेडमिल पर चल रहा है।

या स्मार्ट ग्लास पर दृश्य संकेत दिखाई देते हुए, वास्तविक समय में गति का मार्गदर्शन करते हुए ऊपरी अंगों के व्यायाम कर रहा है।

वीआर-आधारित चिकित्सा ने शुरुआती अल्जाइमर और एमसीआई आबादी (मनेरा एट अल., 2020) में कार्यकारी कार्य, स्मरण क्षमता, संतुलन और प्रेरणा में महत्वपूर्ण सुधार दिखाया है। इसका गेमीफाइड और इंटरैक्टिव प्रारूप अनुपालन को बढ़ाता हैकृजो अक्सर पारंपरिक चिकित्सा में एक बड़ी चुनौती होती है।

एआई-संचालित अनुकूली पुनर्वास

जहाँ वर्चुअल रियलिटी और पहनने योग्य उपकरण अनुभव प्रदान करते हैं, वहीं एआई वह इंजन है जो पुनर्वास प्रक्रिया को वैयक्तिकृत करता है। एआई मॉडल निम्न कार्य कर सकते हैं:

- प्रदर्शन के आधार पर कठिनाई को समायोजित करें
- भविष्यवाणी करें कि कौन से व्यायाम सबसे अधिक कार्यात्मक लाभ प्रदान करेंगे
- गति या भाषण पैटर्न में गिरावट के शुरुआती संकेतों की पहचान करें
- चिकित्सक की अनुपस्थिति में स्वचालित प्रतिक्रिया प्रदान करें उदाहरण के लिए, यदि कोई रोगी लगातार दोहरे कार्य वाले चलने (सोचते हुए चलना) में संघर्ष करता है, तो एआई गति को धीमा कर सकता है, संज्ञानात्मक कार्य को सरल बना सकता है, या लक्षित व्यायाम सुझा सकता है। इसके विपरीत, यदि सिस्टम सुधार का पता लगाता है, तो यह चुनौती बनाए रखने और तंत्रिका अनुकूलन को बढ़ावा देने के लिए जटिलता को बढ़ा सकता है।

पहले गहन चिकित्सक की भागीदारी के बिना वैयक्तिकरण का यह स्तर असंभव थाकृलेकिन एआई अब इसे मापनीय बनाता है।

घर-आधारित पुनर्वास के लिए न्यूरोमॉर्फिक और एज कंप्यूटिंग

पाँचवीं पीढ़ी के कंप्यूटिंग में न्यूरोमॉर्फिक चिप्स और एज कंप्यूटिंग शामिल हैं, जो एआई को क्लाउड पर निर्भर हुए बिना सीधे छोटे उपकरणों पर चलने की अनुमति देते हैं। यह घर-आधारित पुनर्वास उपकरणों के लिए आदर्श है।

यह सक्षम बनाता है:

- तेज प्रोसेसिंग
 - कम डेटा लागत
 - बेहतर गोपनीयता
 - गतिशील कार्यों के दौरान रीयल-टाइम प्रतिक्रिया
- एक स्मार्ट पुनर्वास चटाई या कुर्सी की कल्पना करें जो मिलीसेकंड के भीतर मुद्रा, प्रतिक्रिया गति या संतुलन का विश्लेषण करती हैकृबिना इंटरनेट कनेक्शन के तुरंत प्रतिक्रिया प्रदान करती है।

चुनौतियाँ और नैतिक विचार

इस वादे के बावजूद, कई बाधाएँ अभी भी बनी हुई हैं:

- वृद्धों में तकनीकी साक्षरता अलग-अलग होती है।
 - ग्रामीण क्षेत्रों में विश्वसनीय नेटवर्क और उपकरणों तक पहुँच सीमित हो सकती है।
 - डेटा गोपनीयता और एआई पारदर्शिता पर सावधानीपूर्वक ध्यान दिया जाना चाहिए।
 - चिकित्सकों को एआई अंतर्दृष्टि को व्यवहार में एकीकृत करने के लिए प्रशिक्षण की आवश्यकता है।
- न्यायसंगत, सुरक्षित और प्रभावी उपयोग सुनिश्चित करने के लिए संतुलित कार्यान्वयन आवश्यक है।



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ग्राम स्वराज और टेक्नोलॉजी

• प्रदुम्न शर्मा • कन्हैया रेगर

प्रारंभिक अल्जाइमर रोग से पीड़ित लोगों के पुनर्वास में बदलाव

24 अप्रैल को मनाए जाना वाला राष्ट्रीय महत्व का दिन 'पंचायती राज दिवस' या 'ग्राम स्वराज दिवस' के रूप में 2010 से मनाया जा रहा है। यह दिन भारत में ग्रामीण लोकतंत्र एवं स्थानीय स्वशासन को मजबूत करने के लिए मनाया जाता है। इस दिन, पंचायती राज संस्थानों के महत्व को उजागर किया जाता है। यह दिन 1993 में 73 वें संवैधानिक संशोधन अधिनियम के पारित होने का प्रतीक है, जिसने पंचायती राज संस्थानों को एक संवैधानिक दर्जा दिया।

ग्राम स्वराज: महात्मा गाँधी की सोच

ग्राम स्वराज महात्मा गाँधीजी की सोच थी एवं उन्होंने ग्राम स्वराज की कल्पना एक ऐसे भारत के रूप में की थी, जहाँ गाँव सामाजिक, आर्थिक और राजनितिक रूप से आत्मनिर्भर हों। वे मानते थे कि भारत की असली ताकत उसके गाँवों में निहित है। आज, 21 वीं सदी, टेक्नोलॉजी का युग है, ग्रामीण भारत भी डिजिटल क्रान्ति की तरफ अग्रसर है। ग्राम स्वराज की अवधारणा को टेक्नोलॉजी के साथ जोड़कर ही गाँवों को असल में आत्मनिर्भरता की ओर ले जाया जा सकता है। गाँधीजी के अनुसार, ग्राम स्वराज का अर्थ था— गाँवों का स्वशासन, स्थानीय संसाधनों पर निर्भरता और सामुदायिक सहयोग व सहकारिता। उनका विचार था कि यदि गाँव मजबूत होंगे, तो देश मजबूत होगा। लेकिन स्वतंत्रता के बाद, शहरीकरण व औद्योगीकरण ने ग्रामीण विकास को चुनौती दी है। लेकिन अब टेक्नोलॉजी के माध्यम से ग्राम स्वराज के एक नए हिस्से को सशक्त किया जा सकता है।

डिजिटल गाँव - समृद्ध भारत

आज डिजिटल इंडिया, मेक इन इंडिया एवं स्टार्टअप इंडिया जैसी पहलों ने गाँवों को तकनीक से जोड़ा है। भारतीय आबादी लगभग 70: कृषि पर निर्भर है। टेक्नोलॉजी ने किसानों की मदद के लिए नए तरीके व उपकरण उपलब्ध करवाए हैं। जैसे— ई-मंडी (म-छ।ड), ड्रोन तकनीक, स्मार्ट सेंसर व मौसम पूर्वानुमान एप्स आदि। डिजिटल लेनदेन जैसे दृ न्च, रुपे कार्ड और जनधन खातों ने गाँवों में कैशलेस अर्थव्यवस्था को बढ़ावा दिया। ई-ग्राम स्वराज पोर्टल द्वारा पंचायती राज संस्थाओं को डिजिटल बनाने की पहल की गई एवं आधार और डायरेक्ट बेनिफिट ट्रांसफर (कठज) द्वारा सरकारी आर्थिक योजनाओं का लाभ सीधे लाभार्थियों तक पहुँचाना। डिजिटल स्किल डेवलपमेंट द्वारा 'स्किल इंडिया' जैसे कार्यक्रमों से युवाओं को ऑनलाइन प्रशिक्षण देना। गूगल साथी और इंटरनेट साक्षरता द्वारा ग्रामीणों को ऑनलाइन कमाई के तरीके सिखाना जिससे वे अपनों का एक

समृद्ध भविष्य निर्माण कर सके। ग्रामों में शिक्षा के क्षेत्र में व उसकी गुणवत्ता में सुधार के लिए टेक्नोलॉजी ने नए रास्ते खोले हैं। जैसे— ऑनलाइन क्लासेज, डिजिटल लाइब्रेरीज व सरकारी योजनाएँ, जैसे— 'दीक्षा' व 'स्वयं' जैसे प्लेटफॉर्म ने मुफ्त शिक्षा सामग्री उपलब्ध करवाई। टेक्नोलॉजी के माध्यम से गाँवों में स्वास्थ्य सेवाओं में क्रान्ति आई है। डॉक्टरों व अस्पतालों की कमी को टेक्नोलॉजी ने कुछ हद तक दूर किया है। जैसे— टेलीमेडिसिन (मोबाइल एप्स से दूरस्थ इलाज), आयुष्मान भारत डिजिटल मिशन (।ठक्ड) एवं मोबाइल मेडिकल यूनिट्स (गाँव- गाँव तक दवा और जाँच सुविधाएँ पहुँचाना)।

समापन

महात्मा गाँधीजी के ग्राम स्वराज के सपने को टेक्नोलॉजी के माध्यम से साकार किया जा सकता है। डिजिटल इंडिया, स्मार्ट विलेज और सस्टेनेबल डेवलपमेंट जैसी पहले गाँवों को आत्मनिर्भर बना रही है। हालाँकि अभी भी बहुत सारी चुनौतियाँ बनी हुई हैं, पर सरकार, निजी क्षेत्र एवं स्थानीय समुदायों के मिलकर काम करने से हर ग्रामीण तक टेक्नोलॉजी का लाभ पहुँचा सकती हैं।



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प्राकृतिक खेती (जैविक खेती और पारंपरिक खेती में अंतर)

● राहिल प्रजापत ● मुस्तकीम उल अमीन

प्राकृतिक खेती एक टिकाऊ कृषि पद्धति है जो कृत्रिम रसायनों, कीटनाशकों और उर्वरकों के उपयोग से बचती है। इसके बजाय, यह मिट्टी की उर्वरता और फसल स्वास्थ्य को बनाए रखने के लिए प्राकृतिक प्रक्रियाओं, जैव विविधता और स्थानीय रूप से उपलब्ध संसाधनों पर निर्भर करती है। यह प्रकृति के साथ सामंजस्य बिठाकर खेती पर जोर देती है, जहाँ मिट्टी, पानी, सूक्ष्मजीव, पौधे और जानवर एक आत्म-निर्भर प्रणाली में परस्पर क्रिया करते हैं।

प्राकृतिक खेती का दर्शन मसानाबू फुकुओका (जापान) द्वारा उनकी पुस्तक "द वन-स्ट्रॉ रिवोल्यूशन" के माध्यम से विश्व स्तर पर लोकप्रिय हुआ। भारत में, इसे सुभाष पालेकर द्वारा शून्य बजट प्राकृतिक खेती (उछथे) की अवधारणा के माध्यम से बढ़ावा दिया गया।

प्राकृतिक खेती की मुख्य विशेषताएँ

- कोई रासायनिक निवेश नहीं : उर्वरकों, कीटनाशकों, शाकनाशियों से बचाता है।
- कोई बाहरी जैविक निवेश नहीं : जैविक खेती के विपरीत, यह खरीदे गए इनपुट को भी कम करता है।
- प्राकृतिक संसाधनों का उपयोग : गाय का गोबर, गोमूत्र, फसल अवशेष, मल्लिंग, हरी खाद, लाभकारी सूक्ष्मजीव।
- कम लागत : किसानों की बाजारों पर निर्भरता कम करता है अक्सर "शून्य बजट" कहा जाता है।
- मिट्टी का स्वास्थ्य और जैव विविधता : सूक्ष्मजीवों की गतिविधि, प्राकृतिक पोषक तत्व चक्रण और पारिस्थितिकी तंत्र संतुलन पर केंद्रित है।

प्राकृतिक और पारंपरिक खेती के बीच अंतर

1. रसायनों का उपयोग

- प्राकृतिक खेती: सिंथेटिक उर्वरकों, कीटनाशकों, शाकनाशियों और वृद्धि हार्मोन से बचा जाता है। इसके बजाय, यह गाय के गोबर, गोमूत्र, खाद, बायो-एंजाइम, हरी खाद, पलवार और प्राकृतिक मिट्टी के रोगाणुओं जैसे जैविक इनपुट पर निर्भर करती है।
- पारंपरिक खेती: पैदावार बढ़ाने और कीटों को नियंत्रित करने के लिए रासायनिक उर्वरकों, कीटनाशकों, शाकनाशियों और सिंथेटिक वृद्धि नियामकों का उपयोग करती है।

2. मृदा स्वास्थ्य

- प्राकृतिक खेती: प्राकृतिक चक्रों (केंचुए, रोगाणु, जैविक पदार्थ) के माध्यम से मिट्टी की उर्वरता बनाए रखती है। जोर मिट्टी को "जीवित" रखने पर है।
- पारंपरिक खेती: रसायनों पर अत्यधिक निर्भरता के कारण समय के साथ अक्सर मिट्टी के स्वास्थ्य को खराब करती है, जिससे सूक्ष्मजीवों की विविधता कम हो जाती है और मिट्टी का क्षरण हो सकता है।

3. उत्पादन लागत

- प्राकृतिक खेती: कम लागत वाली, क्योंकि यह स्थानीय रूप से उपलब्ध संसाधनों (गाय का गोबर, फसल अवशेष, खेत पर तैयारियाँ) पर निर्भर करती है।
- पारंपरिक खेती: बाजार से खरीदे गए इनपुट जैसे उर्वरक, कीटनाशक और हाइब्रिड बीज पर निर्भरता के कारण उच्च लागत वाली होती है।

4. उपज

- प्राकृतिक खेती : शुरुआत में, उपज कम हो सकती है, लेकिन समय के साथ मिट्टी की उर्वरता और उत्पादकता में सुधार होता है, जिससे स्थिर और टिकाऊ उपज मिलती है।
- पारंपरिक खेती : आमतौर पर उच्च अल्पकालिक उपज सुनिश्चित करती है, लेकिन मिट्टी की थकावट और कीट प्रतिरोध में कमी के कारण लंबे समय में गिरावट आ सकती है।

5. भोजन की गुणवत्ता

- प्राकृतिक खेती : रसायन-मुक्त, स्वस्थ और पोषक तत्वों से भरपूर भोजन का उत्पादन करती है।
- पारंपरिक खेती : भोजन में अक्सर उर्वरकों और कीटनाशकों से रासायनिक अवशेष होते हैं।

6. पर्यावरण पर प्रभाव

- प्राकृतिक खेती : पर्यावरण के अनुकूल है, जैव विविधता को बढ़ावा देती है, पानी का संरक्षण करती है और प्रदूषण को कम करती है।
- पारंपरिक खेती : मिट्टी और जल प्रदूषण (रासायनिक अपवाह), ग्रीनहाउस गैस उत्सर्जन और जैव विविधता के नुकसान में योगदान करती है। देती है, पानी का संरक्षण करती है और प्रदूषण को कम करती है।

प्राकृतिक खेती की प्रमुख प्रथाएँ

- रसायनों के बजाय जैव-इनपुट का उपयोग : उर्वरता और कीट नियंत्रण जीवामृत, बीजामृत, पंचगव्य, नीम के अर्क और गोमूत्र जैसे प्राकृतिक

उपायों पर निर्भर करते हैं। ये मिट्टी के सूक्ष्मजीवों में सुधार करते हैं, पोषक तत्व प्रदान करते हैं और फसलों को स्वाभाविक रूप से बचाते हैं।

- **बीज उपचार** : बीजों को कीटों, बीमारियों से बचाने और अंकुरण को बढ़ाने के लिए प्राकृतिक घोल (जैसे बीजामृत) से उपचारित किया जाता है।
- **मिट्टी संवर्धन** : जैविक खाद, कम्पोस्ट, हरी खाद और पलवार मिट्टी की संरचना और उर्वरता में सुधार करते हैं। फसल अवशेषों को मिट्टी में पुनर्चक्रित किया जाता है।
- **पलवार** : नमी बनाए रखने, खरपतवारों को दबाने और केंचुओं और सूक्ष्मजीवों का समर्थन करने के लिए मिट्टी को फसल अवशेषों, सूखी पत्तियों या पुआल से ढकना।
- **अंतरफसल और मिश्रित फसल** : संसाधनों के उपयोग को अधिकतम करने, मिट्टी की उर्वरता में सुधार करने और कीटोंधरोगों के जोखिम को कम करने के लिए कई फसलों को एक साथ उगाना (जैसे, अनाज, दालें)।
- **कृषि वानिकी और जैव विविधता संवर्धन** : प्राकृतिक पारिस्थितिकी तंत्रों की नकल करने और पारिस्थितिक संतुलन प्रदान करने के लिए पेड़, झाड़ियाँ और विविध फसलें लगाना।
- **गो-आधारित उत्पादों का उपयोग** : स्वदेशी गाय का गोबर और मूत्र जैव-उर्वरक और जैव-कीटनाशक बनाने के लिए केंद्रीय हैं।
- **प्राकृतिक कीट प्रबंधन** : हानिकारक कीटों को दूर भगाने के लिए तेल, मिर्च-गा अर्क और ट्रैप फसलें (जैसे गेंदा) का उपयोग किया जाता है। मधुमक्खियों, लेडीबग्स और केंचुओं जैसे लाभकारी कीड़ों को प्रोत्साहित करता है।
- **जल प्रबंधन पद्धतियाँ** : वर्षा जल संचयन, ड्रिप सिंचाई और पलवार जैसी पद्धतियाँ पानी के उपयोग को कम करती हैं और दक्षता में सुधार करती हैं।
- **शून्य जुताई & न्यूनतम जुताई**: मिट्टी की संरचना, सूक्ष्मजीव जीवन और जैविक पदार्थ को बनाए रखने के लिए गहरी जुताई से बचना।

मिथक और तथ्य

- **मिथक 1** : प्राकृतिक खेती और जैविक खेती एक ही हैं।
 - **तथ्य** : दोनों रासायनिक उर्वरकों और कीटनाशकों से बचते हैं, लेकिन प्राकृतिक खेती शून्य बाहरी इनपुट (कोई जैविक खाद, कम्पोस्ट या वर्मीकम्पोस्ट नहीं) पर जोर देती है, इसके बजाय गाय के गोबर, गोमूत्र और खेत में उपलब्ध बायोमास जैसे प्राकृतिक संसाधनों पर निर्भर करती है।
- **मिथक 2** : प्राकृतिक खेती लोगों को खिलाने के लिए पर्याप्त उपज पैदा नहीं कर सकती है।
 - **तथ्य** : अध्ययनों से पता चलता है कि शुरुआती पैदावार थोड़ी कम हो सकती है, लेकिन समय के साथ मिट्टी की उर्वरता में सुधार होता है, फसल का लचीलापन बढ़ता है, और स्थिर पैदावार प्राप्त होती है। यह इनपुट लागत को भी कम करता है, जिससे खेती अधिक लाभदायक



- **मिथक 3** : प्राकृतिक खेती में किसानों को कोई प्रयास नहीं करना पड़ता है।
 - **तथ्य** : किसानों को जीवामृत, बीजामृत, पलवार जैसे आदान तैयार करने और मिट्टी की नमी बनाए रखने के लिए प्रशिक्षण और देखभाल की आवश्यकता होती है। यह कम खर्चीला है लेकिन इसमें प्रयास की आवश्यकता होती है।
- **मिथक 4** : प्राकृतिक खेती फसलों को कीटों और बीमारियों से नहीं बचा सकती है।
 - **तथ्य** : प्राकृतिक खेती पर्यावरण-अनुकूल फार्मूलेशन (जैसे अग्निअस्त्र, नीमास्त्र) का उपयोग करती है और जैव विविधता को बढ़ावा देती है, जो प्राकृतिक कीट नियंत्रण और रोग प्रबंधन में मदद करती है।
- **मिथक 5** : प्राकृतिक खेती केवल पर्यावरण के लिए फायदेमंद है, किसानों की आय के लिए नहीं।
 - **तथ्य** : आदान लागत (उर्वरककीटनाशकों की खरीद नहीं) कम करके, और मिट्टी के स्वास्थ्य में सुधार करके, प्राकृतिक खेती किसानों की शुद्ध आय बढ़ाती है और दीर्घकालिक स्थिरता सुनिश्चित करती है।

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E20 ईंधन

• मो. मोदस्सिर अख्तर

ऊर्जा अब आधुनिक सभ्यता की रीढ़ बन चुकी है। परिवहन, उद्योगों, कृषि और दैनिक मानवीय गतिविधियों के लिए भारी मात्रा में ईंधन की खपत होती है। दशकों से, बड़ी संख्या में वाहन कच्चे तेल से प्राप्त ईंधन और डीजल को मूलभूत ऊर्जा स्रोत के रूप में इस्तेमाल करते आ रहे हैं। जीवाश्म ईंधन के बढ़ते उपयोग से प्रदूषण, जलवायु परिवर्तन, प्राकृतिक संसाधनों की कमी और तेल आयात करने वाले देशों पर निर्भरता जैसी गंभीर चुनौतियाँ उत्पन्न हो रही हैं। इन चुनौतियों से निपटने के लिए कई देश वैकल्पिक और स्वच्छ ईंधन विकल्पों की तलाश कर रहे हैं।



से उत्पादित होता है, जिससे यह जीवाश्म ईंधन की तुलना में एक स्वच्छ विकल्प बन जाता है।

अब तक, भारत E5 (5% इथेनॉल मिश्रित ईंधन) और बाद में E10 (10% इथेनॉल) का उपयोग कर रहा था। इस प्रकार, E20 को अपनाना जैव ईंधन के उपयोग को बढ़ाने में एक महत्वपूर्ण कदम है। E20 ईंधन पर चलने वाले वाहनों को E20-अनुरूप वाहन कहा जाता है, जिनका निर्माण इथेनॉल के संक्षारक गुणों के प्रति प्रतिरोधी सामग्रियों का उपयोग करके किया जाता है। E20 ईंधन की आवश्यकता

E20 ईंधन की शुरुआत कई कारकों से प्रेरित है:

- शहरी क्षेत्रों में बढ़ता वायु प्रदूषण
 - ग्रीनहाउस गैस उत्सर्जन में वृद्धि
 - आयातित कच्चे तेल पर अत्यधिक निर्भरता
 - वैश्विक तेल कीमतों में अस्थिरता
 - नवीकरणीय और घरेलू ऊर्जा स्रोतों को बढ़ावा देने की आवश्यकता
- देश वर्तमान में आवश्यक कच्चे तेल की भारी मात्रा के आयात पर निर्भर है, जिससे विदेशी मुद्रा भंडार पर काफी दबाव पड़ रहा है। साथ ही, अतिरिक्त कृषि उपज के अलावा भारी मात्रा में कृषि अपशिष्ट भी उपलब्ध है। यदि इसे इथेनॉल में संसाधित किया जाए, तो यह पर्यावरण और अर्थव्यवस्था दोनों के लिए लाभकारी स्थिति होगी।

ऐसा ही एक वैकल्पिक ईंधन है इथेनॉल-मिश्रित ईंधन, विशेष रूप से E20 ईंधन, जो 20% इथेनॉल और 80% पेट्रोल से बना होता है। कार्बन उत्सर्जन को कम करने, नवीकरणीय ऊर्जा को विकसित करने और ऊर्जा सुरक्षा सुनिश्चित करने की देश की दीर्घकालिक नीति के अनुरूप, भारत ने E20 ईंधन के उपयोग को अपनाया है। सरकार सतत विकास लक्ष्यों को आगे बढ़ाने के लिए पूरे देश में E20 ईंधन को लागू कर रही है।

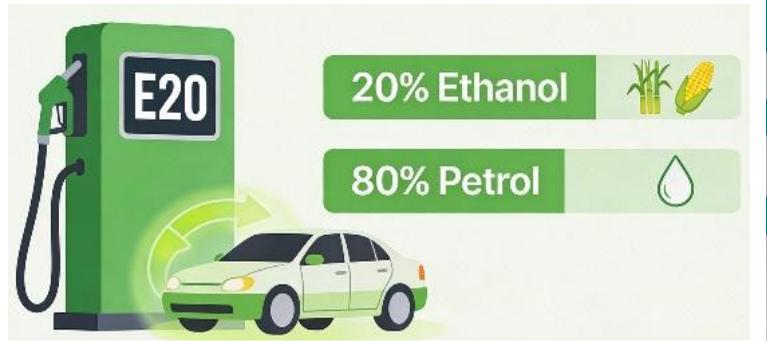
E20 ईंधन पर्यावरण, आर्थिक और सामाजिक दृष्टिकोण से अपार लाभ प्रदान करता है, लेकिन इसमें कुछ कमियाँ और कार्यात्मक खामियाँ भी हैं। इस शोधपत्र में E20 ईंधन पर विस्तार से चर्चा की गई है, क्योंकि इसमें इसके फायदे और नुकसान तथा अर्थव्यवस्था, पर्यावरण और ऑटोमोबाइल क्षेत्र पर पड़ने वाले इसके समग्र प्रभाव को दर्शाया गया है।

E20 ईंधन क्या है?

E20 ईंधन पेट्रोल और इथेनॉल का मिश्रण है, जिसमें इथेनॉल की मात्रा 20% होती है। इथेनॉल एक जैव ईंधन है जो गन्ने, मक्का, गेहूं और अन्य फसलों से प्राप्त शर्करा के किण्वन द्वारा उत्पादित होता है। इथेनॉल को स्वच्छ ईंधन इसलिए माना जाता है क्योंकि यह नवीकरणीय कृषि सामग्रियों

E20 ईंधन के लाभ

○ पर्यावरणीय लाभ



○ वायु प्रदूषण में कमी: E20 ईंधन का सबसे महत्वपूर्ण लाभ यह है कि

यह पर्यावरण के अनुकूल है, क्योंकि यह वायु प्रदूषण को रोकता है। ऐसा इसलिए है क्योंकि इथेनॉल में ऑक्सीजन होता है, इसलिए ईंधन स्वच्छ तरीके से जल सकता है। इससे प्रदूषण के परिणामस्वरूप उत्सर्जित कार्बन मोनोऑक्साइड, हाइड्रोकार्बन और कण पदार्थ की मात्रा में कमी आती है, जो घनी आबादी वाले शहरों के लिए अत्यंत आवश्यक है। यह पर्यावरण के अनुकूल है, क्योंकि यह वायु प्रदूषण को रोकता है। ऐसा इसलिए है क्योंकि इथेनॉल में ऑक्सीजन होता है, इसलिए ईंधन स्वच्छ तरीके से जल सकता है। इससे प्रदूषण के परिणामस्वरूप उत्सर्जित कार्बन मोनोऑक्साइड, हाइड्रोकार्बन और कण पदार्थ की मात्रा में कमी आती है, जो घनी आबादी वाले शहरों के लिए अत्यंत आवश्यक है।

○ **आर्थिक विकास और रोजगार सृजन:** इथेनॉल उत्पादन से जुड़े विभिन्न क्षेत्र रोजगार के अवसर प्रदान करते हैं।

- जैव ईंधन उत्पादन संयंत्र
- भंडारण और वितरण के लिए बुनियादी ढांचा

इथेनॉल उद्योग में सुधार औद्योगीकरण को बढ़ावा देता है, जिससे आर्थिक विकास में योगदान होता है।

E20 ईंधन की कमियां

इसके फायदों के बावजूद, E20 ईंधन की कई सीमाएं भी हैं जिन पर सावधानीपूर्वक विचार करने की आवश्यकता है।

○ **मौजूदा वाहनों के साथ अनुकूलता संबंधी समस्याएं :** E20 ईंधन की सबसे बड़ी चुनौतियों में से एक है वाहनों के साथ इसकी अनुकूलता। कई पुराने वाहन E0 या E10 ईंधन के लिए डिजाइन किए गए हैं। इथेनॉल निम्नलिखित घटकों को नुकसान पहुंचा सकता है:

- रबर सील
- प्लास्टिक के पुर्जे
- ईंधन पाइप
- गैसकेट

E20 ईंधन का उपयोग असंगत वाहनों में करने से ईंधन का रिसाव, इंजन में खराबी और रखरखाव लागत में वृद्धि हो सकती है।



○ **ईंधन दक्षता में कमी :** पेट्रोल की तुलना में इथेनॉल में प्रति लीटर कम ऊर्जा होती है। परिणामस्वरूप, E20 ईंधन पर चलने वाले वाहनों का माइलेज कम हो सकता है। इसका मतलब है कि ड्राइवर्स को बार-बार ईंधन भरवाना पड़ सकता है, जिससे उपभोक्ताओं का ईंधन खर्च बढ़ सकता है।

○ **रखरखाव और जंग लगने की समस्याएँ :** इथेनॉल नमी सोखने वाला होता है, यानी यह हवा से नमी सोख लेता है। इस गुण के कारण निम्नलिखित समस्याएं हो सकती हैं:

- धातु के पुर्जों में जंग लगना
- ईंधन टैंकों में जंग लगना
- इंजन के पुर्जों का जीवनकाल कम होना

यदि वाहन विशेष रूप से इथेनॉल मिश्रण के लिए डिजाइन नहीं किए गए हैं,

○ **ग्रीनहाउस गैस उत्सर्जन में कमी:** जलवायु परिवर्तन का कारण बनने वाली हानिकारक ग्रीनहाउस गैसों के उत्सर्जन को कम करने के संबंध में E20 ईंधन के कई लाभ हैं। ऐसा इसलिए है क्योंकि यद्यपि इसमें पौधों से प्राप्त इथेनॉल के अर्क होते हैं, फिर भी पौधों द्वारा वायुमंडल से कार्बन डाइऑक्साइड को अवशोषित करने की दर सीधे पेट्रोल की तुलना में कम होती है, जिससे यह पर्यावरण के अनुकूल बन जाता है।

○ **ऊर्जा सुरक्षा और तेल आयात में कमी:** अंतरराष्ट्रीय स्तर पर कच्चे तेल के सबसे बड़े आयातकों में से एक होने के नाते, भारत अंतरराष्ट्रीय बाजारों में तेल की कीमतों में होने वाले उतार-चढ़ाव से हमेशा प्रभावित रहा है। इसके अलावा, भू-राजनीतिक तनाव भी देश की अर्थव्यवस्था पर असर डाल रहे हैं। ऐसे में, गैसोलीन में इथेनॉल मिलाने से जीवाश्म ईंधन पर निर्भरता काफी हद तक कम हो जाएगी, जिससे देश की विदेशी मुद्रा की बचत होगी।

○ **कृषि क्षेत्र को समर्थन:** इस प्रकार, इथेनॉल उत्पादन कृषि ऊर्जा का एक ठोस स्रोत है। गन्ना, मक्का और अनाज जैसी फसलों की बढ़ती मांग से किसानों को लाभ मिलता है। कृषि अवशेषों का उपयोग भी इथेनॉल उत्पादन में किया जाता है, जिससे कृषि अपशिष्ट कम करने में मदद मिलती है। आय का यह अतिरिक्त स्रोत निम्न में सहायक है:

- किसानों की आय में वृद्धि
- ग्रामीण रोजगार को बढ़ावा
- कृषि अर्थव्यवस्था को सुदृढ़ करना

इस प्रकार, E20 ईंधन ग्रामीण विकास में महत्वपूर्ण भूमिका निभाता है।

○ **नवीकरणीय ऊर्जा को प्रोत्साहन:** इथेनॉल एक नवीकरणीय ऊर्जा स्रोत है जिसका निरंतर उत्पादन किया जा सकता है। E20 ईंधन को अपनाने से गैर-नवीकरणीय जीवाश्म ईंधन से नवीकरणीय ऊर्जा स्रोतों की ओर संक्रमण को बढ़ावा मिलता है। यह विश्व के सतत विकास के एजेंडे के अनुरूप है।

○ **बेहतर इंजन प्रदर्शन (समर्थित मॉडलों में):** इथेनॉल का ऑक्टेन नंबर गैसोलीन से अधिक होता है। ऑक्टेन नंबर ईंधन के प्रज्वलन को न्यूनतम स्तर तक बढ़ा देता है और इंजन में नॉकिंग को रोकता है। इसलिए, जिन वाहनों के इंजन E20 ईंधन पर चल सकते हैं, उनमें तापीय दक्षता में सुधार होता है।

तो समय के साथ रखरखाव लागत बढ़ सकती है।

○ **अवसंरचना और उत्पादन संबंधी चुनौतियाँ** : E20 ईंधन को बड़े पैमाने पर अपनाने के लिए निम्नलिखित की आवश्यकता है:

- इथेनॉल उत्पादन क्षमता का विस्तार
- ईंधन भंडारण टैंकों में संशोधन
- पाइपलाइनों और वितरण प्रणालियों का उन्नयन

इन परिवर्तनों में महत्वपूर्ण निवेश और रसद योजना की आवश्यकता होगी। प्रारंभिक चरणों में, इससे परिचालन लागत बढ़ सकती है।

○ **खाद्य सुरक्षा पर प्रभाव**

- **खाद्य सुरक्षा** : इथेनॉल उत्पादन के लिए कृषि फसलों का उपयोग आवश्यक है, जिनका उपभोग मानव उपयोग के लिए किया जा सकता है। यदि देश की जनसंख्या पर्याप्त है, तो ईंधन के लिए इन फसलों का उपयोग स्वास्थ्य के लिए खतरा पैदा कर सकता है।

यह अत्यंत महत्वपूर्ण है कि इथेनॉल उत्पादन के लिए गैर-खाद्य बायोमास और कृषि अपशिष्ट के प्रसंस्करण को प्रोत्साहित किया जाए, जिससे इस समस्या का समाधान करने में सहायता मिलेगी।

○ **E20 की व्यापक उपलब्धता का अभाव** : हालांकि ऑटोमोबाइल निर्माता E20-अनुकूल कारों बनाना शुरू कर रहे हैं, लेकिन वर्तमान में सड़कों पर चल रही कारों का बेड़ा E20-अनुकूल नहीं है। इसका मतलब यह होगा कि उपभोक्ताओं को अपनी पुरानी कार को अपग्रेड करना होगा या नई कार खरीदनी होगी, जो कुछ लोगों के लिए एक बड़ा निवेश है।



E20 ईंधन का ऑटोमोबाइल उद्योग पर प्रभाव

○ **E20 एक मिश्रित ईंधन है** : "E20 ईंधन की शुरुआत का ऑटोमोबाइल क्षेत्र पर महत्वपूर्ण प्रभाव पड़ा है। उद्योग जगत के खिलाड़ियों को अब इथेनॉल के अनुकूल अपने इंजन, ईंधन प्रणाली और सामग्री डिजाइन में बदलाव करना होगा। यह उनके लिए एक चुनौती है क्योंकि इससे उत्पादन लागत बढ़ती है। हालांकि, यह नवाचार और प्रौद्योगिकी के विकास के लिए एक महत्वपूर्ण उत्प्रेरक भी है।"

अंततः, E20 मानक बन जाएगा, ठीक उसी तरह जैसे उत्सर्जन मानकों जैसे अन्य नियम ऑटोमोबाइल उद्योग को और अधिक पर्यावरण-अनुकूल बनाने

में योगदान देंगे।

○ **सरकारी पहल और नीतियाँ** : इथेनॉल मिश्रण को प्रोत्साहित करने के लिए भारत सरकार द्वारा की गई कुछ पहलें इस प्रकार हैं:

- इथेनॉल मिश्रित पेट्रोल (E20)
- इथेनॉल उत्पादन संयंत्रों को प्रोत्साहन
- दूसरी पीढ़ी की जैव ईंधन प्रौद्योगिकी के लिए समर्थन

इन नीतियों का उद्देश्य E20 ईंधन का सुचारु कार्यान्वयन सुनिश्चित करना है।

○ **E20 ईंधन का भविष्य में उपयोग** : E20 ईंधन नवीकरणीय ऊर्जा संसाधनों के विकास की दिशा में एक महत्वपूर्ण कदम है। हो सकता है भविष्य में इलेक्ट्रिक कारों या हाइड्रोजन ईंधन से चलने वाले वाहन ही प्रमुख वाहन हों, लेकिन फिलहाल गैसोलीन में इथेनॉल मिलाकर उपयोग करना उपयोगी है। उचित योजना और तकनीकी विकास के साथ-साथ E20 ईंधन की कमियों को दूर किया जा सकता है।

निष्कर्ष

E20 ईंधन टिकाऊ और पर्यावरण के अनुकूल परिवहन प्रणालियों की दिशा में एक महत्वपूर्ण पहल है। इससे वायु उत्सर्जन में कमी, ग्रीनहाउस गैसों के कम उत्पादन, ऊर्जा सुरक्षा में सुधार, किसानों को सहायता और आर्थिक विकास जैसे कई लाभ मिलते हैं। हालांकि, इसके कुछ नुकसान भी हैं, जैसे वाहनों के लिए परिवहन संबंधी चुनौतियाँ, ईंधन दक्षता में कमी, बुनियादी ढांचे के विकास पर व्यय और खाद्य सुरक्षा से संबंधित मुद्दे।

इनकी सफलता के लिए राष्ट्रीय स्तर पर इन्हें अपनाना आवश्यक है, जिसके तहत: E20 ईंधन का डिजाइन तैयार किया जाए।

○ एथेनॉल के उत्पादन में सतत वृद्धि

○ जन जागरूकता

○ अनुसंधान और नवाचार में निवेश

संतुलित नीतियों के साथ सही ढंग से लागू किए जाने पर, E20 ईंधन भारत के स्वच्छ, हरित और आत्मनिर्भर ऊर्जा भविष्य की दिशा में निर्णायक कारकों में से एक साबित होगा।



(Writer is Pursuing B.Tech. CSE
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7	BMLT, BOT	05
8	BPT (Bachelor of Physiotherapy)	10



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Holidays

- Jan 1 New Year's Day
- Jan 26 Republic Day
- Feb 26 Maha Shivaratri
- Mar 14 Holi
- Mar 31 Id-ul-Fitr
- Apr 10 Mahavir Jayanti
- Apr 15 Vaisakhadi
- Apr 18 Good Friday
- May 12 Buddha Purnima
- Jun 6 Id-ul-Zuha (Bakri-id)
- Jul 7 Muharram
- Aug 15 Independence Day
- Aug 27 Ganesh Chaturthi
- Sept 5 Milad un Nabi
- Sept 6 Anant Chaturdashi
- Oct 2 Gandhi's Jayanti
- Oct 2 Dussehra
- Oct 20 Diwali
- Oct 21 Diwali Amaasya
- Oct 22 Govardhan Puja
- Oct 23 Bhaidooj
- Nov 5 Guru Nanak's Birthday
- Dec 25 Christmas Day



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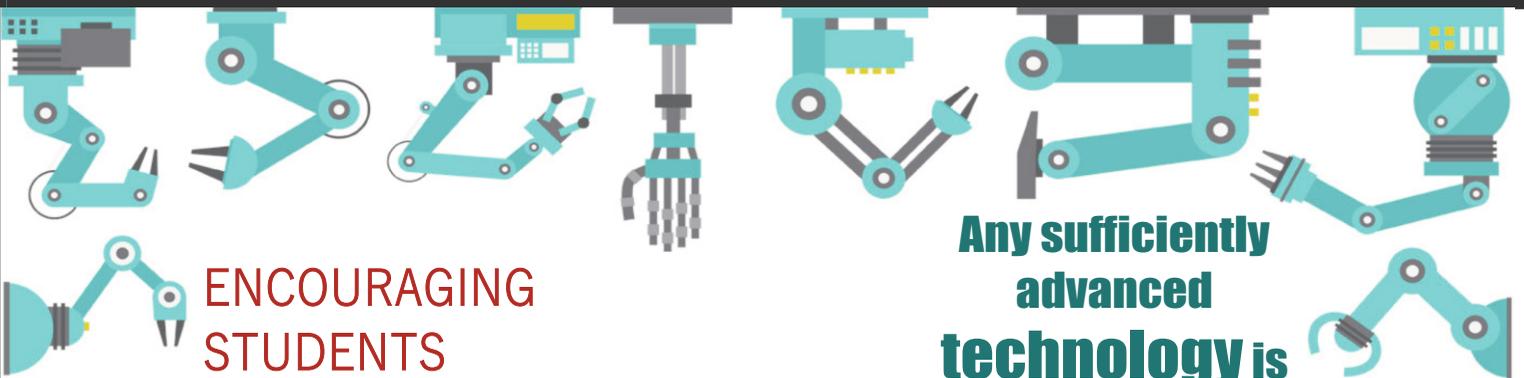


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