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TECHNICA

TECHNICAL MAGAZINE

2022

DEPARTMENT OF MECHANICAL ENGINEERING

FROM PRINCIPAL'S DESK

We provide best platforms to budding engineers to acquire technical knowledge, motor skills and soft skills which are utmost demands of the industry. Uniqueness of our institute is a caring, nurturing culture that recognizes the various aspects of each student and encourages them to bloom to their fullest with confidence.

We are also committed to very good quality of teaching-learning process with having maintained high grade discipline among the staff and students and to achieve sky-scraping point superiority in academic by maintaining a conductive atmosphere for studies, state-of art laboratories communication centre and digital library. MOUs have been signed with reputed organization to impart cutting edge technologies through extensive courses.

In another view, we aim at development of our student at different levels by the proper encouragement, guidance, support, and generation of in-house recourses for sports, cultural, yoga, meditation etc followed by giving them a confidence to feel free at home.

These efforts have resulted in more placements and we are keen to argument it further. We are quite self-assured for the

Regards,
PROF. A. A. TAMBOLI
PRINCIPAL

Mechanical Engineer is a professional who is equipped with the knowledge of designing, manufacture and maintenance or mending of machines. The Department was established in 2008 & offers Diploma in Mechanical engineering can accommodate 150 students.

Our vision is to be recognized as innovative & leading mechanical department in Pune & beyond. Our goal is to provide students a well-equipped lab to keep the students up-to-date in terms of knowledge to seek new advancements of professional skills which will make our students industry ready. The syllabus in Mechanical engineering is designed to deliver the needs of manufacturing industries, the power sector etc. With the growth of technologies, the new subjects of studies are also introduced such as CAD/CAM & Automation, Alternative energy sources & Management, Material Handling Systems. The Department has experienced and highly qualified staff, spacious classrooms and well-equipped laboratories. The faculty members extend their extensive support and guidance to the students to help them build a bright future.

FROM HOD'S DESK

The Department was established as Dnyanganga Polytechnic in 2008. It offers a diploma in mechanical engineering and can accommodate 150 students We function with the vision that the Department should get recognized as an innovative and leading Mechanical department in Pune region and afar. The department aims at offering students with the high quality education clubbed with practical exposure that empowers them with the ability to aid the society by their services in the future. The Department aims at making superior diploma engineering professionals through academic brilliance and excellent education. The syllabus in Mechanical Engineering is steered with an extraordinary approach that helps students to meet the modern requirements of industries. To cater to the current advancement in technology, new subjects such as CAD / CAM and Automation, alternative Energy Resources, Material Handling System are also conducted using modernized laboratories and the required infrastructure. A team of well qualified and experienced faculty members forms the backbone of the Department. This team is determined to empower students with sound academic knowledge and practical experience which in turn makes the students ready to face the industry challenges.

Regards,
PROF. S G AGHOR
HOD

DEPARTMENTAL VISION AND MISSION

VISION

Inculcate foundational and experimental knowledge with entrepreneurial skills that prepares students to succeed in the field of mechanical engineering.

MISSION

- ❖ Enlightening the students with fundamental concepts of mechanical engineering.
- ❖ Providing practical training through upgrading department resources and industry interaction.
- ❖ Inculcating entrepreneurial qualities by arranging co-curricular and extra-curricular activities.
- ❖ Nurturing ethical values among students.

PROGRAM EDUCATIONAL OBJECTIVES

PEO 1: Graduates will have core competency in diversified areas.

PEO 2: Graduates will be able to work individually/in team to solve engineering problems.

PEO 3: Graduates will practice ethical responsibilities and services towards their employers and society.

PEO 4: Graduates will be able to continue life-long learning.

PROGRAM OUTCOMES

1. **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

2. **Problem analysis:** Identify and analyze well-defined engineering problems using codified standard methods.

3. **Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

4. **Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

5. **Engineering practices for society, sustainability, and environment:** Apply appropriate technology in context of society, sustainability, environment, and ethical practices.

6. **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

7. **Life-long learning:** Ability to analyze individual needs and engage in updating in the context of technological changes.

PROGRAM SPECIFIC OUTCOMES

PSO1: The mechanical engineering graduates will be able to supervise production planning and control of mechanical components/systems.

PSO2: The mechanical engineering graduates will be able to maintain the mechanical systems and inspect mechanical component using various tools for quality assurance.

PSO3: The mechanical engineering graduates will be able to design and draft mechanical components and systems.

EDITORIAL

We proudly present 3nd consecutive edition of our department's annual technical magazine "Prarambh-2022". This year we are showcasing innovative ideas and hidden talents of our young minds on the theme "**Technological Advancement".** The objective of the magazine is to provide platform for our students to augment the technology focus and scope of it. The technical section of this magazine elaborates the advancement of technology in this era of **technology** and how it has impacted individual's lives both personal and professional. During this time of sheer uncertainty and constant fear, our willingness to adopt technology has been our lifeline. So, we started adopting technological advancements like distance learning, online entertainment, fitness and health apps etc. On behalf of the entire magazine team, I would like to extend my gratitude to our respected Principal Prof. A. A. Tamboli Sir and HOD Prof. S G Aghor Sir for their invaluable guidance and support towards accomplishment of MESA events successfully. Special thanks to team of passionate and dynamic students for their incredible contribution in making of the magazine. There is remarkable contribution of the student's editorial team to make this magazine amazing. I congratulate all the participants for sharing distinguished articles in the magazine.

MAGAZINE COMMITTEE

CHIEF EDITOR

Prof. Sachin Surywanshi,
Prof. Balaji Shinde

EDITORIAL TEAM

Miss. Maithali Pasalkar,

Mr. Sumit Hawaldar,

Mr. Soham Pachaore,

Mr. Ayan Beg.

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TECHNICAL ARTICLE

1.   UPI: THE DAWN OF DIGITAL FINTECH NIRVANA

In March 2022, the Reserve Bank of India took a revolutionary leap in the Indian payments ecosystem by launching a version of UPI that can be used on feature phones. This move will be a significant way forward to boost financial inclusion and bring more than 40 million feature phone users into the digital payments fold. With innovation and committed focus, India has achieved remarkable feats in a digital payments ecosystem that is unmatched globally. In 2020, India surpassed all other countries in the world with the highest number of real-time online transactions, and the latest market studies now estimate that by 2023, digital wallet transactions are expected to overtake cash as the leading point of sale in India. . At the macro level, these are the dividends of the Digital India mission, which has led to a wave of transformation in the country.

Unified Payments Interface (UPI) has indeed played a pivotal role in revolutionizing the digital financial landscape, particularly in India. UPI is a real-time payment system developed by the National Payments Corporation of India (NPCI), allowing users to link multiple bank accounts to a single mobile application and make seamless money transfers with a few clicks.

Here are some key aspects that highlight the significance of UPI in the realm of digital fintech:

Ease of Transactions:

UPI has simplified the process of digital transactions. Users can send or receive money instantly using their smartphones, eliminating the need for cumbersome account details and lengthy processes.

Interoperability:

UPI is designed to be interoperable across different banks, which means users can make transactions between accounts held at different banks seamlessly. This interoperability has contributed to the widespread adoption of UPI.

24/7 Availability:

UPI operates round the clock, allowing users to make transactions at any time of the day. This has significantly increased the convenience factor for users, as traditional banking hours and holidays no longer pose restrictions on financial transactions.

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Multiple Use Cases:

Apart from person-to-person (P2P) fund transfers, UPI has been integrated into various applications and services. It is commonly used for bill payments, online shopping, and even in-store purchases, making it a versatile tool for various financial activities.

Financial Inclusion:

UPI has played a crucial role in promoting financial inclusion by providing a platform for individuals who may not have access to traditional banking services. The ease of use and low entry barriers have made digital transactions accessible to a wider population.

Innovation and Competition:

The success of UPI has spurred innovation in the fintech space. Numerous startups and established financial institutions have developed innovative products and services built on the UPI infrastructure, fostering healthy competition and pushing the boundaries of what is possible in digital finance.

Security Features:

UPI transactions are secured through two-factor authentication, ensuring a high level of security. This has contributed to building trust among users, which is crucial for the widespread adoption of digital payment systems.

Government Initiatives:

The Indian government has actively supported and promoted digital payments, with UPI being a central element of this push. Initiatives such as demonetization in 2016 and the Digital India campaign have further accelerated the adoption of UPI.

In summary, UPI has emerged as a game-changer in the fintech landscape, providing a user-friendly, secure, and interoperable platform for digital transactions. Its success has not only transformed the way people handle money but has also paved the way for further innovation in the financial technology sector.

-MR. SOHAM PANGARE

2. CHAT GPT- DANGEROUS TO NON TECHNICAL JOBS

ChatGPT works through its Generative Pre-trained Transformer, which uses specialized algorithms to find patterns within data sequences. ChatGPT originally used the GPT-3 large language model, a neural network machine learning model and the third generation of Generative Pre-trained Transformer. The deployment of technologies like ChatGPT can have both positive and potentially disruptive effects on various types of jobs, including non-technical ones. Here are some aspects to consider:

Automation of Routine Tasks: ChatGPT and similar AI technologies are capable of automating certain routine and repetitive tasks. In non-technical jobs, this could impact roles that involve basic information processing, data entry, or responding to common queries. Jobs that primarily rely on rule-based decision-making might be more susceptible to automation.

Enhancing Productivity:

On the positive side, AI technologies can enhance productivity by handling routine tasks, allowing human workers to focus on more complex and creative aspects of their jobs. This can lead to a shift in job roles rather than outright job displacement.
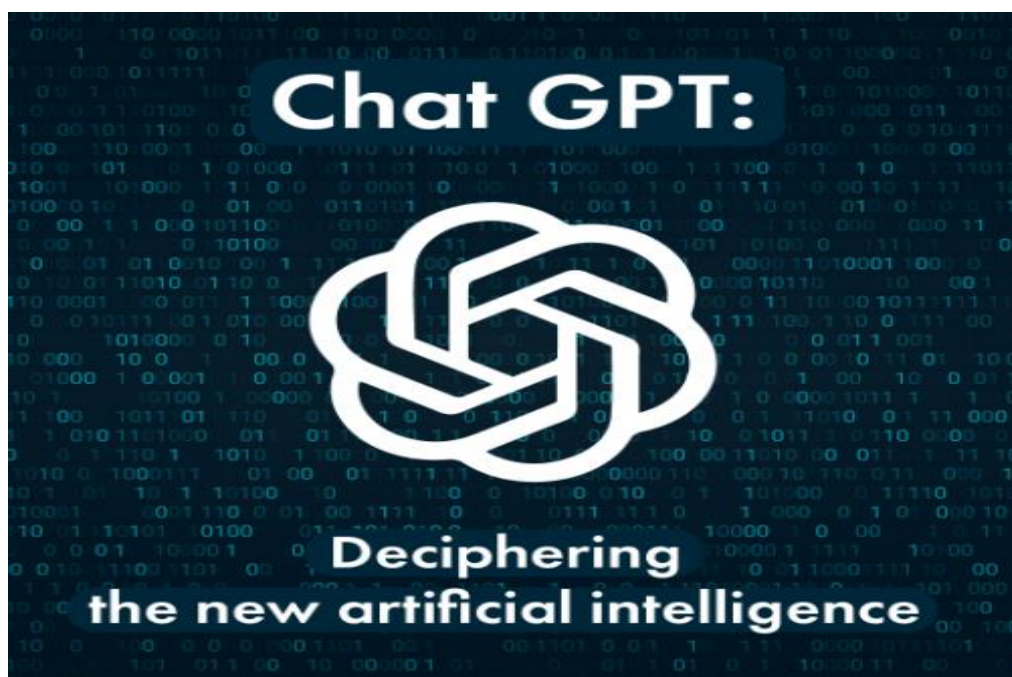
Creation of New Roles: The implementation of AI can lead to the creation of new job roles, particularly in areas related to AI development, maintenance, and supervision. Non-technical jobs may emerge to support and manage AI systems, such as AI trainers, ethicists, and explain ability experts.

Impact on Customer Service: In industries where customer service is crucial, ChatGPT and similar technologies can handle basic customer inquiries, but human interaction and emotional intelligence remain valuable. Non-technical jobs that involve complex problem-solving, empathy, and interpersonal skills may be less susceptible to automation.

Skill Shifts and Reskilling: The integration of AI technologies may necessitate a shift in the skills required for certain jobs. Non-technical workers might need to acquire new skills, such as basic understanding of AI systems, to adapt to changing job requirements. Upskilling and reskilling initiatives become crucial in this context.

Ethical Considerations: The use of AI in various sectors raises ethical considerations. Non-technical jobs in ethics, policy-making, and regulation may become more important to ensure responsible AI deployment and to address societal concerns related to job displacement and privacy.

Dependency on Technology: A potential drawback is over-reliance on technology without proper oversight. Non-technical roles that involve strategic decision-making and risk assessment become essential to ensure that AI systems are deployed responsibly and ethically.

In conclusion, while the deployment of ChatGPT and similar technologies can have implications for non-technical jobs, it is important to view these changes as an opportunity for adaptation and growth. Organizations and individuals need to proactively address the challenges by investing in education, training, and ethical frameworks to ensure a smooth transition into an AI-enhanced workplace.

Mr. ATHARVA THORAT
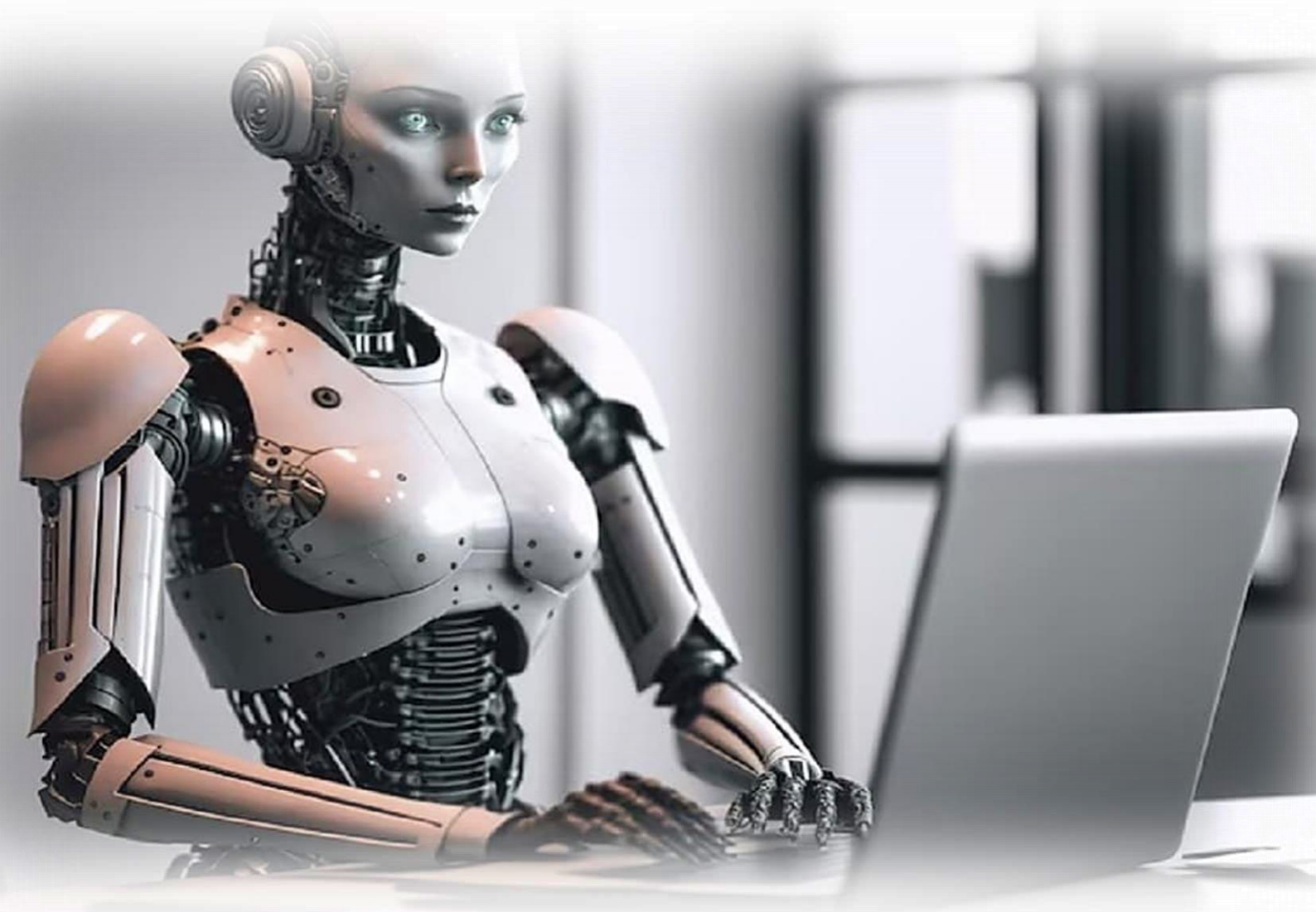
3. INDUSTRY 4.0

Industry 4.0 is revolutionizing the way companies manufacture, improve and distribute their products. Manufacturers are integrating new technologies, including Internet of Things (IoT), cloud computing and analytics, and AI and machine learning into their production facilities and throughout their operations.

These smart factories are equipped with advanced sensors, embedded software and robotics that collect and analyse data and allow for better decision making. Even higher value is created when data from production operations is combined with operational data from ERP, supply chain, customer service and other enterprise systems to create whole new levels of visibility and insight from previously siloed information.

This digital technologies lead to increased automation, predictive maintenance, self-optimization of process improvements and, above all, a new level of efficiencies and responsiveness to customers not previously possible.

Developing smart factories provides an incredible opportunity for the manufacturing industry to enter the fourth industrial revolution. Analyzing the large amounts of big data collected from sensors on the factory floor ensures real-time visibility of manufacturing assets and can provide tools for performing predictive maintenance in order to minimize equipment downtime.

Using high-tech IoT devices in smart factories leads to higher productivity and improved quality. Replacing manual inspection business models with AI-powered visual insights reduces manufacturing errors and saves money and time. With minimal investment, quality control personnel can set up a smartphone connected to the cloud to monitor manufacturing processes from virtually anywhere. By applying machine learning algorithms, manufacturers can detect errors immediately, rather than at later stages when repair work is more expensive.

Industry 4.0 concepts and technologies can be applied across all types of industrial companies, including discrete and process manufacturing, as well as oil and gas, mining and other industrial segments.

-Mr AYAN BEG

4. A COMPARATIVE ANALYSIS OF ELECTRIC VEHICLES AND CONVENTIONAL VEHICLES

Introduction:

The automotive industry is undergoing a transformative shift with the emergence of electric vehicles (EVs) as a sustainable and eco-friendly alternative to conventional vehicles powered by internal combustion engines. This article explores the key differences and advantages of electric vehicles over traditional vehicles, highlighting the environmental impact, technology, and the evolving landscape of the automotive market.

I. Environmental Impact:

A. Emission Reduction:

1. EVs produce fewer greenhouse gas emissions during operation compared to conventional vehicles.

2. Reduction of air pollutants contributes to improved air quality and public health.

B. Energy Efficiency:

1. Electric motors are more energy-efficient than internal combustion engines.

2. Regenerative braking in EVs enhances energy recovery, further increasing efficiency.

II. Technology:

A. Powertrain:

1. EVs use electric motors powered by rechargeable batteries.

2. Conventional vehicles rely on internal combustion engines fueled by gasoline or diesel.

B. Battery Technology:

1. Advances in battery technology impact the range, charging time, and overall performance of EVs.

2. Challenges such as range anxiety and battery degradation are addressed through ongoing research.

C. Charging Infrastructure:

1. Development of a robust charging infrastructure is crucial for widespread EV adoption.

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2. Initiatives to expand charging networks globally and address range concerns.

III. Cost and Operating Economics:

A. Initial Cost:

1. EVs often have a higher upfront cost due to the expense of battery technology.

2. Incentives and decreasing battery costs contribute to the growing affordability of EVs.

B. Operating Costs:

1. EVs generally have lower operating costs with reduced maintenance requirements.

2. The cost of electricity compared to gasoline is a significant factor in cost savings.

IV. Consumer Adoption and Market Trends:

A. Consumer Perception:

1. Growing awareness of environmental issues influences consumer preferences.

2. Perceived barriers, such as charging infrastructure, are gradually diminishing.

B. Automaker Initiatives:

1. Major automakers investing in EV development and production.

2. Expansion of EV models across various vehicle types.

Conclusion:

The automotive industry's transition from conventional vehicles to electric vehicles represents a pivotal moment in the pursuit of sustainable transportation. While challenges remain, ongoing advancements in technology, coupled with supportive policies, are accelerating the global shift towards a more sustainable and electrified future. As the market matures, the choices between electric and conventional vehicles are becoming not only a matter of personal preference but a strategic decision for the benefit of the environment and future generations.

-**OMKAR SANAS**

5. 2G TO 5G INTERNET REVOLUTIONS AND IMPACT ON HUMAN LIFE

For the majority of people, it is difficult to imagine what life would be like without the internet. The world of education has also undergone tremendous change since the advent of the internet. It allows students to quickly obtain a vast amount of information on every subject. They also get the convenience of going to class and completing assignments, permitting them to schedule their time with great flexibility. The internet has become one of the easiest, fastest and most effective tools that can be used to explore and comprehend more about the world; however, it is not without problems. The uses of the internet by students changes their thinking patterns, distracts their attention and reduces their interpersonal skills. The evolution from 2G to 5G represents significant advancements in mobile communication technology, and each generation has brought about changes that have had a profound impact on human life. Here's an overview of the revolutions and their impact:
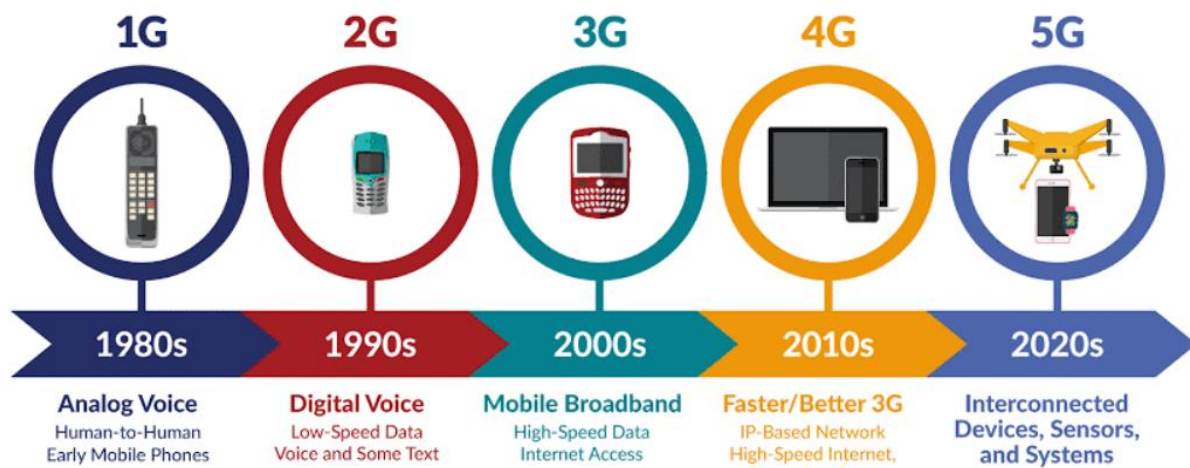
2G (Second Generation):

Technology: 2G introduced digital voice communication and text messaging (SMS).

Impact: Improved voice quality, increased capacity, and the introduction of basic text messaging. This era saw the widespread adoption of mobile phones for personal communication.

3G (Third Generation):

Technology: 3G brought faster data transfer speeds, enabling mobile internet access, video calling, and mobile TV.

Impact: The introduction of mobile data services revolutionized communication, leading to the rise of smartphones and mobile internet usage. People could access information on the go, leading to changes in how we consume content and communicate.

4G (Fourth Generation):

Technology: 4G marked a significant increase in data transfer speeds, facilitating high-quality video streaming, online gaming, and other data-intensive applications.

Impact: The widespread adoption of smartphones and the development of mobile apps transformed various aspects of daily life. Mobile internet became a critical part of business, education, entertainment, and social interactions.

5G (Fifth Generation):

Technology: 5G is characterized by extremely high data transfer speeds, low latency, and increased capacity. It utilizes new frequency bands and technologies such as massive MIMO (Multiple Input, Multiple Output) and beamforming.

Impact:

Faster Speeds: 5G offers significantly faster download and upload speeds, making data-intensive tasks even more seamless. This can impact industries like healthcare, education, and entertainment.

Low Latency: The reduced latency in 5G allows for near real-time communication. This is crucial for applications like autonomous vehicles, remote surgery, and augmented reality (AR)/virtual reality (VR) experiences.

IoT Connectivity: 5G can support a massive number of connected devices, enabling the growth of the Internet of Things (IoT). This has implications for smart cities, smart homes, and industrial automation.

Enhanced Mobile Broadband: Improved connectivity enables better mobile broadband experiences, benefiting activities like streaming 4K video, online gaming, and high-quality video calls.

Business and Industry Transformation: 5G is expected to drive innovation in various industries, including manufacturing, transportation, and healthcare. It can enable new business models and improve efficiency.

The transition to 5G is not just an upgrade in speed; it's a fundamental shift that opens up possibilities for innovations that can reshape how we live, work, and interact with the world around us. However, it also brings challenges related to infrastructure development, security, and potential societal impacts that need careful consideration.


MISS. PRADNYA PAWAR
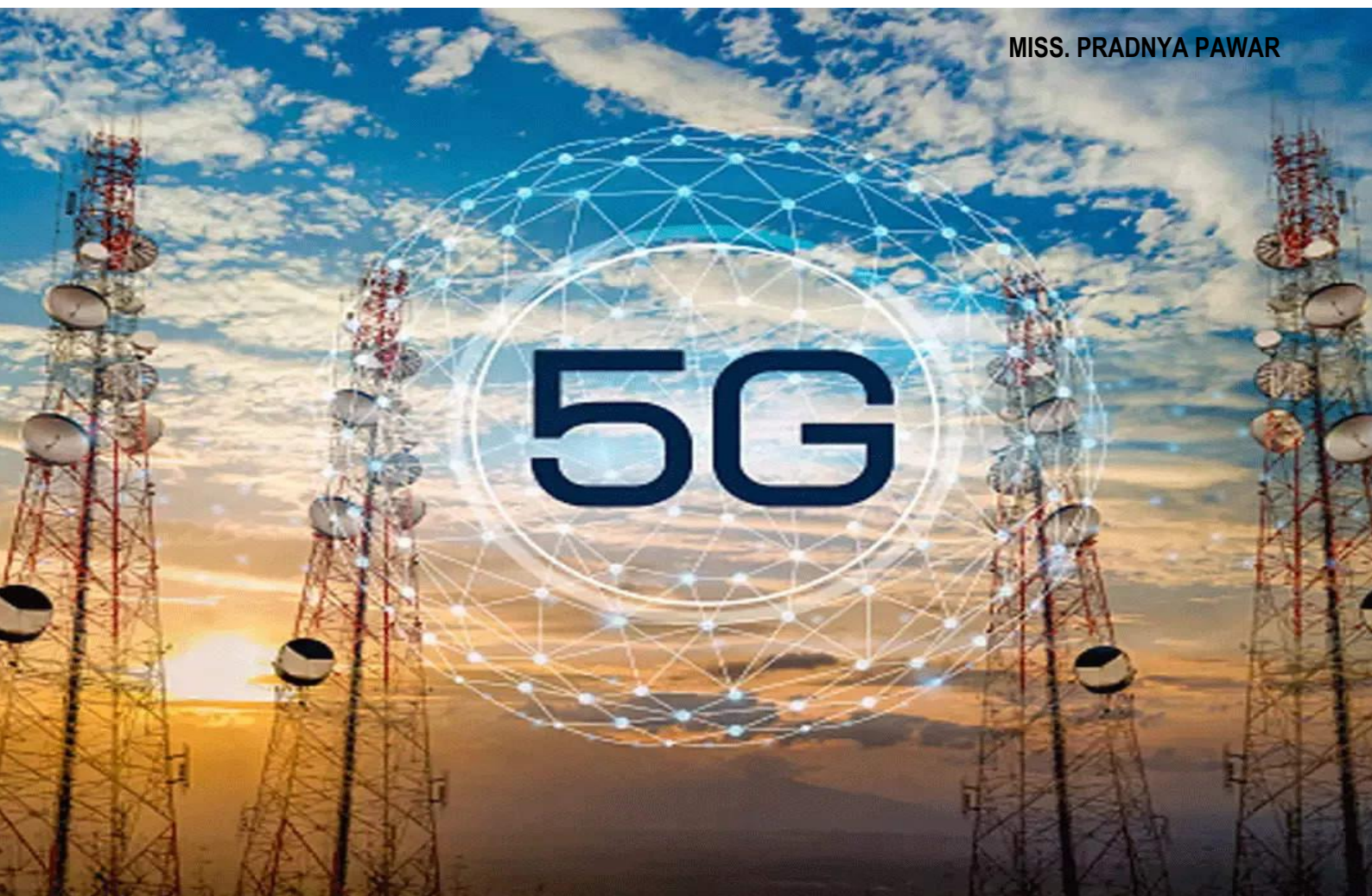
6. THE IMPACT OF THE CORONAVIRUS ON STUDENT EXAMS

The Coronavirus, also known as COVID-19, has brought about unprecedented changes in various aspects of our lives, including education. One of the areas significantly affected is the way students take exams. The pandemic has necessitated adjustments and adaptations in the examination process to ensure the safety and well-being of students. The most noticeable change in student exams during the pandemic is the widespread adoption of online examinations. With physical distancing measures in place, educational institutions have transitioned to virtual platforms to conduct exams. This shift has required both students and educators to adapt to new technologies and online assessment methods.

Online exams, while essential for maintaining safety, have presented challenges for students. Technical issues, such as poor internet connectivity and difficulties in navigating online platforms, have been hurdles that some students had to overcome. Additionally, the absence of a traditional exam environment can impact concentration and focus. Some educational institutions have modified the formats of exams to accommodate the constraints imposed by the pandemic. This includes changes in question types, open-book exams, and the incorporation of more project-based assessments. These adaptations aim to ensure fair evaluation while acknowledging the unique circumstances. The pandemic has heightened awareness of the importance of mental health, and educators have recognized the stress and anxiety that students may experience during exam periods. Efforts have been made to implement supportive measures, such as flexible deadlines, mental health resources, and communication channels for students to express their concerns. The unpredictability of the pandemic has led to the postponement of exams and adjustments to academic calendars. Institutions have had to revaluate schedules to accommodate disruptions caused by lockdowns, quarantines, and other public health measures.
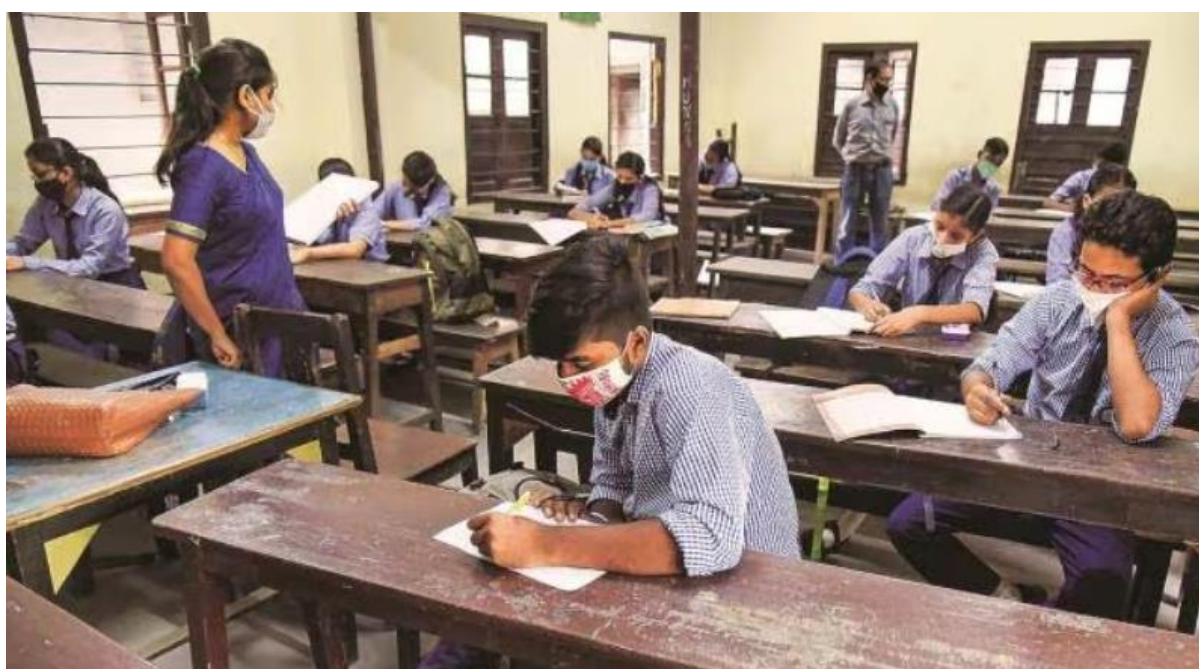
In conclusion, the Coronavirus has necessitated significant changes in the way student exams are conducted. The shift to online exams, modifications in exam formats, and increased emphasis on mental health are all responses to the challenges posed by the pandemic. While these changes have presented difficulties, they have also prompted innovation and a revaluation of traditional assessment methods. As we navigate these unprecedented times, a collaborative effort from educators, students, and institutions is essential to ensure a fair and supportive examination process.

MR. RUSHIKESH JOGLEKAR

ZEAL POLYTECH NIC, NARHE, PUNE

DEPARTEMENT OF MECHNICAL ENGINEERING

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