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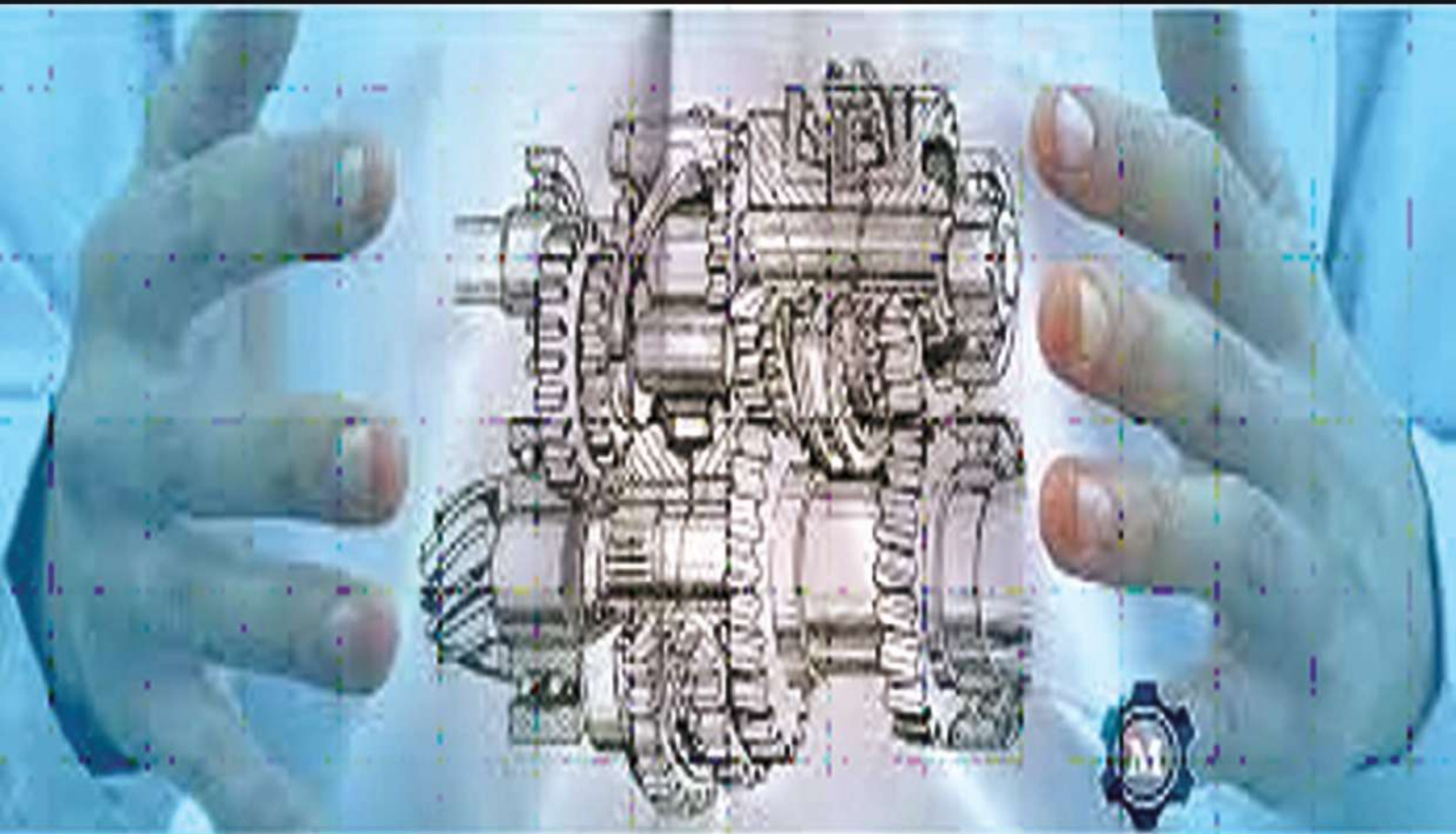
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■ Volume 03 ■ Issue 01 ■ January 2024

ACADEMIC YEAR – 2023-2024

MECH MAGAZINE



DEPARTMENT OF MECHANICAL ENGINEERING

College Vision & Mission

Vision

"To become an internationally renowned Institution in technical education, research and development, by transforming the students into competent professionals with leadership skills and ethical values."

Mission

- ❖ Providing the best resources and Infrastructure.
- ❖ Creating Learner centric Environment and continuous –Learning.
- ❖ Promoting Effective Links with Intellectuals and Industries.
- ❖ Enriching Employability and Entrepreneurial Skills.
- ❖ Adapting to Changes for Sustainable Development.

Department Vision & Mission

Vision

To endeavour the excellence in Mechanical Engineering field globally by producing competent and confident graduates to face the future challenges.

Mission

❖ Provide transformative education to students and improving their skills to face the global challenges in Mechanical and Allied Engineering.

❖ Nurture innovation, attitude, creativity, core competency and serve the society through requisite infrastructure and environment.

❖ Inculcate real world challenges, emerging technologies and endeavour the students to become entrepreneurs or employable.

Program Educational Objectives (PEOs)

PEO I : Graduates shall excel in the field of design, thermal, materials and manufacturing, as successful engineers or researchers or as entrepreneurs.

PEO II : Graduates will analyze problems, design solutions and develop products as a team member in advanced industrial projects.

PEO III : Graduates shall have professional ethics, team spirit, life-long learning, good oral and written communication skills and adopt corporate culture, core values and leadership skills.

Program Specific Outcomes (PSOs)

❖ **PSO 1 :** Professional skills: Students shall understand, analyze, design and develop integrated equipment, thermal devices and composite components.

❖ **PSO 2 :** Competency: Students shall qualify at the State, National and International level competitive examination for employment, higher studies and research.

Program Outcomes (POs)

Engineering Graduates will be able to:

1. Engineering knowledge : Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis : Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions : Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems : Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage : Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society : Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability : Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work : Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10.Communication : Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance : Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning : Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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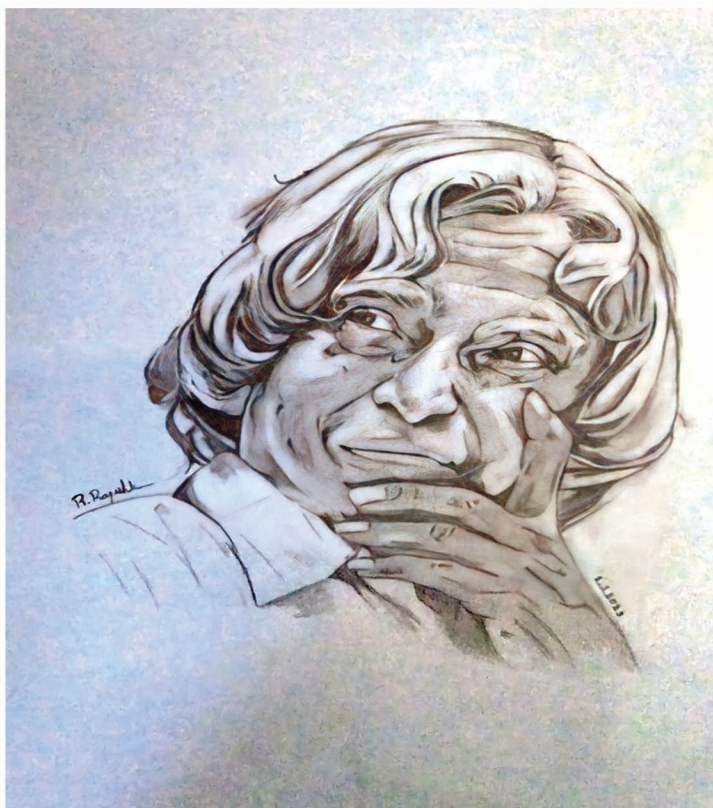
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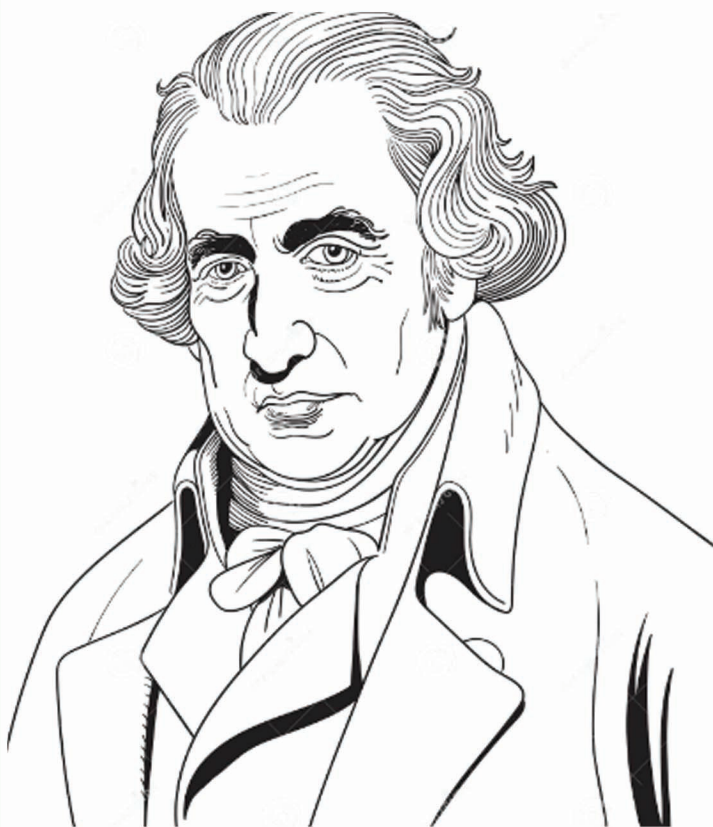
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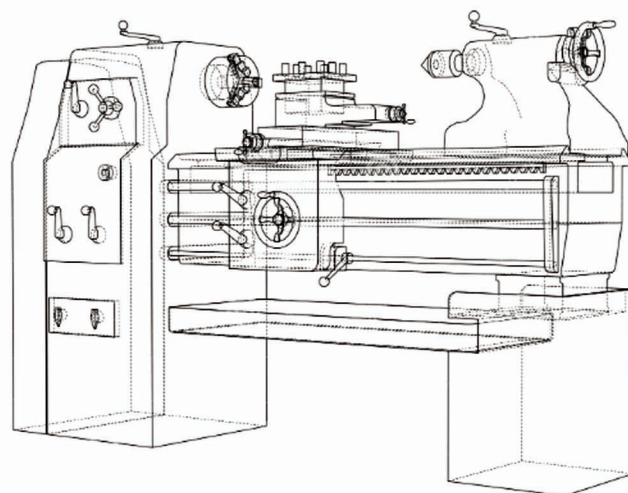
R. Rajeshkumar
II Year- Mech



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IV Year - Mech



K. Hariharan
III Year - Mech



S. Pushparaj
IV Year - Mech

HOW TO WORK SMART IN YOUR JOB

What do you live for?
 Work, Power, Money?
 Watts the use, Have you ever drilled your Mind?
 Running around amidst Milling Crowd,
 Aren't you ever Bored of revolving round?

When you gear up for a promotion
 You are screwed and get just a motion
 From One office to another
 Like a dummy toy fixture

Once a while you have moments of Inertia
 But your boss wants you fly to Siberia
 For a task which you think a trivia
 It's not Horse power but the Modulus of Elasticity
 That determines your success and Efficiency.
 If your Modulus of Rigidity is too high
 Juniors with Young's Modulus will fly high!

If you are in friction with your boss
 Someone with Lube and Coolant will pass!
 If your short temper shows Flash Point
 You may soon be in Fire Point!
 You may be good in details to nuts and bolt
 But if you can't handle those who revolt
 You will be rough-cut to size and
 Soon you'll lay on surface-finished!

You must constantly leverage on your smartness
 By never allowing the boss to reach high Hardness!
 You must be bearing in mind fully
 That growth will be faster with a Pulley!

A.D.Vignesh
 II Year - Mech

JOKES

Teacher : anyone who thinks he's stupid may stand up.
 nobody stands up
 Teacher : I'm sure there are some.
 Little Johnny stand up.
 Teacher : Ohh. Johnny you think you're stupid?
 Little Johnny : "no.... I just feel bad that you're standing

V.Vishveshwaran
 III Year - Mech

AIM OF EDUCATION

E - To eradicate ignorance and illiteracy
 D - To develop a sense of discipline
 U - To utilize the power of understanding
 C - To cultivate a sense of curiosity
 A - To acquire the quality of inspiration
 T - To teach the quality of tolerance
 I - To inculcate interest for acquiring knowledge
 O - To be obedient to elders
 N - To be noble and humble in life.

P.Thavasi
 IV Year - Mech

BOOK

B - Brainy
 O - Object
 O - Of
 K - Knowledge

S.Shamyuktha
 II Year - Mech

AFTER GRADUATION IN ENGINEERING HIGHER STUDIES

After graduations the next step is getting a master's degree like M.tech, MBA or M.S. and after that if one is still enthusiastic, then they can go for a Ph.D. Let's discuss each option one by one.

1. Masters in Technology (M.Tech)

There are two ways possible. Either go for an Indian university like IITs, IISc or go to foreign university. In USA the equivalent degree is M.S, which will be discussed in a separate tab. For M.Tech one needs to appear for GATE (Graduate Aptitude Test in Engineering).

• Graduate Aptitude Test in Engineering (GATE):

It is jointly conducted by IISc and seven IIT and is considered to be a benchmark test for engineering graduates. Each year one IIT take the responsibility of conducting the exam on rotation basis. The scores are only for application to graduate programs in engineering disciplines in India. Any candidate who has cleared her bachelors or masters or is in the final year of her respective course is eligible for GATE. Some PSUs like BARC, NPIL and HAL give preference to GATE scores, so apart from being a ticket to higher education, it is also helpful in landing up at that dream job.

• Basic Features of GATE :

Examinations for all the 22 papers will be conducted by an ONLINE Computer Based Test (CBT). The online examination paper will contain some questions for which numerical answers must be keyed in by the candidate using the virtual keypad. Rest of the questions shall be of Multiple Choice Question (MCQ) type. Biometric information (Photograph and Fingerprints) for randomly selected candidates may be captured before the start of the examination.

GATE examinations will be held during forenoon and afternoon sessions on alternate weekends (Saturday and Sunday) between 31st January and 14th February every year. Examination for some of the papers in GATE will be held in multiple sessions. Exact details regarding complete examination schedule will be notified at a later date.

2. Master of Science (MS)

USA has been a preferred destination for Indian engineers for the past several years and Indians continuously form the largest chunk of foreign students in USA. To get admission in a foreign university for MS, one needs to appear for Graduate Record.

- **Graduate Record Examination (GRE) :**

It is an admission requirement for many graduate schools in USA and in other English-speaking countries. It is a computer-based test measuring verbal reasoning, quantitative reasoning, critical thinking, and analytical writing skills that have been acquired over a long period of time and that are not related to any specific field of study. Unlike GATE, there is no cut-off line for GRE and the admission score varies from one university to other. After appearing for GRE, one needs to apply to the universities of his choice. As applying to each university is very costly affair, hence selection of universities is an equally important activity. The selection should be based on realistic assessment of One's abilities and GRE score. For scholarships many universities also consider the research work that a candidate has undertaken previously. Combining this with the GRE core, they give an admission offer to a candidate

- **3. Master of Business Administration (MBA)**

Again like M.Tech one has many options. In fact the options are much more here, owing to the presence of a large number of good private colleges. First we will discuss about the options available in India. For admission to Indian institutes there are many exams like CAT, MAT, XAT, apart from separate exams conducted by some universities like FMS.

- **Common Admission Test (CAT) :**

It is conducted by IIMs on an all India basis and is basically used for admission to IIMs. There are other colleges as well, which use CAT score for granting admissions. Post 2009, the pattern has moved from offline to online mode and has seen a change in pattern as well. With the increase in number of IIM and increase in number of seats in each IIM, it has become an attractive option. What works against it is the exorbitant fees being charged by the IIMs.

- **Management aptitude test (MAT)**

It is the smaller, less popular and less efficient brother of CAT. Its score is applicable to basically every other college that is not covered under CAT.

- **XAT, FMS**

Some other colleges like XLRI Jamshedpur, XLRI Bhubaneswar and FMS New Delhi conduct their own admission test and a student need to appear in these exams to be eligible for these institutes.

- **Graduate Management Admission Test (GMAT)**

It is a computer-adaptive standardized test in mathematics and the English language for measuring aptitude to succeed academically in graduate business studies. Business schools commonly use the test as one of many selection criteria for admission into graduate business administration programs (e.g. MBA, Master of Accountancy, etc.) Principally in the United States, but also in other English-speaking countries. Similar to GRE, based upon preference, score and capability, one needs to apply to institutes separately. So the selection of institutes is very important. Most good universities give a lot of weight to work experience (unlike Indian institutes). Thus a similar score can land you in different university based upon your work experience. A GMAT score is valid for five years, so you can take the exam during your student days (when your mind is really sharp) and then apply for schools after three years (with proper work experience). To select a B-school one can have a look at the last year average and median score, which is published by most of the schools.

J.Bharathiraja,
IV Year - Mech

Advancements in Robotics: Paving the Way for a Technological Revolution

Introduction

In recent years, the field of robotics has witnessed remarkable advancements, transforming the way we live, work, and interact with the world around us. These breakthroughs in advanced robotics have not only accelerated industrial automation but have also paved the way for unprecedented applications in healthcare, education, space exploration, and more. This one-page article explores some key developments in advanced robotics and their potential impact on various sectors.

Body

1. Artificial Intelligence Integration

One of the driving forces behind the recent surge in robotics capabilities is the integration of artificial intelligence (AI). Advanced robots are now equipped with sophisticated AI algorithms, enabling them to perceive and respond to their environment in real-time. This has led to the development of robots that can adapt to dynamic situations, learn from experience, and perform complex tasks with increased efficiency.

2. Human-Robot Collaboration

Traditional notions of robots as standalone machines isolated from human interaction are evolving rapidly. Advanced robotics now focuses on creating robots that can work alongside humans collaboratively. This collaborative approach enhances productivity in various industries, as robots and humans complement each other's strengths, creating a more efficient and flexible workforce.

3. Soft Robotics and Bio-Inspired Design

The development of soft robotics, inspired by natural organisms, has opened new possibilities. Soft robots mimic the flexibility and adaptability of living organisms, allowing them to navigate complex environments with ease. Bio-inspired designs contribute to advancements in medical robotics, as soft robots can be more compatible with the human body, leading to breakthroughs in minimally invasive surgeries and rehabilitation.

4. Autonomous Vehicles and Drones

Robotics is reshaping the transportation sector with the rise of autonomous vehicles and drones. Self-driving cars and delivery drones are becoming increasingly sophisticated, relying on advanced sensors, computer vision, and machine learning algorithms to navigate safely and efficiently. These technologies hold the potential to revolutionize the way we commute and transport goods.

5. Robotics in Healthcare

The healthcare industry is experiencing a revolution with the integration of robotics. Surgical robots assist surgeons in performing intricate procedures with precision, while robotic exoskeletons aid in rehabilitation and mobility for patients with mobility impairments. Robotics in healthcare is enhancing patient outcomes and opening avenues for innovative medical treatments.

Conclusion

As advanced robotics continues to push the boundaries of innovation, we find ourselves on the brink of a technological revolution. The integration of artificial intelligence, collaboration between humans and robots, bio-inspired designs, autonomous vehicles, and healthcare applications are just a glimpse of the transformative power of robotics. These advancements not only improve efficiency and productivity across industries but also contribute to creating a more connected, intelligent, and automated future. The continued evolution of robotics holds the promise of unlocking even greater possibilities, shaping a world where technology seamlessly enhances our daily lives.

M.Elavarasan,
IV Year - Mech

Advancements in Medicine: AI Co-Pilot Bronchoscope Robot

Introduction

In the ever-evolving landscape of medical technology, artificial intelligence (AI) is playing an increasingly vital role in enhancing diagnostic and therapeutic procedures. One remarkable example is the AI co-pilot bronchoscope robot, a cutting-edge innovation that promises to revolutionize bronchoscopy procedures and improve patient outcomes.

Body

Bronchoscopy is a medical procedure that allows physicians to visualize and examine the airways of the lungs. Traditionally, this procedure has been performed manually by skilled pulmonologists. However, the integration of AI into bronchoscopy introduces a new era of precision and efficiency. The AI co-pilot bronchoscope robot functions as a collaborative tool alongside the medical professional, providing real-time insights and assistance during the procedure. Equipped with advanced image recognition and machine learning algorithms, the robot analyzes the bronchial anatomy, identifies abnormalities, and offers valuable suggestions to the physician.

Key Features

1. Image Recognition

The bronchoscope robot uses high-resolution imaging combined with AI algorithms to identify and highlight potential areas of interest, such as lesions, tumors, or other abnormalities.

2. Navigation Assistance

AI algorithms help in guiding the bronchoscope through the intricate network of airways, ensuring optimal positioning for accurate diagnosis and targeted interventions.

3. Real-time Decision Support

The AI co-pilot continuously analyzes the live images from the bronchoscope, providing real-time suggestions to the physician based on its extensive database of medical knowledge and historical case data.

4. Procedural Efficiency

By streamlining the bronchoscopy procedure and improving navigation, the AI co-pilot reduces the overall time required for the examination, minimizing patient discomfort and enhancing the efficiency of healthcare delivery.

Benefits

1. Enhanced Accuracy

The combination of human expertise and AI assistance results in a more accurate and precise diagnosis, especially in detecting early-stage lung diseases or abnormalities.

2. Reduced Procedure Time

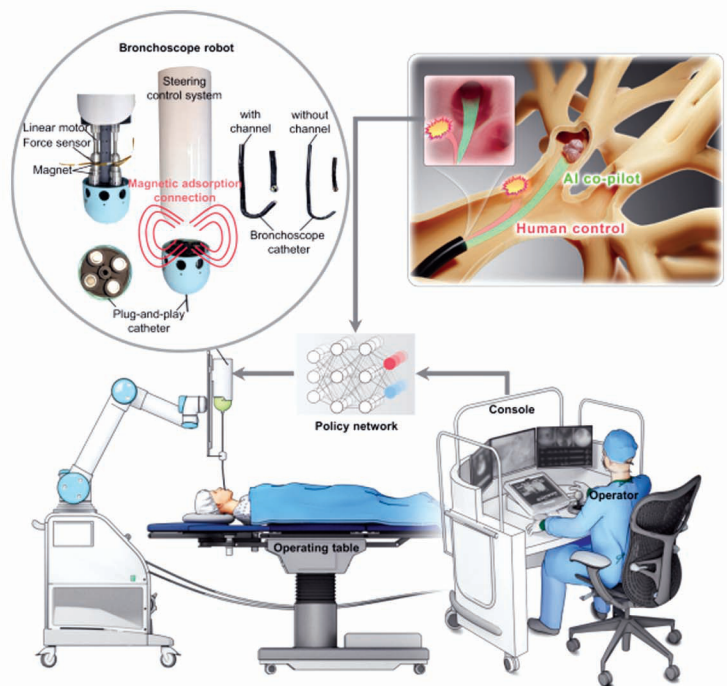
The AI co-pilot's ability to streamline the bronchoscopy process contributes to shorter procedure times, reducing patient stress and discomfort.

3. Improved Training

The robot serves as a valuable training tool for medical professionals, offering a dynamic learning environment and opportunities for skill development in bronchoscopy procedures.

4. Data-driven Insights

The system generates valuable data that can be used for research, analysis, and further refinement of AI algorithms, contributing to ongoing advancements in respiratory medicine.



Conclusion

The integration of an AI co-pilot bronchoscope robot represents a significant leap forward in the field of bronchoscopy. By combining the expertise of medical professionals with the precision and efficiency of artificial intelligence, this innovative technology holds the promise of improving patient care, advancing medical training, and pushing the boundaries of what is achievable in the realm of respiratory medicine. As research and development continue, the future looks bright for AI-driven innovations in medical procedures.

K.Priyadharshini,
III Year - Mech

✿ Advancing Infrastructure Monitoring : Drone-Based Displacement Measurement with Phase Information

Introduction

The rapid evolution of technology has given rise to innovative solutions in infrastructure monitoring. Among these, the utilization of drones equipped with advanced sensors and phase-based displacement measurement techniques has emerged as a groundbreaking approach. This article explores the transformative potential of drone-based displacement measurement, focusing on the significance of phase information for accurate and efficient monitoring of critical infrastructures.

Body

1. Unmanned Aerial Vehicles (UAVs) in Infrastructure Monitoring

Drones equipped with high-resolution cameras and LiDAR sensors have become indispensable tools for inspecting and assessing the condition of various infrastructures such as bridges, buildings, and dams. Their ability to access hard-to-reach areas and capture detailed imagery contributes to a comprehensive understanding of structural health.

2. Phase-Based Displacement Measurement

The integration of phase-based measurement techniques, often utilizing interferometry principles, allows for highly precise displacement measurements. By analyzing the phase information of captured images, engineers can detect even subtle structural deformations, settling, or movements over time.

3. Advantages of Drone-Based Displacement Measurement

Accessibility

Drones provide access to areas that are challenging or hazardous for manual inspections.

Real-time Monitoring

Continuous and real-time monitoring capabilities enable the early detection of structural changes, mitigating potential risks.

Cost-Efficiency

Drone-based monitoring is cost-effective compared to traditional methods, reducing the need for extensive manual inspections.

4. Integration of Phase Information

Interferometric Synthetic Aperture Radar (InSAR)

Utilizing InSAR techniques, drones can capture phase information by comparing radar signals over time. This enables the creation of highly accurate displacement maps.

Multispectral Imaging :

Drones equipped with multispectral cameras enhance the ability to extract phase information from various wavelengths, improving the reliability of displacement measurements.

5. Case Studies and Applications

Bridges

Monitoring structural deformations and settlement in bridge components.

Buildings

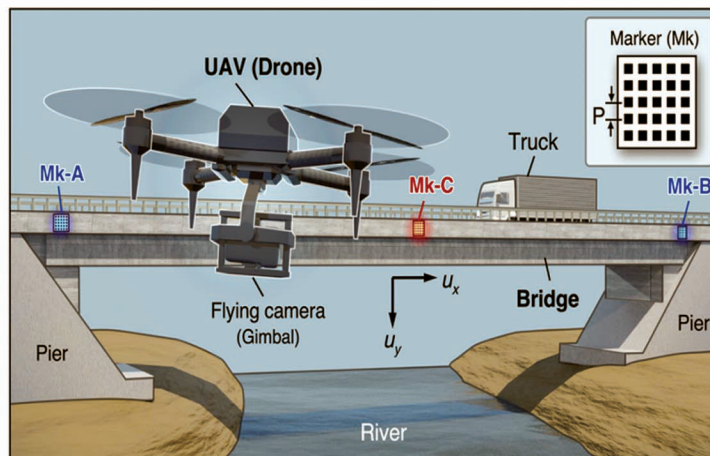
Assessing the stability and movement of tall structures in urban environments

Dams

Detecting potential shifts or displacements in dam structures for early intervention

6. Future Prospects

As technology continues to advance, the integration of artificial intelligence for automated analysis of phase information and the development of more compact and efficient sensors promise further improvements in drone-based displacement measurement.



Conclusion

Drone-based displacement measurement, enriched with phase information, signifies a paradigm shift in infrastructure monitoring. This approach not only enhances the accuracy of assessments but also enables proactive measures to ensure the safety and longevity of critical structures. As the synergy between drone technology and displacement measurement techniques evolves, the potential for more resilient and sustainable infrastructure management becomes increasingly promising.

K.Harini,
II Year - Mech

✿ Gearing Up for Excellence: Advances in Gear Design for High-Performance Transmissions

Introduction

In the dynamic realm of mechanical engineering, the design of gears plays a pivotal role in the efficiency and performance of transmissions. Recent advancements in gear design have ushered in a new era of high-performance transmissions, addressing challenges and pushing the boundaries of what is achievable. This article explores the cutting-edge developments in gear design that are propelling mechanical systems to unprecedented levels of efficiency and reliability.

Body

1. Nanotechnology in Gear Materials

- Introduction of nano materials in gear manufacturing to enhance strength, durability, and wear resistance.
- Nano coatings and surface treatments for reduced friction and improved efficiency.

2. Additive Manufacturing Revolutionizing Gear Production

- Utilization of 3D printing for complex gear geometries, allowing for optimized tooth profiles and reduced weight.
- Tailored material composition for specific performance requirements.

3. Advanced Tooth Profile Optimization

- Computer-aided design (CAD) and simulation tools for precise tooth profile optimization, minimizing noise and vibration.
- Non-traditional tooth forms for increased load-bearing capacity and efficiency.

4. Smart Gearing Solutions

- Integration of sensors and embedded electronics for real-time monitoring of gear health.
- Condition-based maintenance strategies for prolonged gear life.

5. High-Performance Lubricants

- Development of advanced lubricants tailored for high-speed and high-torque applications.
- Nanofluids and smart lubrication systems for improved heat dissipation.

6. Gearbox Efficiency through Computational Modelling

- Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) for comprehensive gearbox performance simulations.
- Multi-physics simulations to optimize gear systems under various operating conditions.

7. Noise and Vibration Reduction Techniques

- Implementation of advanced dampening materials for noise reduction.
- Active vibration control systems to minimize undesirable vibrations.

8. Sustainability in Gear Manufacturing

- Exploration of eco-friendly materials and manufacturing processes for reduced environmental impact.
- Recycling and repurposing initiatives for end-of-life gear components.

9. Miniaturization and Micro-Gearing

- Application of gear design principles to micro-mechanical systems and miniature devices.
- Challenges and innovations in scaling down gear components for micro-scale applications.

10. Future Directions and Industry Implications

- Exploration of bio-inspired gear designs for enhanced efficiency.
- Emerging technologies such as magnetic gears and gearless transmissions

Conclusion

As the demand for higher efficiency and reliability in mechanical systems continues to rise, the ongoing advancements in gear design are instrumental in meeting these challenges head-on. The marriage of nanotechnology, additive manufacturing, smart solutions, and sustainable practices heralds a future where high-performance transmissions not only excel in functionality but also contribute to a more sustainable and technologically advanced world. The gears of progress are turning, driving mechanical engineering towards unprecedented heights of innovation.

B.Vihash,
III Year - Mech

INTRODUCTION TO MARINE ENGINEERING

Marine engineering is a specialized branch of engineering that deals with the design, construction, operation, and maintenance of ships, boats, submarines, and offshore structures. It encompasses various disciplines including mechanical, electrical, electronic, and naval architecture to ensure the safe and efficient operation of marine vessels and structures in diverse marine environments.

Marine engineering covers a wide range of activities, including :

1. Ship Design and Construction : Marine engineers are involved in designing ships and other marine vessels, ensuring they meet safety, stability, and performance requirements. They oversee the construction process, from the initial concept to the final delivery of the vessel.

2. Propulsion Systems : Marine engineers design and maintain propulsion systems, including engines, propellers, and thrusters, to propel ships through water efficiently. They also work on alternative propulsion technologies such as electric propulsion and LNG (liquefied natural gas) propulsion systems to reduce emissions and improve fuel efficiency.

3. Power Generation and Distribution : Marine engineers are responsible for designing, installing, and maintaining power generation and distribution systems on ships. This includes diesel generators, gas turbines, and electrical systems to provide power for propulsion, onboard systems, and amenities.

4. Navigation and Control Systems : Marine engineers develop and maintain navigation and control systems, including GPS (Global Positioning System), radar, autopilot, and dynamic positioning systems, to ensure safe and precise navigation of ships in all weather conditions.

5. Safety and Environmental Compliance : Marine engineers play a crucial role in ensuring ships comply with international safety and environmental regulations, including SOLAS (Safety of Life at Sea) and MARPOL (International Convention for the Prevention of Pollution from Ships). They implement measures to minimize the environmental impact of ships, such as ballast water treatment systems and exhaust gas cleaning systems.

6. Maintenance and Repair : Marine engineers are responsible for the maintenance, repair, and overhaul of ship systems and equipment to ensure they remain in optimal condition. This includes routine inspections, troubleshooting, and conducting repairs both at sea and in dry dock facilities.

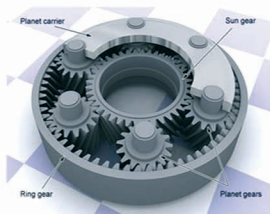


Figure 1 : Planetary Gear Set

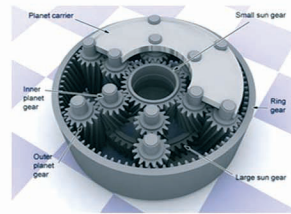


Figure 2 : Compound Planetary Gear set

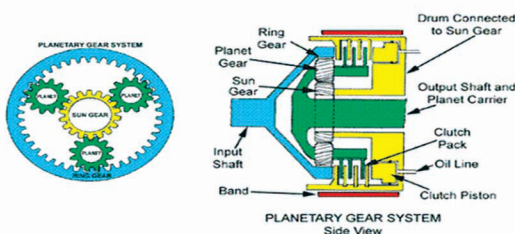


Figure 3 : planetary Gear sets with Band and Clutch

Challenges and Innovations:

Marine engineering faces various challenges, including the demand for increased fuel efficiency, stricter environmental regulations, and the need to adopt new technologies to improve safety and reliability. To address these challenges, marine engineers are embracing innovative solutions such as:

1. Alternative Fuels : With growing concerns about greenhouse gas emissions and air pollution, marine engineers are exploring alternative fuels such as LNG, hydrogen, and biofuels to reduce the environmental impact of shipping.

2. Electric Propulsion : Electric propulsion systems are gaining popularity in the marine industry due to their lower emissions, reduced fuel consumption, and improved maneuverability. Marine engineers are designing hybrid and fully electric propulsion systems for ships of all sizes, from small ferries to large container vessels.

3. Autonomous Shipping : Advances in automation, artificial intelligence, and remote monitoring are paving the way for autonomous shipping, where ships can operate with minimal human intervention. Marine engineers are developing autonomous navigation systems and unmanned surface vessels to improve safety, efficiency, and operational flexibility.

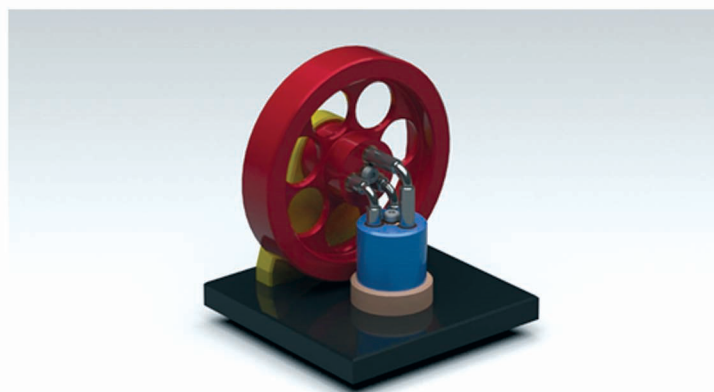
4. Digital Twin Technology : Digital twin technology allows marine engineers to create virtual replicas of ships and offshore structures, enabling them to simulate and optimize performance, monitor real-time data, and predict maintenance needs accurately.

In conclusion, marine engineering is a dynamic and multidisciplinary field that plays a vital role in the maritime industry. With ongoing technological advancements and a focus on sustainability, marine engineers continue to drive innovation and ensure the safe and efficient operation of ships and offshore structures in the global maritime ecosystem.

K.Santhoshkumar
II Year - Mech



K.Guna
IV Year - Mech



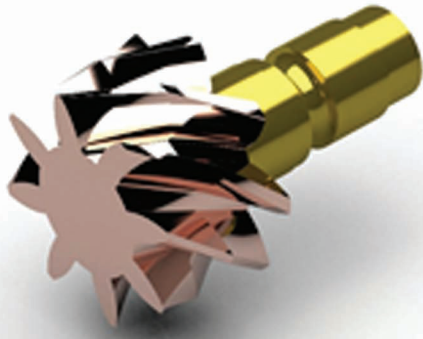
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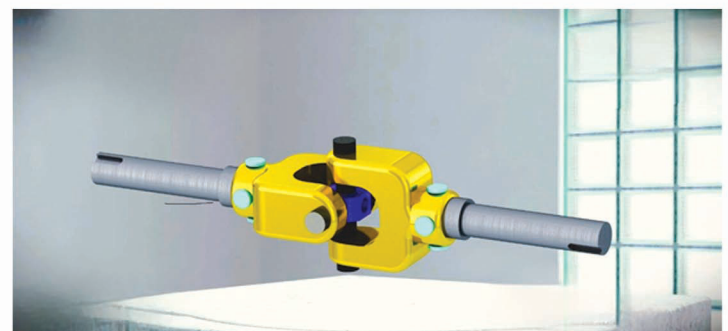
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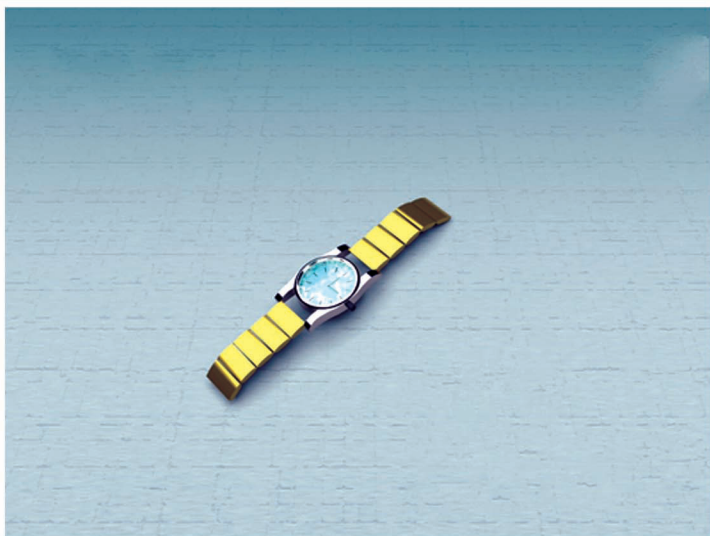
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K.Yogeshwaran
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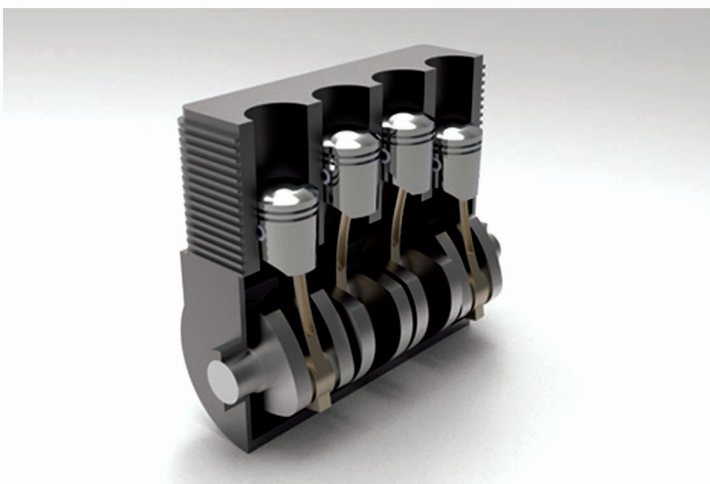
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V.Thirumoorthy
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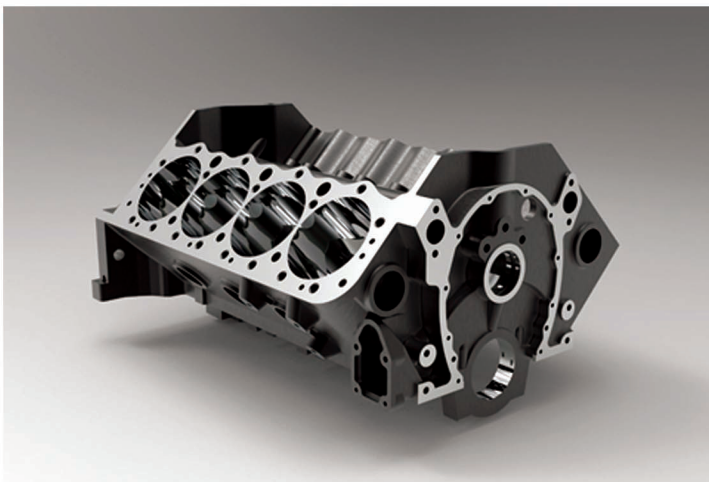
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R.Suryaprakash
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M.Aravinth
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