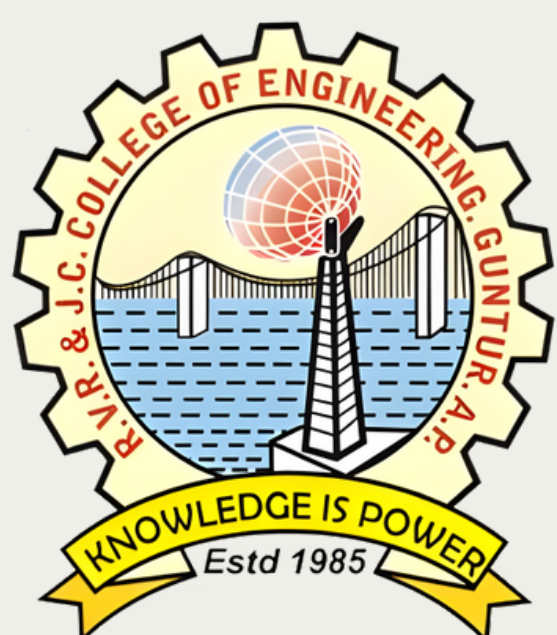


# MECHZINE

Vol 9 | Issue 2 | Jun 2024



**A STUDENT INITIATIVE TECHNICAL MAGZINE**



# CONTENTS

## EDITOR:

R.Rahul Sai - L22ME143

## ASSOCIATE EDITOR:

S.J.V.Kushal -L22ME146

## DESIGNER :

HI FRDS -L23ME

## MEMBERS:

CH.JYOTHI AKHIL-Y21ME016

## FACULTY ADVISORS:

Dr.K.Srinivas - Prof.&Head

Dr. S. Radhika - Associate Prof.

Ms.Sneha H Dhoria -Asst.prof

## CONTACT INFORMATION



rvmeczine@gmail.com



www.facebook.com/rvmeczine

## Article Name

## Pg.No

Digital world : The  
impact on present day  
students

3

Time Travel: A Hit in  
Theory, a Fail in  
Reality

4

In-Situ Monitoring

6

Energy Cascade  
Conversion Systems

7

Zoom At Event

8

Intelligent Elevator  
Dispatch

10

Fun Zone

11



# DIGITAL WORLD - THE IMPACT ON PRESENT DAY STUDENTS

-Dr.C.Srinivas  
PROFESSOR



The digital world has a profound impact on students in the present day. Here are some ways in which it influences students:



**1.Access to information:** With the digital world, students have access to an immense amount of information. They can quickly find answers to their questions, and they have access to resources that can help them learn and grow.

**2.Flexibility in learning:** Digital learning offers students the flexibility to learn at their own pace and time. They can access learning materials online, attend online classes, and even interact with other students from anywhere in the world.

**3.Improved communication:** Digital tools have also improved communication between students and teachers. Students can easily reach out to their teachers via email, chat, or video conferencing to clarify doubts and seek guidance.

**4.Increased engagement:** Digital tools such as gamification, interactive learning, and virtual reality have made learning more engaging and interactive for students. This has led to better retention of knowledge and improved learning outcomes.

**5.Social media influence:** Social media has become an integral part of the digital world, and it can have both positive and negative effects on students. While it can be a great tool for connecting with peers and sharing ideas, it can also lead to distraction, addiction, and cyberbullying.



The digital world has both positive and negative influences on students in the present day. It is essential to use digital tools and platforms wisely and with caution to reap their benefits while avoiding their pitfalls. Here are some ways in which it impacts them:

1) Learning      2) Social Media      3) Communication      4) Mental health      5) Entertainment

In summary, the digital world has transformed the way students learn, communicate, and socialize. It offers many benefits, but it is important to be mindful of the potential negative effects and use digital technology in a balanced and healthy way.





## TIME TRAVEL: A HIT IN THEORY, A FAIL IN REALITY

- P.PARDHU

- **Albert Einstein:** “According to the theory of relativity, time is a flexible dimension, not a fixed constant. In theory, time travel could be possible if one could travel at speeds approaching that of light or navigate through certain space-time geometries.”
- **Michio Kaku:** “Time travel is theoretically possible according to Einstein's equations, but we lack the technological capability to achieve it. It remains a speculative idea that excites the imagination and fuels scientific inquiry.”

Even with this advanced technology why we can't achieve the time travel. According to the scientists research time travel is possible only when a human travel with speed of light. What are the mechanical impossibilities that are stopping us to achieve speed of light?

To answer this question let's try to understand this with the 2 types of impossibilities i.e mechanical impossibilities and thermodynamic limitation

### Mechanical Impossibilities

#### 1. Relativistic Mass Increase:

- **Concept:** As an object accelerates toward the speed of light, its relativistic mass increases exponentially. This effect is described by Einstein's theory of special relativity.
- **Implication:** To continue accelerating an object as it approaches the speed of light, the force required grows without bound. Essentially, the energy needed to keep accelerating the object increases exponentially, making it practically impossible to reach or exceed the speed of light.

#### 2. Infinite Energy Requirement:

- **Concept:** The kinetic energy  $E_k$  required to accelerate an object to a fraction of the speed of light can be calculated using the formula  $E_k = (\gamma - 1)mc^2$ , where  $\gamma$  (gamma) is the Lorentz factor that approaches infinity as the velocity approaches the speed of light  $c$ .
- **Implication:** As velocity approaches  $c$ ,  $\gamma$  approaches infinity, and thus the energy required also approaches infinity. Since infinite energy is not available, reaching the speed of light is physically impossible.



#### 3. Mechanical Stress and Structural Integrity:

- **Concept:** As an object's velocity increases, relativistic effects also include increased stress and strain on its structure. The forces involved in maintaining structural integrity would become immense.
- **Implication:** The mechanical stress on materials and structures would become extreme as velocities approach the speed of light, making it impractical for any known material to withstand such forces without disintegrating.



## Thermodynamic Impossibilities

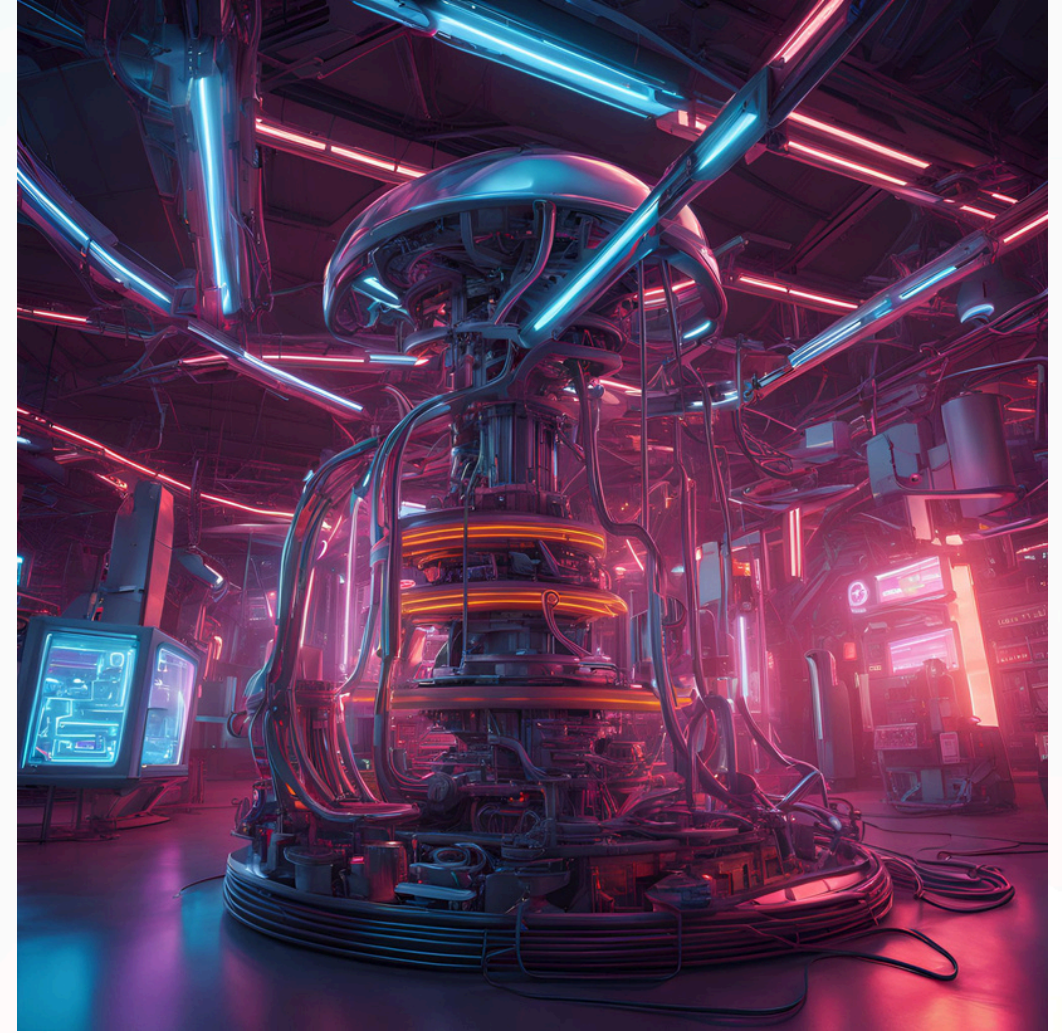
### 1. Heat Dissipation and Entropy:

- **Concept:** The second law of thermodynamics states that entropy, or disorder, increases over time, and energy transformations are never 100% efficient. As an object approaches the speed of light, energy conversion processes become increasingly inefficient, with a significant portion of energy being dissipated as heat.
- **Implication:** The heat generated from friction and other forms of resistance would be enormous. Managing this heat and maintaining the machine's functionality would be beyond current engineering capabilities.



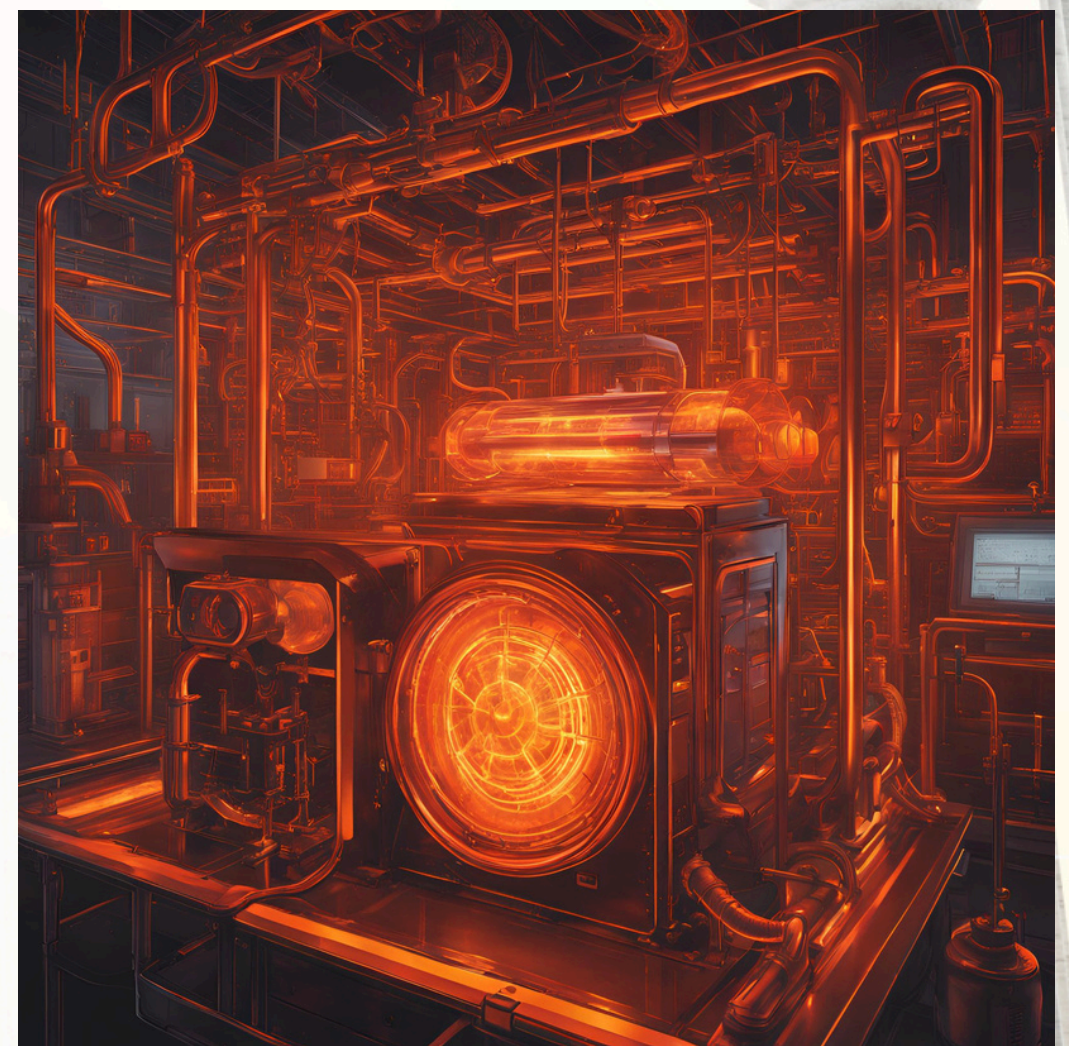
### 2. Energy Conversion Inefficiency:

- **Concept:** No machine is perfectly efficient, and as energy is transformed (e.g., from fuel to kinetic energy), some energy is always lost to heat and other forms of dissipation. As acceleration approaches the speed of light, the efficiency of energy conversion processes would drastically decrease.
- **Implication:** The energy needed to overcome resistance and reach near-light speeds would result in diminishing returns, making it practically impossible to achieve such speeds with current technology.



### 3. Thermal Radiation Limits:

- **Concept:** As objects approach relativistic speeds, they experience increased thermal radiation due to their high velocities and interactions with surrounding particles.
- **Implication:** The amount of thermal radiation would become extreme, leading to significant cooling problems and potential damage to the machine and its components.



The mechanical and thermodynamic barriers to achieving the speed of light are rooted in the laws of relativity and thermodynamics. The infinite energy requirement, extreme relativistic mass increase, mechanical stress, and inefficiency in energy conversion all contribute to the practical impossibility of reaching such speeds. These constraints illustrate the profound limits imposed by fundamental physical laws on our current technological capabilities.





-P. SRI. HARSHA  
Y21ME058

ADDITIVE  
MANUFACTURING

### IN-SITU MONITORING

In-situ monitoring of additive manufacturing (AM) processes involves acquiring real-time data to assess process behaviour and part quality during printing. One key technique is using images captured during the build process for monitoring and analysis. Here are some key applications and methods:

- **Defect Detection and Characterization:** Images can be used to detect and characterize defects like porosity, lack of fusion, and cracking as they form during the AM process. Machine learning techniques like convolutional neural networks are being applied to automatically identify defects from in-situ images.
- **Melt Pool Monitoring:** High-speed imaging of the melt pool during laser or electron beam based AM provides valuable insights into the process. Parameters like melt pool size, shape, and temperature can be extracted from the images and used for process monitoring and control.
- **Layer-by-Layer Monitoring:** Capturing images of each printed layer allows monitoring of the surface texture and geometry. Deviations from the expected texture or shape can indicate issues with the printing process. Random forests and clustering algorithms have been applied to analyze layer images for in-situ monitoring.
- **Thermal Imaging:** Thermal cameras can provide in-situ temperature maps of the build area. Monitoring the thermal history of printed parts is important for understanding residual stresses and distortion. Thermal images can be fused with other sensor data like optical images for comprehensive monitoring.
- **Digital Image Correlation (DIC):** DIC is a full-field optical technique that can measure deformations and strains in-situ during AM. By tracking speckle patterns on the surface of the part, DIC can quantify geometric distortions and residual stresses as they develop layer-by-layer. This provides valuable data for process optimization and part qualification.

In summary, in-situ imaging techniques are enabling new capabilities for monitoring and understanding AM processes in real-time. As the field continues to advance, we can expect to see increasing use of image-based monitoring for improving quality, productivity and consistency in additive manufacturing.



## FACULTY ARTICLE

# ENERGY CASCADE CONVERSION SYSTEMS



- Dr.P.SURESH KUMAR  
Associate Professor

## Concept:

Energy cascade conversion systems are a paradigm shift in the way we utilize energy resources. The concept behind these systems revolves around the efficient transformation of energy at multiple stages to minimize wastage and maximize useful work output. Unlike traditional energy systems, which often involve a linear progression from energy source to end-use, energy cascade systems extract value from energy at each step, effectively "cascading" it through various processes. This concept aligns perfectly with the broader goal of energy efficiency, which seeks to reduce energy losses at every stage of utilization. Energy cascade systems fundamentally change the way we think about energy. Instead of a linear and often wasteful flow, these systems redirect energy at multiple levels, ensuring that as much energy as possible is used productively. The energy cascade concept, which redirects energy across various sectors like industry, transportation, and residential, can significantly improve energy system sustainability by reducing energy losses, reducing greenhouse gas emissions, and responsible use of finite resources. This approach can be customized to meet the specific needs of different industries, offering a customized approach to energy optimization.

## Principles of Energy Cascade Conversion:

Energy cascade conversion systems operate on fundamental principles rooted in thermodynamics and energy conservation, ensuring efficient energy utilization and harnessing of energy.



### MINIMIZATION OF WASTE

The primary principle involves minimizing energy waste by reusing or redirecting energy at various stages. Energy that would typically be lost as heat or discarded in traditional systems is instead captured and utilized.



### EFFICIENT ENERGY TRANSFORMATION

Energy cascade systems focus on transforming energy in the most efficient manner possible. This includes optimizing processes, using advanced materials, and employing technologies that reduce losses during energy conversion.



### DIVERSITY OF ENERGY SOURCES

Another principle is the utilization of diverse energy sources. Energy cascade systems often integrate multiple energy inputs, such as renewable sources, waste heat recovery, and conventional energy, to ensure a constant supply of power.



### SYSTEM INTEGRATION

Energy cascade systems emphasize the integration of components and processes. This integration allows for seamless energy flow between stages, ensuring that energy is efficiently cascaded from one process to the next.



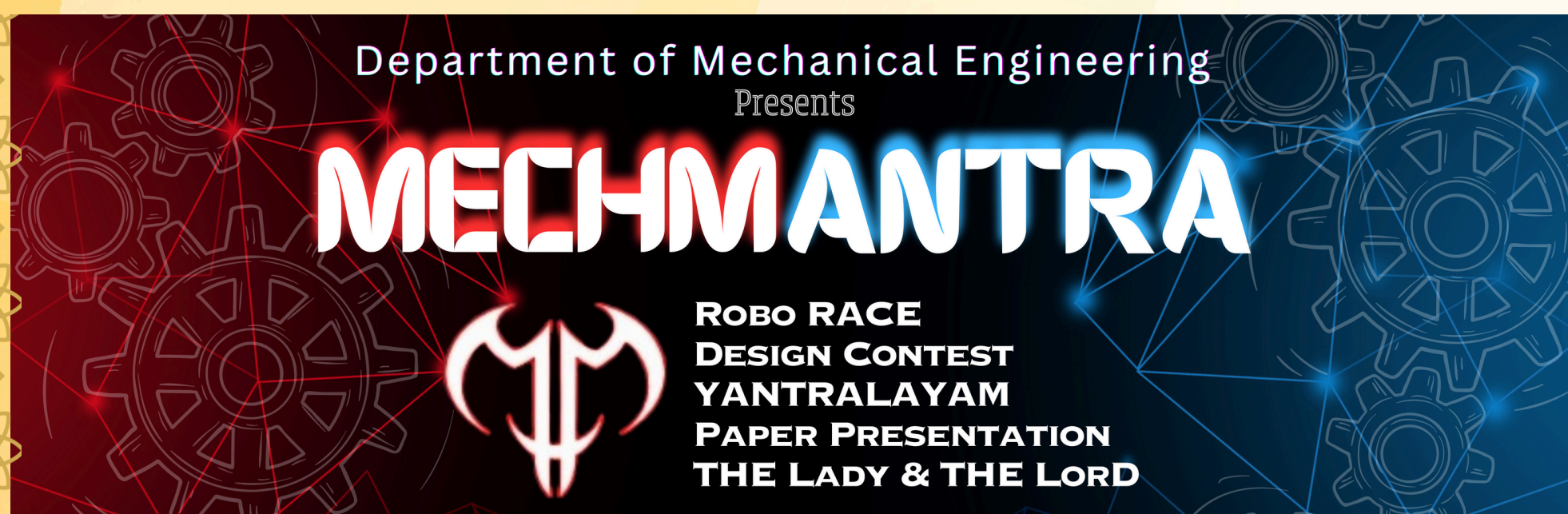
### ADAPTABILITY & SCALABILITY

These systems are designed to be adaptable and scalable to different applications and industries. Whether in a manufacturing facility, a transportation network, or a residential setting, energy cascade systems can be tailored to suit specific needs.



# MECHAMANTRA

*a technical fest*



- **MECHMANTRA-2024** is the annual technical festival of the Mechanical Engineering Department at RVR & JC College of Engineering (RVRJCCE), Guntur.
- It is organized by the student initiative organization **RAJMEA** (RVRJC Mechanical Engineering Association).
- It provides a platform for students to showcase their skills and knowledge, and to learn from each other.
- The event was started as a humble attempt to strengthen the foundations of Mechanical students and pave a way for them to understand theory in the context , real life with a glistering variety of contests and events.
- MECHMANTRA is a popular event among students and faculty at RVRJCCE.
- MECHMANTRA 2024 was held on February 15-16, 2024.
- MECHMANTRA 2024 has a participants about 238 .
- It's always rewarding to see coordinators and organizers' hard work and dedication pay off in a successful event MECHMANTRA 2024.





## PAPER PRESENTATION:

- The Paper Presentation welcomed an impressive 18 participants into 6 groups from various academic backgrounds, showcasing a wealth of knowledge and innovative research.
- First Prize goes to Vignan's Foundation for Science, Technology & Research(VFSTR).
- Second Prize goes to Narasaraopeta Engineering College(NEC).
- Third prize goes to R.V.R&J.C College of Engineering.



## ROBO RACE

- The Robo Race attracted an impressive lineup of 11 participants, each showcasing their engineering skills and innovative designs.
- First Prize goes to R.V.R&J.C College of Engineering.
- Second Prize goes to Prasad V. Potluri Siddhartha Institute Of Technology(PVPSIT)
- Third prize goes to KKR & KSR Institute of Technology & Sciences.



## THE LADY & THE LORD

- The Lady & the Lord welcomed an impressive 94 participants from various academic backgrounds.
- **THE LADY** goes to R.V.R&J.C College of Engineering.
- **THE LORD** goes to R.V.R&J.C College of Engineering.



## DESIGN CONTEST:

- The Design Contest showcased a remarkable gathering of 89 talented participants to the competition. And Finally 3 get the prizes.
- **First Prize** goes to R.V.R&J.C College of Engineering.
- **Second Prize** goes to Bapatla Engineering College
- **Third Prize** goes to Velagapudi Ramakrishna Siddhartha Engineering College.



## YANTRALAYAM:

- The Yantralayam, held on February 16th, showcased a remarkable gathering of 26 talented participants into 8 groups, each group bringing their unique vision and creativity to the competition.
- First Prize goes to Vignan's Foundation for Science, Technology & Research(VFSTR)
- Second Prize goes to R.V.R&J.C College of Engineering.
- Third prize goes to Narasaraopeta Engineering College(NEC)

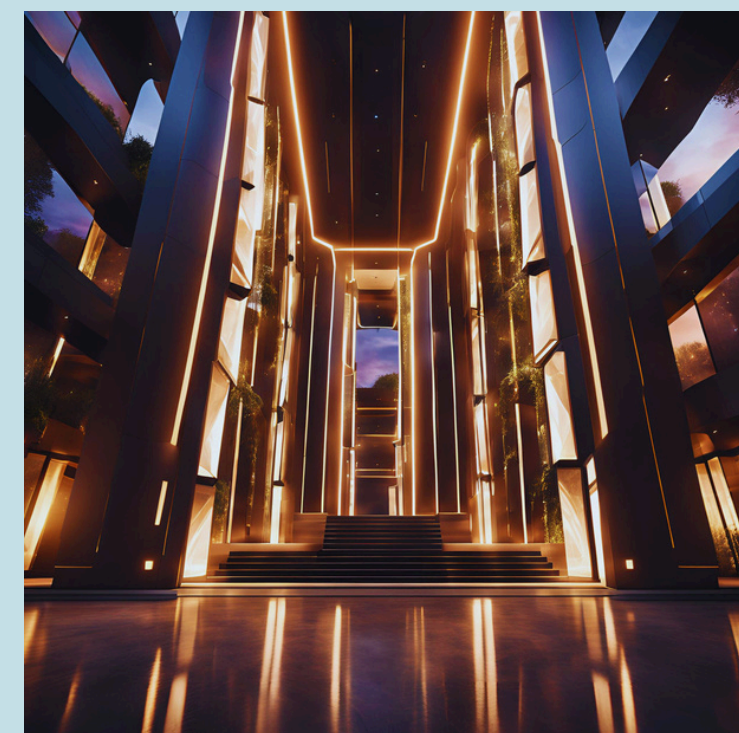
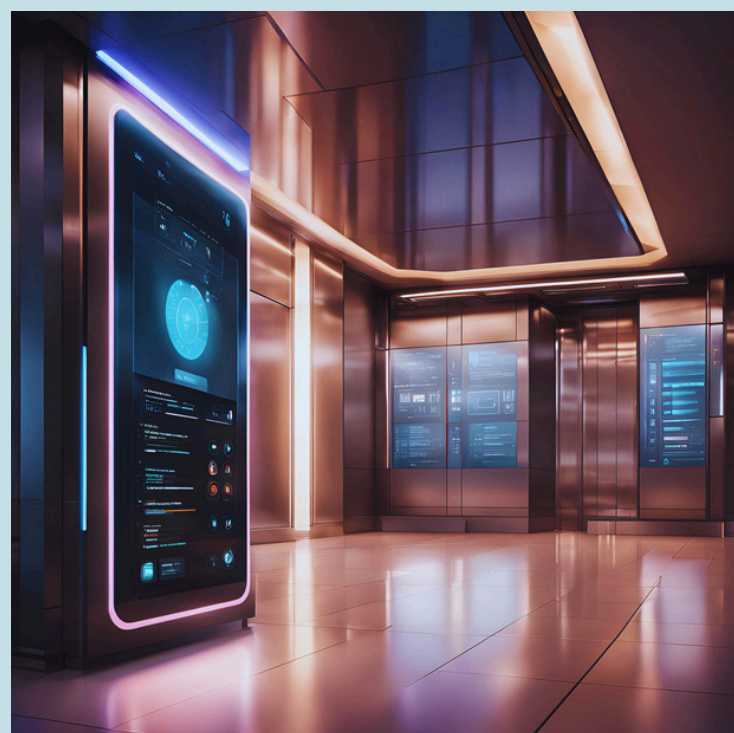


# INTELLIGENT ELEVATOR DISPATCH

-S.J.V.KUSHAL  
L22ME146



Intelligent Elevator Dispatch refers to the use of advanced algorithms and technologies to optimize the operation of elevators in buildings. The main goal is to reduce waiting times, improve energy efficiency, and enhance the overall user experience. Traditionally, elevators follow a simple up-down system, but with intelligent dispatching, elevators are assigned to passengers based on real-time data, predicted demand, and efficiency considerations.



- **Destination Control Systems (DCS):** The system groups passengers with similar destinations into the same elevator, reducing the number of stops.
- **AI and Machine Learning:** These technologies analyze data from sensors and current building occupancy to predict demand and allocate elevators efficiently.
- **Load Balancing:** By monitoring the load in each elevator, the system ensures that weight distribution is optimal, reducing wear and tear and enhancing performance.
- **Energy Efficiency:** Intelligent systems can shut down unnecessary elevators during low traffic periods.
- **Smart Integration:** These systems can be integrated with building management systems, smart sensors, and even smartphones to provide a seamless experience for users.
- **Emergency Management:** Intelligent dispatch systems prioritize the movement of elevators for evacuation or to allow emergency personnel to reach critical floors quickly.

# ELEVATOR

*intelligence*

## Future Trends

The future of intelligent elevator dispatch is likely to see further integration with smart city technologies and building automation systems. This could include:

- **Autonomous Elevators:** They could communicate with other building systems, such as lighting and heating, to optimize energy use across the entire building.
- **AI-Driven Predictive Maintenance:** From sensors, the system could predict when an elevator is likely to experience mechanical issues and schedule maintenance before problems occur.
- **Seamless Mobility Solutions:** Future systems may integrate with public transportation networks, ride-sharing services.

Intelligent elevator dispatch is transforming how we think about vertical transportation, making it more efficient, sustainable, and user-friendly.



|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   | 2 |   |   |   |   |   | 3 | 1 |
| 7 |   |   |   |   | 3 |   |   |   |
|   |   |   | 1 | 4 |   | 2 | 9 |   |
|   | 5 | 2 | 7 | 6 | 4 |   | 1 | 8 |
|   | 6 | 3 |   | 1 | 2 | 7 | 5 | 9 |
|   | 7 | 8 |   |   |   | 4 |   |   |
| 2 |   |   | 3 | 7 |   |   |   | 5 |
|   | 1 |   |   |   |   | 9 |   |   |
| 5 | 4 |   |   | 8 | 1 |   |   |   |

KNOW A FACT

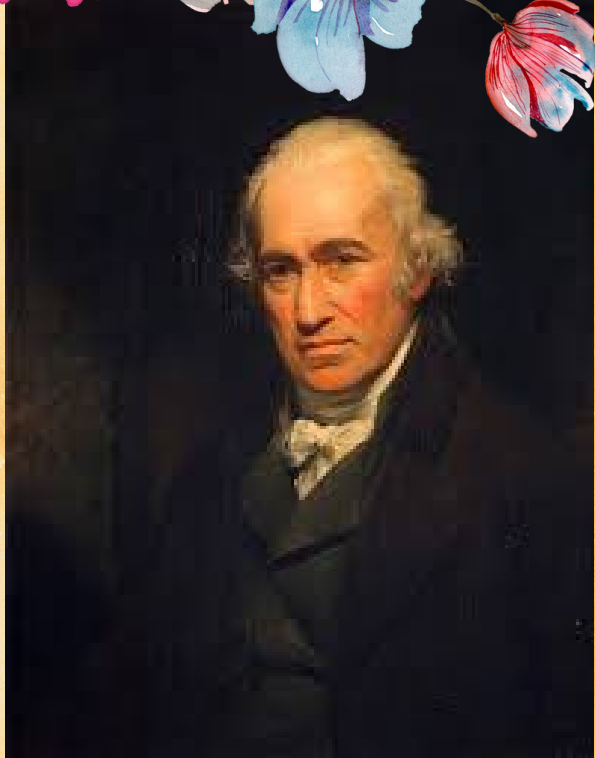
- Scientists say tears tell you the reason for someone crying. If the first drop comes from the right eye, it's tears of joy. Otherwise, it's because of pain.
- Niagara Falls never freezes.
- 92% of the world's currency is digital.
- The largest contiguous land empire in history is The Mongol Empire (13th & 14th centuries).

FIND

There are 100 mathematicians (including you!) in a room. Soon, I will enter and you will all line up such that you can see everyone in front of you, but nobody behind you. I will then place hats on each of yours heads. Each hat may be either black or white. You will not know what color hat you (or anyone behind you in line) is wearing. I will then ask each of you what color hat you are wearing, starting from the back of the line and moving to the front (starting from the person who see's everyone's hat color but his or her own, and ending with the person who sees nobody's hat color). Now, before I enter and place the hats, come up with a strategy to ensure that 75 people live. Can you do even better?

“A LIE CAN RUN  
ROUND THE  
WORLD BEFORE  
THE TRUTH HAS  
GOT ITS BOOTS  
ON.”

-James Watt

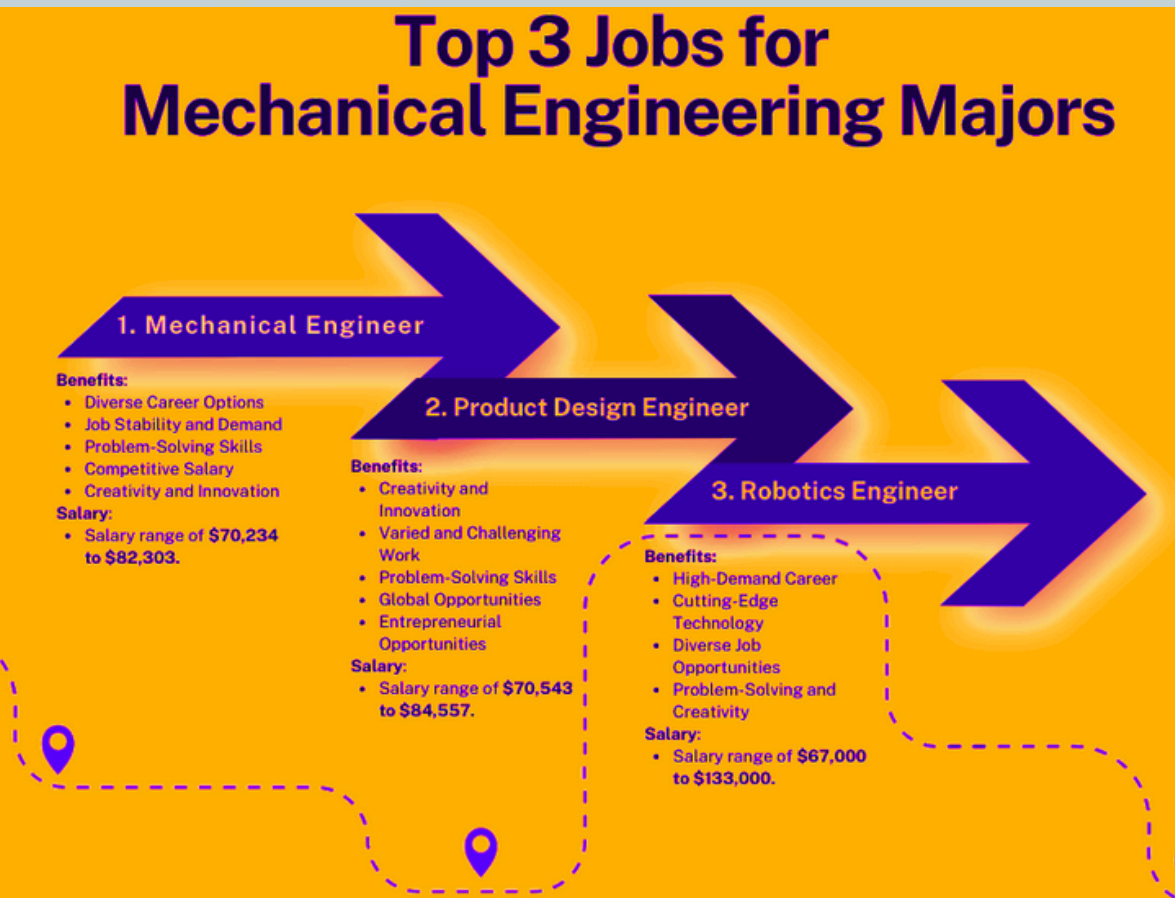


KNOW A GADGET



- Blue Light Filtering or Polarized Sunglass Lenses
- Low Latency Audio
- Built-in Mic and Speakers
- Touch-Enabled and Voice-Assistant Compatible
- More than 5 hours of battery life

DO YOU KNOW







**DEPARTMENT OF MECHANICAL ENGINEERING**  
**R.V.R & J.C COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**  
**Chandramoulipuram, Chowdavaram**  
**Guntur-522019 Andhra Pradesh**

