

ISSUE 12 | SEPTEMBER 2023.

# TECHNOLOGICAL EDUCATION IN SHAPING THE FUTURE

## COMPUTER AIDED ENGINEERING



# THE ORGANIZATIONS MODERN ERA

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# ABOUT US

In 2008, we started our journey by launching the company's first office in Kochi with an operation team executing industrial automation projects and within one year we opened our first training centre in Kozhikode. By providing the finest service, in a short span we got students from various parts of India and Africa too. As a next step, we expanded our training centres to diverse locations in India, Nigeria, Qatar, UAE, Kenya, and the KSA and now in 2022, we have altogether 18+ branches. IPCS Global, one of the most renowned Core Technical Instruction Providers in the World, has been offering training on numerous programmes that are focused on the future.

The programmes that we choose for training segments are influenced by a variety of factors, including the stream's potential growth, the employability of our trainees, the accessibility of various employment markets, and many other aspects. Our current stream list includes Industrial Automation, Building Management and CCTV Systems, Embedded and Robotics, Internet of Things, Digital Marketing and IT and Software Development. 100% live and interactive classes, global certifications and placements are our major highlights.

Our next step is to expand IPCS to every single continent and to build a career oriented generation that stands with the future. We IPCS always focus on the upcoming trends and updates on every stream to make our students best and hold professional ethics and moral values tightly and never turns our clients unsatisfied. We firmly believe in the virtue of team spirit. All throughout, a culture of professionalism and mutual respect is upheld. Technology is the engine of business success and innovation. We believe that in the current digital world, it is important to understand how they affect our lives. As a part of our Corporate Social Responsibility, Team IPCS gave birth to "Iziar", a magazine that reflects technology trends and current trends in the market related to the same. The main goal is to raise awareness of available technologies and make them accessible wherever you are. It's about technology, inventions, startups, cyberpunk life & much more. Iziar was developed to give you insight into the latest innovations and keep you on top of the latest trends.

Technology is like air, You can't live without it. So we welcome you to the technological world of Iziar.

# FACTORY IO

## *THE GAME CHANGER!*



**Arafat Ali**  
Jr. Project Engineer

*In today's fast-paced and technology-driven world, the manufacturing industry is constantly seeking innovative solutions to enhance efficiency, reduce costs, and improve overall productivity. One such solution that has been making waves in the realm of industrial automation is Factory IO. This cutting-edge software application has transformed the way factories and industrial facilities operate, offering a virtual playground for testing, simulating, and optimizing manufacturing processes.*

# The Evolution of Industrial Automation

**Industrial automation** has come a long way from its early days of mechanical control systems to the sophisticated computer-based systems of today. In recent years, the integration of software simulations has played a pivotal role in advancing automation technologies. This is where Factory IO steps in, bridging the gap between virtual simulations and real-world manufacturing environments.

## Understanding Factory IO

**Factory IO** is powerful user-friendly software designed to create virtual environments that mimic actual factory floors. It provides a comprehensive platform for designing, testing, and validating automation systems before they are implemented in a physical setting. This simulation software enables engineers, technicians, and manufacturers to visualize and fine-tune processes without disrupting ongoing operations.

## Key Features and Benefits

**1. Realistic Virtual Environments:** It offers a library of realistic industrial components, machinery, sensors, and actuators, allowing users to replicate their specific manufacturing setup virtually.

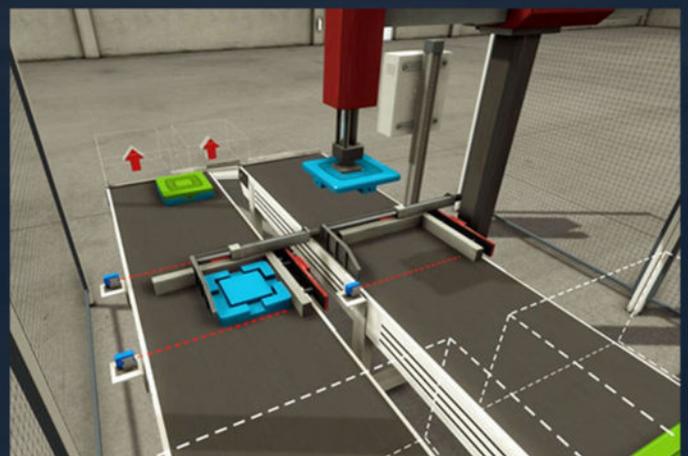
**2. Enhanced Testing and Training:** Engineers can test automation processes and control systems in a risk-free virtual environment. This minimizes the chances of errors during real-world implementation and reduces downtime.

**3. Process Optimization:** Factory IO enables users to experiment with different automation scenarios, helping them identify optimal workflows, production sequences, and resource allocations.

**4. Cost Efficiency:** By identifying and rectifying potential issues in the virtual environment, companies can save substantial costs associated with trial and error in the physical setup.

**5. Training and Education:** By identifying and rectifying potential issues in the virtual environment, companies can save substantial costs associated with trial and error in the physical setup.

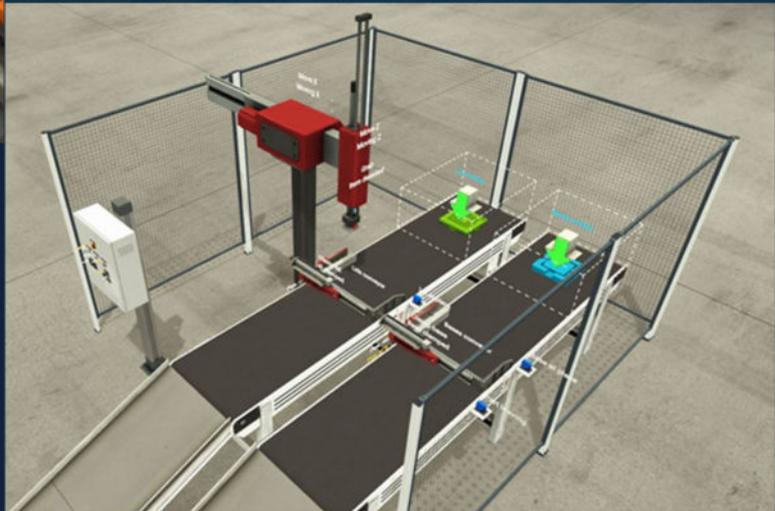
**5. Remote Monitoring:** The software's virtual simulations can be accessed remotely, allowing engineers and managers to monitor and troubleshoot processes from anywhere.





**2. Sensor and Actuator Integration:** The software supports integration with a wide range of sensors, actuators, and control systems. This capability enables users to replicate real-world interactions accurately.

**3. Real-time Data Visualization:** Factory IO provides real-time data visualization tools, allowing users to monitor and analyze process variables, sensor readings, and other relevant data during simulations.



## Use Cases of Factory IO

**1. Proof of Concept:** Factory IO assists in demonstrating the feasibility of new automation concepts and garnering support from stakeholders.

**2. Prototyping:** Engineers can prototype automation systems virtually, refining their designs before the actual physical implementation.

**3. Process Validation:** The software aids in validating complex automation workflows, ensuring seamless integration and operation.

**4. Troubleshooting:** Factory IO helps identify potential issues and bottlenecks in processes, enabling preemptive troubleshooting.

**5. Employee Training:** Manufacturers can use Factory IO to train employees on new automation systems without interrupting production.

## Additional Key Features of Factory IO

**1. Customization and Flexibility:** Factory IO allows users to customize virtual environments according to their specific needs. This flexibility enables the simulation of various production scenarios, from simple assembly lines to complex manufacturing setups.

**4. Scenario Analysis:** Engineers and operators can test different production scenarios and what-if situations, helping them make informed decisions about process modifications and optimizations.

**5. Collaborative Environment:** Factory IO supports collaboration among teams by allowing multiple users to work on a simulation simultaneously. This feature fosters teamwork, knowledge sharing, and collective problem-solving.

**6. Integration with PLCs and HMI Systems:** The software can interface with programmable logic controllers (PLCs) and human-machine interface (HMI) systems, creating a seamless connection between virtual simulations and real-world control systems.

**7. Error and Alarm Simulation:** Users can introduce faults, errors, and alarms into the virtual environment to test how automation systems respond to unexpected situations. This aids in refining error-handling mechanisms.

**8. Historical Data Logging:** Factory IO can log historical data from simulations, allowing users to analyze trends, identify performance bottlenecks, and make data-driven improvements.

**9. Multi-Platform Support:** The software is designed to run on various platforms, including Windows, Mac, and Linux, making it accessible to a wider range of users.

**10. Virtual Commissioning:** Factory IO supports the concept of virtual commissioning, where automation systems are thoroughly tested and commissioned in the virtual environment before being implemented in the physical world.

**11. Digital Twin Creation:** The virtual environments created in Factory IO can serve as digital twins of actual manufacturing setups, providing a real-time reflection of the physical processes and aiding in predictive maintenance.

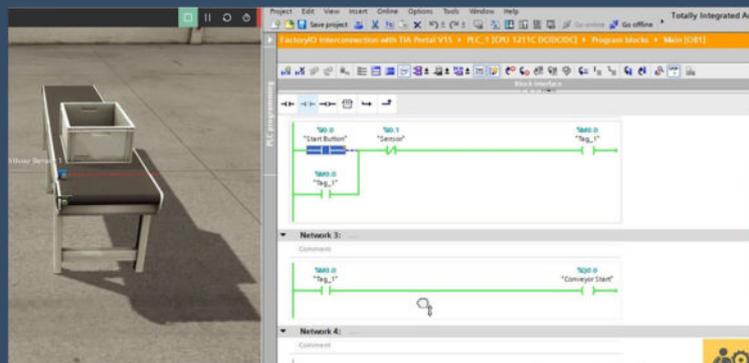
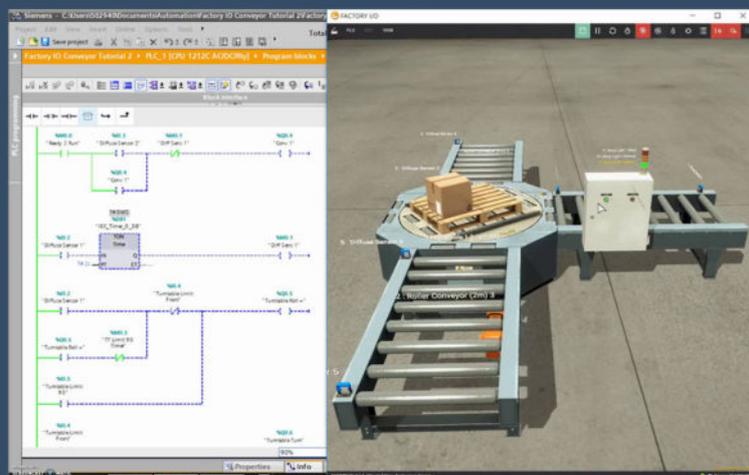
## Challenges and Future Directions

While Factory IO offers numerous benefits, it's important to note that creating a perfectly accurate virtual replica of a factory environment can be complex. The software relies on accurate modeling and thorough input of parameters to achieve the desired results. As technology evolves, we can expect Factory IO to become even more sophisticated, with improved realism, integration capabilities, and ease of use.

## Conclusion

Factory IO has emerged as a game-changer in the world of industrial automation, bridging the gap between virtual simulations and real-world manufacturing. Its ability to create accurate virtual environments, enhance testing and training, optimize processes, and reduce costs has earned it a central place in modern manufacturing strategies. As the manufacturing landscape continues to evolve, Factory IO is poised to play a vital role in shaping the future of industrial automation.

With its extensive list of features, it has not only simplified the process of designing and testing automation systems but has also revolutionized the way manufacturers approach industrial automation. Its ability to create accurate, interactive, and flexible virtual environments offers a safer, more cost-effective, and efficient way to optimize production processes. As the manufacturing industry continues to embrace advanced technologies, Factory IO stands as a beacon of innovation, driving progress and transforming the way factories operate in the digital age.



# THE ROLE OF BLOCKCHAIN IN DIGITAL MARKETING



**Sakthivel. S**  
Digital Marketing Executive

Block chain is a decentralized and distributed digital ledger technology that allows multiple parties to record and verify transactions in a secure, transparent, and tamper-proof manner. It gained prominence as the underlying technology for crypto currencies like Bitcoin, but its applications go beyond just digital currencies.

At its core, a block chain consists of a chain of blocks, each containing a list of transactions. Here's a simplified explanation of how it works in Digital Marketing:



Blockchain technology has the potential to play several important roles in digital marketing by addressing challenges and enhancing various aspects of the industry. Here are some key roles that block chain can have in digital marketing.

### **Data Security & Privacy:**

Block chains decentralized and tamper-proof nature can improve the security and privacy of customer data. Marketers can securely store and manage customer information, reducing the risk of data breaches and unauthorized access.

Data security and privacy are fundamental aspects of block chain technology. Block chain's inherent features contribute to enhancing data security and privacy in various ways:

**1. Decentralization:** Traditional databases are often centralized and controlled by a single entity, making them susceptible to single points of failure and unauthorized access. In a block chain network, data is distributed across multiple nodes, reducing the risk of a single point of failure and making it more difficult for malicious actors to compromise the entire system.

**2. Permissioned vs. Permissionless Blockchains:** In permissioned blockchains, access to the network and data is controlled; allowing only authorized participants to join. Permissionless block chains, like the Bitcoin network, are open to anyone, but data can still be secured through cryptographic methods.

**3. Private and Confidential Transactions:** Some block chain platforms, like Hyper Ledger Fabric, offer features for private and confidential transactions. These mechanisms allow for data to be visible only to authorized parties while still being verifiable by the network.

**4. Data Encryption:** Data stored on the block chain can be encrypted to further protect sensitive information. Only authorized parties with the decryption keys can access and interpret the data.

**5. Self-Sovereign Identity:** Block chain can enable self-sovereign identity, where individuals have control over their own digital identities and personal data. This prevents the consolidation of personal information by central entities.

### **Ad Fraud Prevention:**

Block chain can help verify the authenticity of ad impressions and clicks, reducing ad fraud. This ensures that advertisers get accurate and transparent data about their ad campaigns, leading to more reliable ROI calculations.

Block chain technology has the potential to address several challenges associated with ad fraud in the digital advertising industry. Ad fraud involves fraudulent activities that distort the effectiveness of online advertising campaigns, leading to wasted budgets and misleading metrics. Block chain can contribute to ad fraud prevention in the following ways:

**1. Transparency and Auditability:** Block chain's transparent and immutable nature allows all participants in the advertising ecosystem to track and verify every step of an ad's journey. This includes the creation of ad content, impressions, clicks, conversions, and payments. Advertisers, publishers, and other stakeholders can verify the accuracy of reported metrics, reducing the risk of fraudulent reporting.

**2. Smart Contracts:** Block chain-based smart contracts can automate the execution of advertising agreements and campaigns. These contracts can define the terms, conditions, and actions required for payments based on predetermined criteria, such as reaching a certain number of valid clicks or conversions. This automation reduces the need for intermediaries and minimizes the risk of payment disputes. Smart contracts on block chain platforms can automate the payment process based on predefined conditions. For instance, a smart contract could automatically release payment to the content creator once a certain number of views or interactions have been achieved.

**3. Ad Verification and Attribution:** Block chain can offer a more reliable way to attribute ad interactions to the appropriate sources. Ad clicks and conversions can be recorded on the block chain, ensuring that advertisers pay only for legitimate and verified interactions.

**4. Identity Verification:** Block chain-based identity verification can help ensure the authenticity of publishers, advertisers, and users. This can prevent the creation of fake websites, bots, and other fraudulent entities that contribute to ad fraud.

**5. Real-Time Tracking and Verification:** Block chain's real-time tracking capabilities allow advertisers to monitor and verify ad interactions in real-time. This immediate feedback can help detect and prevent fraudulent activities as they occur.

**6. Cross-Verification and Collaboration:** Multiple parties involved in an advertising campaign, such as ad agencies, publishers, and verification services, can collaboratively verify and cross-validate data on the block chain. This shared verification process reduces the potential for discrepancies and fraud.

**7. Reduced Intermediaries:** Block chains direct peer-to-peer interactions can reduce the number of intermediaries involved in the advertising process, minimizing opportunities for fraudulent activities at various touch points.

Block chain technology has the potential to revolutionize supply chain management by bringing transparency, traceability, and accountability to the process. Transparent supply chains using block chain can address a variety of challenges and create more efficient, secure, and ethical supply chain networks. Here's how block chain contributes to achieving transparent supply chains:

#### ► Traceability

Block chain can offer a more reliable way to attribute ad interactions to the appropriate sources. Ad clicks and conversions can be recorded on the block chain, ensuring that advertisers pay only for legitimate and verified interactions.

#### ► Product Authentication

Block chain allows consumers, businesses, and regulators to verify the authenticity of products. By scanning a QR code or using an app, users can access information about a product's origin, manufacturing processes, and distribution, ensuring that they receive genuine goods.

#### ► Supplier Verification

Block chain enables verification of supplier identities and certifications. This helps prevent the use of counterfeit or substandard materials and ensures that suppliers meet ethical and quality standards.

#### ► Collaborative Networks

Block chain allows different parties within a supply chain (e.g., suppliers, manufacturers, distributors) to share data in a secure and controlled manner. This fosters collaboration and information sharing while maintaining data privacy.

#### ► Real-Time Visibility

Block chain provides real-time visibility into the movement and status of goods, allowing stakeholders to track shipments, monitor inventory levels, and optimize logistics more effectively.

#### ► Recall Management

In the event of a product recall, block chain enables swift and accurate traceability to identify affected products and their sources, minimizing the impact of recalls on consumer safety and brand reputation.

## Transparent Supply Chains



In industries where authenticity and transparency are crucial, such as luxury goods and food, block chain can provide an immutable record of the supply chain. Digital marketers can use this information to communicate the origins and authenticity of products to consumers.

## Micropayments & Content Monetization

Block chain enables direct micropayments between content creators and consumers. This can revolutionize how digital marketing content is monetized, allowing creators to receive fair compensation for their work and consumers to access content more conveniently. Block chain technology has the potential to revolutionize content monetization and enable micropayments for digital content, offering new revenue models and benefits for both content creators and consumers. Here's how block chain can play a role in micropayments and content monetization:

### ► Frictionless Micropayments:

Block chain enables the seamless transfer of small amounts of value, known as micropayments, without the need for intermediaries. This allows consumers to pay a small fee directly to content creators for accessing individual pieces of content, such as articles, videos, images, music, and more.

### ► Direct Peer-to-Peer Transactions:

With block chain, content creators can receive payments directly from consumers, eliminating intermediaries such as payment processors and ad networks. This direct peer-to-peer model reduces transaction fees and enables creators to retain a larger portion of their earnings.

### ► Tokenized Content:

Content creators can tokenize their digital assets, representing them as unique digital tokens on a block chain. Consumers can then purchase and own these tokens, giving them access to specific content. This tokenized approach allows for increased flexibility in content monetization.

### ► Global Accessibility:

Block chain's borderless nature makes it suitable for international micropayments, allowing content creators to reach a global audience and receive payments from anywhere in the world.

### ► Fractional Ownership and Collaboration:

Content creators can leverage block chain to enable fractional ownership of content. Multiple contributors to a piece of content, such as writers, photographers, and designers, can receive proportional.

## Enhanced Copyright Protection:

Block chain's immutable records can assist in copyright management and ownership verification. Creators can prove ownership of their original content, reducing the likelihood of plagiarism and unauthorized use.

## Conclusion

Despite these advantages, it's important to note that,

- Block chain can enhance data security and privacy; it's not a one-size-fits-all solution. Implementing block chain solutions requires careful consideration of factors like network architecture, encryption methods, access controls, and regulatory compliance.
- While block chain has the potential to enhance ad fraud prevention, its adoption in the digital advertising industry is still evolving. Challenges such as scalability, interoperability, and industry-wide adoption need to be addressed for block chain-based solutions to become main stream.
- Block chain-based transparent supply chains offer benefits across industries, including agriculture, food, pharmaceuticals, fashion, electronics, and more. It's important to note that the adoption of block chain-based micropayments and content monetization may face challenges related to user adoption, user experience, scalability, and integration with existing systems.

In today's world, Technological Education has always been a catalyst for change in society. From the discovery of the wheel to the printing press, from steam engines to smart phones, these technological innovations have predominantly changed the mode we live, work, and interact. In the 21st century, as we stand on the precipice of the Fourth Industrial Revolution, technological education is emerging as a crucial driving force behind innovation and progress in various fields.



Navas Jan P  
Content Writer

# TECHNOLOGICAL EDUCATION IN SHAPING THE FUTURE



# Industrial Automation

One of the most tangible examples of technological education shaping the future is in the world of industrial automation. Pupils in Technical education programs learn about the principles of automation, the design and operation of robots and other machines and the use of software to control these systems. Automation has innovated manufacturing and production operations across the sky, guiding to increased efficiency, avoiding human risk, and finest quality products.

Industrial automation is in diverse industries like healthcare, agriculture and logistics. For example, robots are used in hotels to perform executive work, in hospitals to perform surgery and in warehouses to pick and pack orders.

# Developers & IT Careers



The Software industry is another crucial career area for the future realm. It has become a predominant pillar of the modern digital world. From mobile phones and computers to software development, Artificial Intelligence underpins countless aspects of daily things. Technological education is necessary for the expansion and maintenance of the coding of software. Developers have high demand in the job market. The Bureau of Labour Statistics expects a steep 22% growth in the Developing sector in 2020-2030, much faster than the average for all occupations. AI eases the workload of developers. Now we can generate codes within hours by using AI chatbots. Even school students are exploring these AI facilities for developing Games, Mobile apps and software.

# Artificial Intelligence

Artificial Intelligence emerges as a catalyst for change, leaving its indelible mark on every facet of our world. The realm of education stands as no exception to this sweeping transformation. The Ease of AI holds the promises of customization and potency, which is pivotal in reshaping the very essence of education.

It can revolutionize the academic landscape by designing new educational algorithms for syllabus planning and personalized career way selection from the early stages of schooling. Furthermore, it is imperative to ensure access to resources for mastering the fundamentals of programming and the principles of AI, the innovation and performance of AI systems and the ethical dimensions of AI.

AI has already performed almost whole industries, including soft hand work, healthcare, finance, and transportation. The potential applications of AI are vast and still exploring. AI has the calibre to solve some of the world's most pressing problems, such as climate change and poverty.

Here are some additional concrete examples of impact;

- **The COVID-19 pandemic accelerated the adoption of online learning, with educators relying heavily on technology to deliver lessons. Technical education played an important role in training teachers and students to navigate this new digital landscape.**
- **Precision agriculture uses technology like drones, sensors, and AI to optimize crop management. Farmers educated in these technologies can maximize yields while minimizing resources, contributing to sustainable food production.**
- **Renewable power resources like wind energy and Solar photovoltaic benefit from technological betterments. Experienced architects in these technologies are vital for reducing reliance on crude oil like non-renewable energies.**
- **Space exploration-encouraging agencies like NASA and private companies like Virgin Galactic, SNC and SpaceX are moving the boundaries of space tourism. The coming generation of Engineers and astronauts demands a concrete foundation in technology to experience these endeavours.**

Moreover, AI is revolutionizing the transportation industry through self-driving cars, enhancing customer experiences in retail with personalized recommendations and even aiding in disaster prediction and response.



In conclusion, Technical education provides the foundation for progress, innovation and industrial evolution. It encourages skilful individuals to harness the power of technology to shape the future. From industrial automation to software development and the transformative power of Artificial Intelligence, technological education empowers individuals to make meaningful contributions to society. By doing so, we can prepare a workforce capable of pushing the boundaries of innovation, ultimately shaping a brighter and more technologically advanced future for all.

# THE ORGANIZATIONS OF MODERN ERA

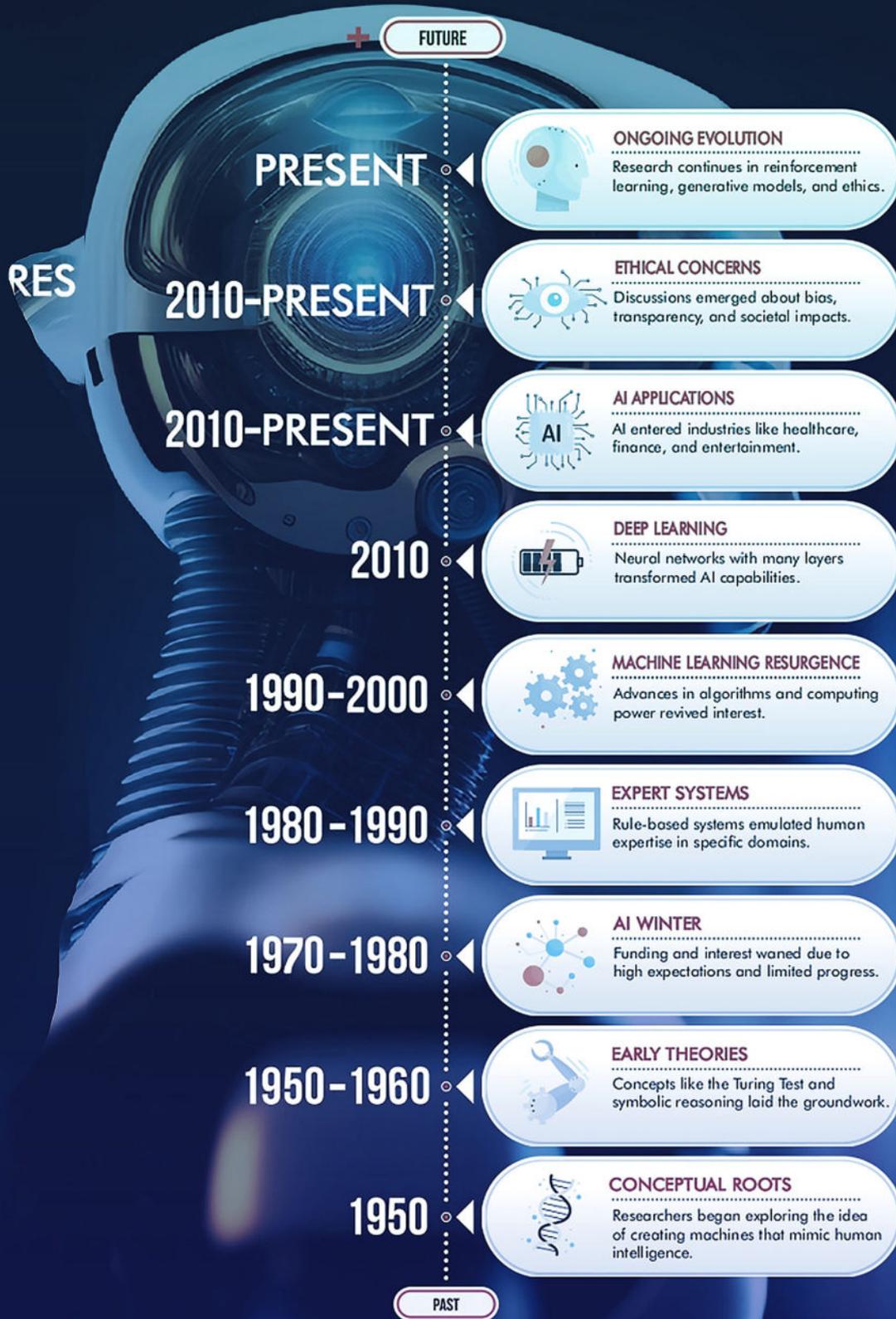


**Navya S Raj**  
CRE

Artificial Intelligence (AI) is a rapidly advancing field of computer science that focuses on the development of machines and systems capable of performing tasks that typically require human intelligence. Through the application of algorithms and data analysis, AI enables computers to learn, reason, and make decisions, emulating human cognitive functions. AI technology has found its way into various domains, from image and speech recognition to natural language processing and autonomous vehicles, revolutionizing industries and enhancing our daily lives in ways previously thought unimaginable.



# HISTORY OF AI



The future of AI holds a tapestry of unprecedented possibilities that stand poised to reshape our world. Advancements in deep learning, natural language processing, and quantum computing promise AI systems of remarkable sophistication, capable of unravelling intricate problems and propelling scientific discovery to new frontiers. Industries will be revolutionized as AI orchestrates smarter automation, ushers in personalized experiences that adapt to individual preferences in real time, and empowers medical breakthroughs that usher in an era of precision health care.

With AI's exponential growth, self-learning algorithms will engender machines that continuously evolve and adapt, raising questions about the nature of human-AI symbiosis and the ethical considerations surrounding it. As AI integrates further into daily life, societal discourse on its implications will shape the path forward, guiding us toward a future where innovation and responsible stewardship harmoniously coexist.

# FUTURE



# RISE OF ARTIFICIAL INTELLIGENCE IN HUMANS

The rise of AI in humans signifies a profound transformation of our daily lives, as artificial intelligence becomes an integral part of our existence. This evolution encompasses a spectrum of changes, from cognitive augmentation that empowers us with enhanced decision-making and problem-solving tools, to the automation of routine tasks that liberates time for more meaningful endeavours. Personalization, driven by AI's ability to analyze vast data, shapes our interactions with tailored recommendations and services, while healthcare enters a new era with AI assisting in diagnoses, treatment plans, and medical research. The workplace undergoes a paradigm shift as AI-driven collaboration amplifies our professional capacities, while autonomous systems redefine safety and efficiency across sectors. Yet, as AI becomes woven into our fabric, ethical considerations arise, urging us to navigate the challenges of bias, privacy, and equitable distribution. The rise of AI in humans propels us into uncharted territory, where innovation and responsibility intersect, reshaping the boundaries of what we can achieve together.

## CONCLUSION

In summary, AI has rapidly transformed from theoretical concepts to tangible realities, driving efficiency, personalization, and innovation across sectors. Its journey from early foundations to deep learning breakthrough reflects a relentless pursuit of replicating human intelligence. As we navigate the future, ethical considerations and responsible development will play a crucial role in harnessing AI's potential for societal benefits, shaping a world where human-AI collaboration paves the way for unprecedented advancements and new possibilities.

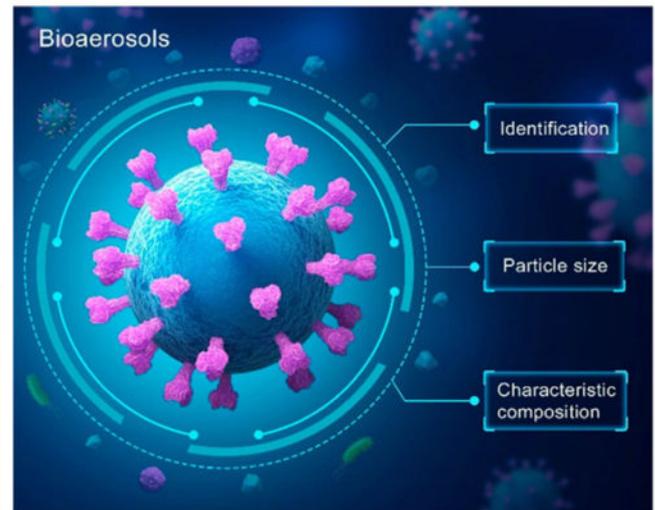
# AIR QUALITY DETECTOR



MR.YASH RAVI JOIODE  
BMS Engineer



An air quality detector or monitors is a device that measures the levels of common air pollutants. Monitors are available for indoor and outdoor environments. Air quality monitors are generally sensor-based devices. Air pollutants come from a variety of sources, including man-made emissions like fossil fuel use in vehicles and cooking and natural sources, like dust storms and smoke from wildfires and volcanoes.



**Air quality detectors** are equipped with sensors designed to detect specific pollutants. Some use lasers to analyze the density of particles in a cubic meter of air, while others rely on satellite imagery to measure energy reflected or emitted from earth.

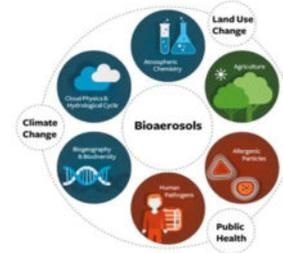
# WHY?

## STUDY OF MICROBES IN AIR IS IMPORTANT

Environmental biology covers micro organisms present in water and land; however air is affected by microbes too. The atmospheric air comprises of pathogens, virus, bacteria's, fungi, algae, gases, cells, fumes and pollutants. Inhalation of such submicroscopic infectious agents may lead to pulmonary diseases and disorders. Oxygen deficiencies, humidity could prove further complications to human health.

The droplets discharged by humans wheeze and sneeze evaporate and these droplets contains microbes which remain suspended in the air for long period of time, once inhaled these microbes have potential to settle in respiratory tract and cause pulmonary illness. It is therefore relevant to study microbes in air in order to understand and avoid illness.

Air quality detectors would open possibilities of analyzing infection and diseases in air by monitoring the bacterial level for indoor and outdoor. Determining the level of contamination of air in the surrounding the device would take in air from the space and measures the amount of bioaerosols in the atmosphere and send the data to computer.



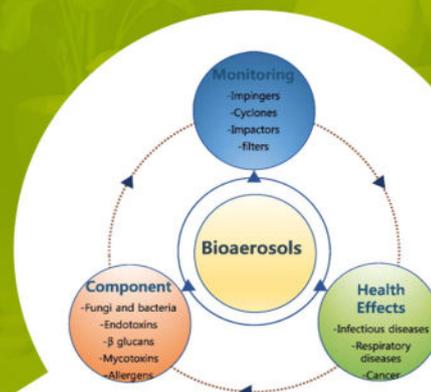
Bioaerosol



## The detector

will then get real time data on the air quality or the level of contamination of air in space as it changes overtime. The air detector will apply the Maillard reaction to measure the microbe in short time. The Maillard reaction is a reaction that creates substance Melanoidin by heating or reducing sugar and amino acid such as protein. Melanoidin becomes fluorescent when radiated with certain wavelength of light.

The formation of melanoidin is accelerated by adding thermal process to capture microbes to increase fluorescent strength. The air from space will be drawn by detector and particles <10 microns including micro organisms would be separated by cyclone method. The separated particles are then charged with static electricity and absorbed to the captured plate as test section.



## MULTIPLE FUNCTION & REAL-TIME MONITORING



They are then exposed with the light and the amount of fluorescent is measured before the maillard reaction (detect fluorescence before heating). Next they're heat treated and the amount of fluorescent is measured again after maillard reaction creates and increases the quantity of fluorescent microbes. Finally the amount of microbes will be calculated from the difference of the amount of fluorescent before and after the heat treatment. Aftermath of these detectors would lead to necessary precautionary measures to be taken in order to avoid contagion for human health.

The air purifiers helps eliminate the microbes i.e., remove contaminants from the air and circulate back, however air purifiers can produce ozone gas and other pollutants that are hazardous to human health. Ozone gas from air purifiers could also react with existing chemicals present in air which would lead hazard to human health.

The air conditioners on other hand are used in facilities for cooling and ventilation and they control the temperature and humidity of air in enclosed space. Enclosed space such as offices comprises Co2 from occupants that effects air quality.

Air conditioning systems do supply conditioned and filtered air to spaces but limits the air contamination level when it comes to occupant's chronic behavior. Air Detectors can also feature fall in temperature in spaces. The environmental conditions in winter zone such as European countries or exposure of extreme cold conditioned air from Ac's can cause alterations to respiratory airways of people with sensitive categories. Air Detectors can warn the occupants of sudden fall in temperatures. The Air detectors can have applications in commercial, industrial and residential spaces and would have a great impact on human health for the future.

# THE FUTURE OF **CONNECTIVITY**



**ATHIRA A V**  
CRE

A spectacular acceleration is currently underway. The types of devices connected to networks are critical to the ecosystem of wired and wireless technologies, products and services, all of which form the basis of the digital economy.



## NEW INNOVATIONS IN IOT

The concept of the smart device was first introduced in 1982 at Carnegie Mellon University with an improved vending machine for inventory counting. Ten years later, toasters are connected and controlled via the Internet.

However, the term Internet of Things or IoT was only officially coined by Kevin Ashton of Procter & Gamble in 1999, and it took more than a decade for IoT to really develop. Even when IoT started to take off in 2010, connected devices account for only 9% of global connections, but they are predicted to reach 75% of total global connections by 2025. With growth in this regard, the infrastructure-based connected devices designed for mobile phones have evolved, but has the infrastructure evolved enough to support them?

From the demise of 2G and 3G networks to the introduction of 5G and region-specific regulations, the connectivity landscape is changing rapidly. Combined with the emergence of increasingly sophisticated IoT applications, traditional cellular connectivity is no longer enough



Today, patients make telehealth calls with doctors, leveraging data from remote patient monitoring devices. The installed camera supports real-time security monitoring. Delivery trucks are tracked in real time. Industrial robots are an integral part of some manufacturing plants. And the list goes on. These new IoT applications are made possible by advances in connectivity technology.

Today, advancements in technology have allowed SIM cards, such as eUICC and multi-IMSI, to connect to multiple carriers and be reprogrammed virtually, creating new more sophisticated IoT applications.

Specifically, the ability to connect to multiple carriers via global roaming has become a popular choice for IoT deployments as it offers the ability to insert SIM cards during deployment in multiple markets. It's a cost-effective way to provide redundancy for your connectivity, where the eUICC SIM card allows users to easily switch between mobile network providers.

This is a great choice for many IoT deployments. But with new sophisticated IoT applications, besides redundancy, performance has

## DIRECT OPERATOR INTEGRATION FOR BETTER PERFORMANCE

Mobile connection providers (mobile network operators) provide both direct connections and roaming connections through third-party service providers, hosted through another core network.

The ability to connect directly to these cellular profiles also addresses the growing global restrictions on permanent international roaming. When integrated natively with a local mobile carrier, IoT deployments benefit from carrier-guaranteed network access and no longer have to worry about access changes and Network access issue due to roaming restrictions.

# Innovating For the Future

There are several things product manufacturers can do to optimize their applications to reduce the amount of data used.

Monitor Usage By Device

Understand the minimum network consumption unit to pay

Batching Messages

Digital transformation and data processing

Smart Grids and AI Ops

## MONITOR USAGE BY DEVICE

Most network operators charge at the device level with a fixed (MRC) and variable (per MB) payment component. One of the best ways to control connection costs is to make sure that devices that are no longer active or that consume data have been "paused" or "disabled" so that the network provider does not charge additional fees. The price of the monthly MRC can represent data consumption for a device from 5 MB to 1 GB or even more.

## UNDERSTAND THE MINIMUM NETWORK CONSUMPTION UNIT TO PAY

Different service providers set different data thresholds create a "minimum charge unit" that consumes data per data session, which can vary from 100 bytes to 1 KB. If the device uses less than this during an individual data session, usage will be "rounded" to the minimum billable unit. For applications that frequently open/close sessions (devices spend a lot of time in standby mode), this can create "waste of use" that drives up bills. Prioritizing providers with lower minimum usage thresholds or mass data transfers can prevent this.

## BATCHING MESSAGES

At the packet level, the typical overhead for an encrypted MQTT payload can be as high as 40 bytes. For customers who frequently send very small data points (e.g. 80K temperature/humidity readings every 5 seconds), this encoding overhead can be up to 33% of data consumed with each transmission. Aggregating KB of time series data for transmission every 5 minutes can reduce encoding costs to less than 5% or even less than 1% of data consumed.

While it is now possible to obtain both root access and roaming access, it is more important to simplify the connection. With continued growth in mobility and innovation in SIM cards, new technologies are simplifying IoT SIM connectivity and deployment with both native performance and global roaming reliability. IoT manufacturers can now welcome the next era of connected devices, whether it's autonomous drones or an unprecedented innovation.

## DIGITAL TRANSFORMATION AND DATA PROCESSING

Most network operators charge at the device level with a fixed (MRC) and variable (per MB) payment component. One of the best ways to control connection costs is to make sure that devices that are no longer active or that consume data have been "paused" or "disabled" so that the network provider does not charge additional fees. The price of the monthly MRC can represent data consumption for a device from 5 MB to 1 GB or even more.

## SMART GRIDS AND AIOps

AIOps (Artificial Intelligence for IT Operations) is becoming essential to operations, especially as AI tools evolve. Smart networks – in which edge networks deploy automation, programmability, predictive analytics, and orchestration – have the advantage of making network architectures more proactive and dynamic.

AIOps and automation solutions can simplify ongoing network operations, but initial setup is complicated. To address this conundrum, organizations will need a well-thought-out AIOps deployment plan to ensure that new network features deliver business benefits. This is especially true for mid-sized companies that lack the skills and budget to fully implement AIOps internally. One option for these companies is to use an aggregator, such as a managed service provider, to ensure that they get the most out of AIOps' advanced features without the worry of lack of skills, complexity and capital costs

## CONCLUSION

Overall, as the digital connectivity landscape continues to evolve, we can expect to see more devices of all shapes and sizes, with capabilities that far exceed current products. As a result, we will continue to see spectacular technologies that have a lasting impact on businesses, society and individuals.

# C A E

COMPUTER AIDED ENGINEERING

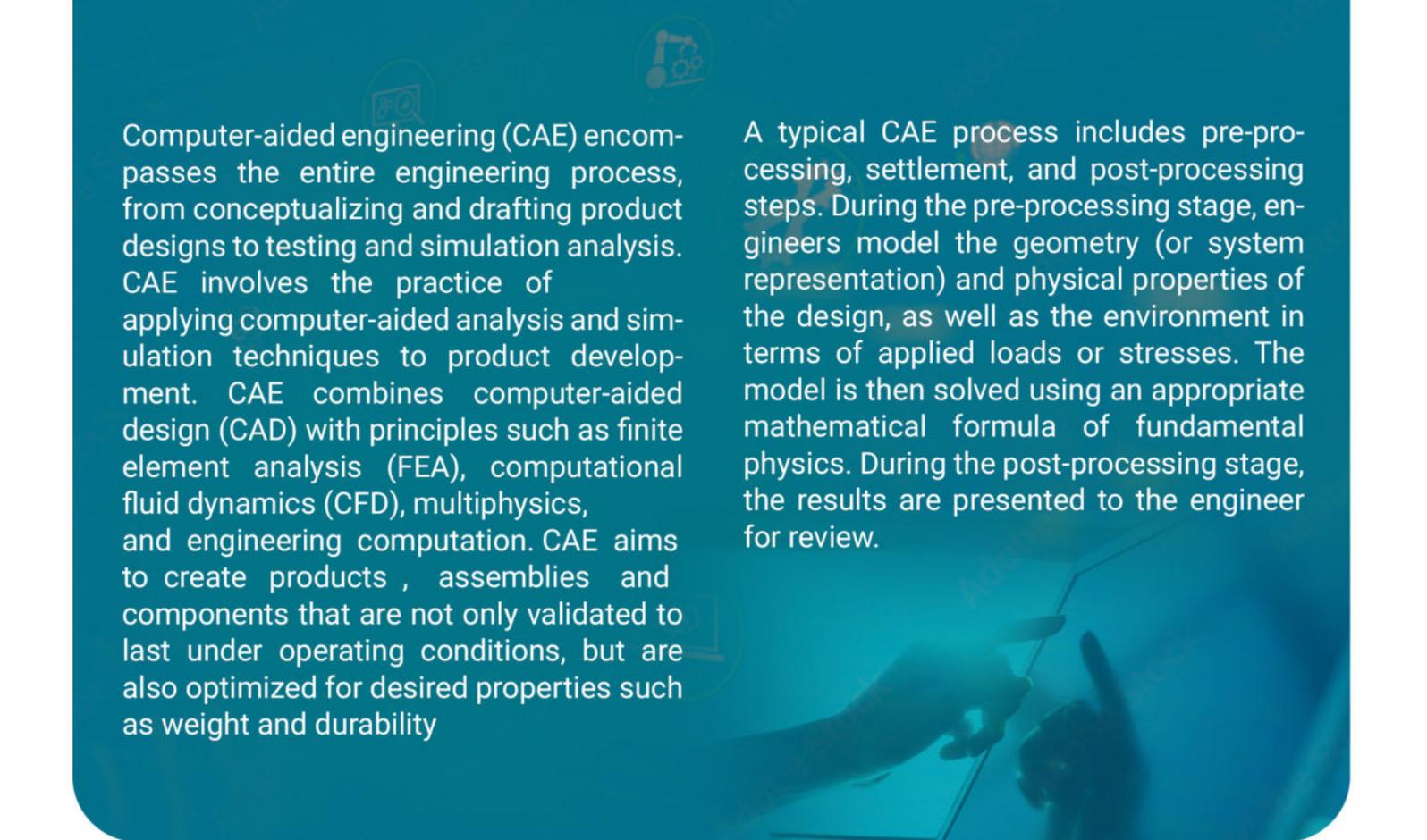


**D A ANAND**  
TERRITORY TECHNICAL HEAD  
CHENNAI

## COMPUTER-AIDED ENGINEERING (CAE)

is the use of computer software to simulate performance to improve product design or help solve engineering problems for many industries. This includes simulation, validation, and optimization of production products, processes, and tools.





Computer-aided engineering (CAE) encompasses the entire engineering process, from conceptualizing and drafting product designs to testing and simulation analysis. CAE involves the practice of applying computer-aided analysis and simulation techniques to product development. CAE combines computer-aided design (CAD) with principles such as finite element analysis (FEA), computational fluid dynamics (CFD), multiphysics, and engineering computation. CAE aims to create products, assemblies and components that are not only validated to last under operating conditions, but are also optimized for desired properties such as weight and durability

A typical CAE process includes pre-processing, settlement, and post-processing steps. During the pre-processing stage, engineers model the geometry (or system representation) and physical properties of the design, as well as the environment in terms of applied loads or stresses. The model is then solved using an appropriate mathematical formula of fundamental physics. During the post-processing stage, the results are presented to the engineer for review.

# CAE SOFTWARE FEATURES

## BATCHING MESSAGES

CAE software often allows the integration of design and manufacturing processes. This feature enables manufacturers to create a streamlined workflow from design to production, allowing them to quickly develop new products and make changes to existing products.

## SIMULATION

The simulation feature of CAE software allows users to simulate physical phenomena such as motion, heat transfer, flow, stress analysis, etc. This allows engineers to study the performance of a design before production, helping them identify potential problems that could cause problems during production or operations

## DATA MANAGEMENT

CAE software includes powerful data management features that allow easy sharing of design files between project teams. It also helps ensure the accuracy of all design-related information by supporting version control and revision tracking.

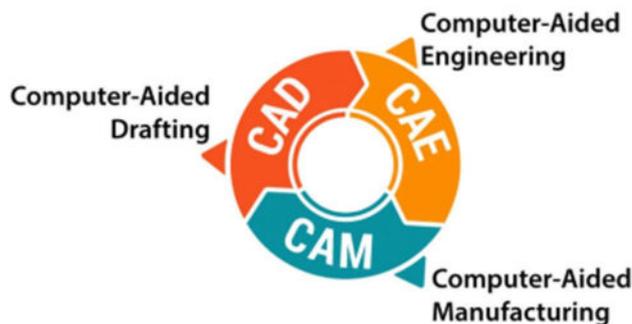
## VISUALIZATION

Users can take advantage of CAE software's powerful data visualization tools to better understand their simulation designs and results. These tools help engineers better understand how their designs will react under different conditions and are essential for validating simulation results.

## DESIGN OPTIMIZATION

CAE software can be used for parametric optimization techniques allowing designers to tweak parameters in a virtual environment until an optimal solution is found. This helps determine the best possible shape or configuration for a given set of criteria, thereby reducing development time and enabling efficient use of resources throughout the product lifecycle.

# TYPES OF CAE SOFTWARE



## FINITE ELEMENT ANALYSIS (FEA)

FEA software helps engineers analyze and study stresses, strains, and displacements of physical systems. It is used to predict the performance of complex systems or products under various conditions

## COMPUTER-AIDED DESIGN (CAD)

CAD software helps engineers create 2D and 3D models of parts or assemblies for the products or systems being designed. These models can be used to simulate how a design should work in the real world and help identify potential problems before production

## COMPUTER-AIDED MANUFACTURING (CAM)

CAM software helps engineers create instructions that CNC machines use to manufacture parts with high precision. This type of software is especially useful when high precision parts with tight tolerances are required

## COMPUTATIONAL FLUID DYNAMICS (CFD)

CFD software helps engineer to model fluid flows to analyze their interactions with other objects in the environment. This type of software can be used in a variety of fields including aerospace engineering, automotive engineering, and marine engineering

## COMPUTER-AIDED TECHNICAL ANALYSIS (CAEA)

CAEA software helps engineers to perform different types of analysis, from basic stress analysis to more complex thermal simulations of complete components or systems. It also provides tools to optimize designs based on criteria such as durability, weight, cost or manufacturability

## DIGITAL PROTOTYPES

Digital prototyping allows engineers to test their designs before validating them for production by creating precise digital representations of not only geometry but also material properties and environmental conditions such as temperature and pressure

**C**omputer  
**A**ided  
**E**ngineering



# TRENDS IN CAE SOFTWARE

CAE software has become increasingly complex due to advances in modelling technology and simulation capabilities.

The use of 3D printing is becoming increasingly common, increasing the accuracy of design simulations and enabling rapid prototyping.

Cloud-based computing gives engineers access to more powerful computing resources, allowing them to run complex simulations and analysis.

CAD/CAM software is more commonly used to program and automate parts, reducing time-to-market and manufacturing costs.

CAE software is also used in conjunction with IoT (Internet of Things) devices to create “smart” products with built-in sensors that can collect data and provide performance feedback. Augmented reality (AR) is becoming a popular tool for CAE, allowing engineers to visualize data in 3D and interact with it in real time.

Data analytics and machine learning are used for predictive maintenance, allowing engineers to anticipate problems before they happen.

# BENEFITS OF CAE SOFTWARE



## INCREASE DESIGN EFFICIENCY

CAE software allows engineers to quickly create and test digital prototypes before investing in physical models or components. This reduces development costs, speeds up the design process, and helps ensure that only the highest quality products go into production

## REDUCED TIME TO MARKET

By leveraging automated design processes, CAE software can reduce the time it takes to bring innovative products to market. This is especially helpful for businesses that are competing in fast-paced markets where staying ahead of the competition is essential

## IMPROVED COMMUNICATION

By providing a common platform for collaboration between teams and stakeholders, CAE software can help streamline communication and avoid misunderstandings caused by language barriers. Additionally, the precise digital representation of parts makes it easier for engineers from different departments to work together on complex projects with confidence that their designs will work, as intended

## ADVANCED SIMULATION CAPABILITIES

With powerful computing power, CAE software enables engineers to perform simulations accurately and quickly, reducing design iteration and time to market more than before. It also eliminates the need for costly physical testing, allowing companies to refine their designs through virtual testing

## ADVANCED ANALYTICS TOOLS

Using advanced analysis tools like Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD), CAE software helps designers better understand how their products work under extreme real-world conditions, thereby minimizing risk while maximizing performance



# THANKS

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