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Department of Electronics and Instrumentation Engineering

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CONTENTS

VISION AND MISSION

DEPARTMENT VISION

To impart excellent education to provide globally competent Electronics and Instrumentation Engineers.
To establish Centre of Excellence and Research in Electronics and Instrumentation Engineering and allied fields.

DEPARTMENT MISSION

To prepare competent Electronics and Instrumentation Engineers who can pursue professional career and/ or higher studies.

To promote excellence in teaching with academically good ambiance that allows the learners to be socially responsible with professional ethics.

From the HOD's desk

Work hard at what you like to do and try to overcome all obstacles

Laugh at your mistakes and praise yourself for learning from them

I am having immense pleasure to note that this year's edition of "**ICSARIA-VISION**" is ready to release. I would like to congratulate the team of active students and faculty leadership for their efforts to ram-up various department activities under the aegis of department association.

The department conducts many programs aimed to nurture a professional interest towards the domain of study among all members of the department and "**ICSARIA-VISION**" is one of the means to publish various creative articles and news which reflects state-of-the art.

Technology related developments are there in the field of robotics, Iot, machine learning, automotive electronics, healthcare and so on which are closely linked with the common man's life.

Plenty of opportunities as well as challenges are awaiting. Hope that "**ICSARIA-VISION**" could be a platform for both students and faculty members to conduct fruitful discussion on all these breakthrough developments. Let us strive together for a greener, technically enriched better India!

As an Instrumentation and Control Engineers, it is the need of the time to follow these changes and understand the state-of-the art technology in order to be updated in the domain.

I wish that, this endeavor is a humble beginning in this direction and wish all the success.

COLLABORATIVE MEASUREMENT VIA CLOUD

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With the revolutionary development in aerospace, energy, transportation, and other fields, it has been witnessed in recent years an increased demand for the processing quality of large-scale components [1], such as aircraft wings, vehicle bodies, wind power blades, and hull surface [2,3,4,5]. The accuracy of surface manufacturing affects the performance and quality of equipment in relevant fields. Large-scale complex components are irregular and diverse, and there are a large number of hidden points on their surfaces that are difficult to measure. Traditional measurement methods cannot satisfy the requirements and accuracy of on-site measurement [6,7]. Therefore, accurate 3D data measurement is essential for surface feature extraction and machining quality inspection of complex components [8,9,10]. It is of great significance to improve the manufacturing capability of large-scale complex components by realizing the comprehensive and high-precision automatic measurement of large-scale complex components and effectively eliminating the accumulated errors in large-scale measurements.

Currently, a host of 3D measurement methods for large-scale complex components have been proposed one after another. O. Hall Holt et al. integrated a novel approach to real-time structured light range scanning [11], and the system used a standard video camera and DLP projector and produced dense range images at 60 Hz with 100 mum accuracy over a 10 cm working volume. J. Salvi et al. found through experiments that the high sensitivity to non-linearities of the camera reduces the accuracy and sensitivity to details in the surface [12]. Coordinate measuring machine (CMM) is a standard displacement system used for dimension measurement, which is the most typical measurement method at present [13,14]. Although it is highly accurate, it has many shortcomings, such as the large size of equipment, lack of flexibility, and inability to measure hidden points, failing to meet the on-site measurement requirements of complex components. The point cloud alignment is also widely used in the measurement. The point cloud measurement based on public coded targets [15] requires sticking a large number of coded targets on the surface of the component, which is inefficient. Therefore, the surface features-based method [16] is unsuitable for complex components. The local point cloud stitching that tracks the scanner pose [17,18] aims to align the local point cloud after multiple scans, which is suitable for the measurement of large-scale complex components. Yang Shourui of Tianjin University proposed a large-scale and high-accuracy automatic measurement method based on fringe projection, close-range photogrammetry, and industrial robots [19,20], which has high precision, but can only be measured within the motion range of the robot. A Paoli developed an industrial robot with two linear guide rails, whose end-effector could fix the optical scanner [21,22], and the scanner pose for point cloud alignment was acquired by the mechanical system and a total station. This method is suitable for measuring the hull of a large yacht. However, the fixed guide rails in this system limit the vertical measurement range and lack flexibility.

If the robot carrying the scanner is upgraded to an omnidirectional mobile robot, the measurement range and flexibility of the measurement system will be greatly improved. However, the precise positioning of the omnidirectional mobile robot will become a new problem, which will affect the estimation accuracy of the scanner pose and the alignment accuracy of the multi-view point cloud. Gan Z.X. et al. proposed an application of robot 3D coordinate measurement combined with laser scanning system [23]. G. Mosqueira et al. studied a special closed-loop fuze laser alignment method using industrial robots, and the average positioning accuracy reached 0.38 mm [24]. Jung M. et al. presented an alternative global localization scheme that uses dual laser scanners and the pure rotational motion of a mobile robot, and the proposed method showed sufficient efficiency and speed to be considered robust to real-world conditions and applications [25]. Zheng Wang et al. found that the laser tracker and IGPS usually have linear error through testing and will be affected by laser occlusion [26]. Although related devices such as laser sensors and GPS can solve this problem, these devices are often disturbed by environmental factors and are not suitable for this study. In recent years, visual tracking techniques have been gradually used for robot positioning [27,28], but the tracking range is limited by the field of view of the vision camera. In this regard, the team led by Tao Bo came up with a mobile robotic measurement system for large-scale complex components based on optical scanning and visual tracking, achieving the positioning of the robot by measuring scanner and coded marks on the ground. In the actual measurement of a 2.88 m wind turbine blade model, the translation error is less than 0.2 mm [29,30]. Although the measurement accuracy is very high, the ground coding and marking process also increases the complexity of the measurement task. In the paper [31], based on the new principle of dynamic triangulation with a laser scanner, the discontinuous (i.e., discrete step) scanning method is converted into continuous scanning method to eliminate the dead zone in the field of vision. In the paper [32], in the application of mobile robot navigation, the combination variable scanning step is implemented to provide accurate measurement and improve obstacle detection. All of these show that the robot mobile vision system combined with a scanner is a more suitable method for robot motion measurement.

To solve the above-mentioned problems, including the complexity of public-coded targets, inflexibility of scanner poses, and spatial limitation of visual tracking, this study proposes a dual mobile robot with a cooperative measurement system that integrates vision tracking and 3D measurement for large-scale complex workpieces. Specifically, the system includes the mobile robot, optical scanning measurement system, and visual tracking system. The mobile robot carries an optical scanner with a target installed to complete a wide range of multi-directional scanning of components. At the same time, the mobile robot has a vision system that can realize the real-time tracking and calibration of the target, which can convert all the local point cloud data obtained from each scan into a unified world coordinate system and achieve a wide range of flexible data acquisition with high accuracy for large-scale components without sticking coded targets. Additionally, this study also introduces the DeepMerge algorithm, which integrates local and global features of the point cloud, to effectively correct the cumulative error in the initial splicing process of the visual tracking so as to ensure the accuracy of the large-scale mobile measurement of robots.

2.1. Overall Structure

The large-scale automatic measurement system proposed in this study consists of hardware and software systems. The former includes the tracking chassis (AGV), target tracking system, measurement chassis (AGV), industrial robot, stereo target, visual measurement system, and central control system, while the latter contains the calibration module, motion planning module, measurement module, and data processing module, as shown in Figure 1.

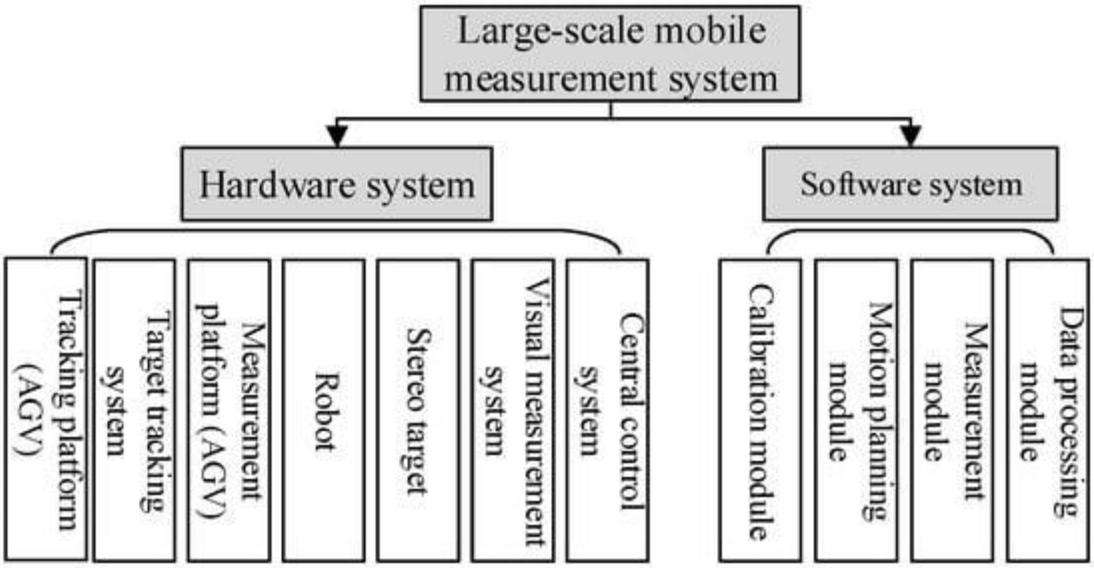

Figure 1. Schematic diagram of the structure of the large-scale mobile measurement system.

2.2. Hardware System

The hardware system integrates the mobile robot with the function of optical measurement and the mobile robot that can perform visual tracking. The two move autonomously and work independently, completing the measurement together. The specific configuration is shown in Figure 2.

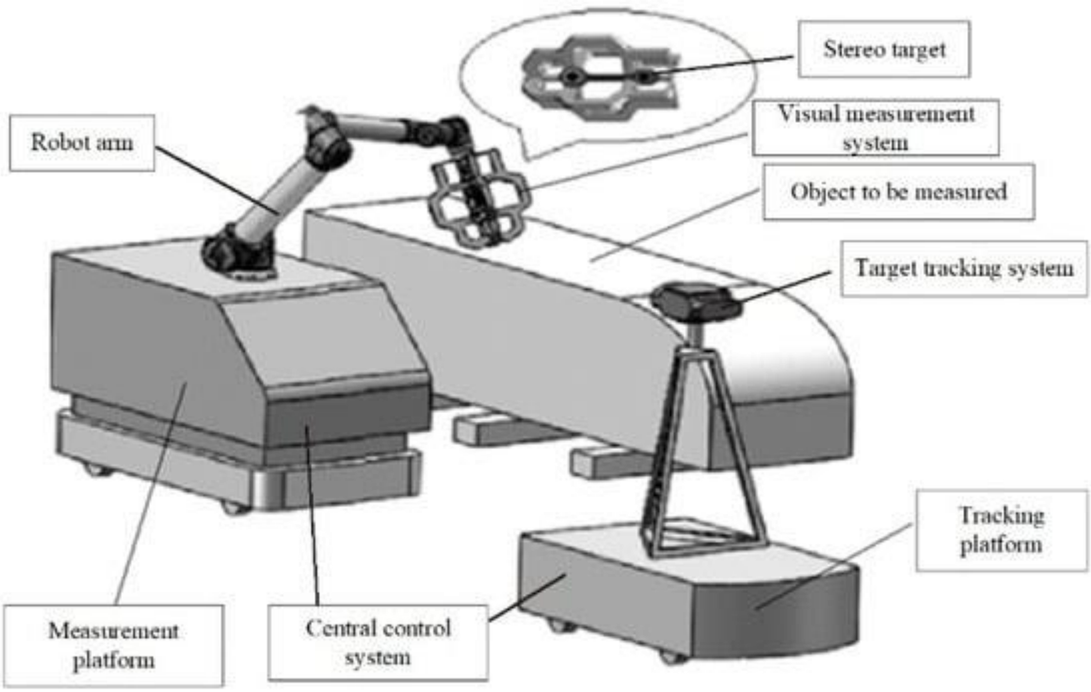

Figure 2. Schematic diagram of the hardware system.

The mobile robot with the function of optical measurement consists of the measurement chassis (AGV), visual measurement system, high-precision stereo target, industrial robots, and central control system. The robot can adopt various multi-degree-of-freedom tandem industrial robots depending on the measurement tasks, with the stereo target mounted at the end of the robot. The surface of the stereo target has many targets for tracking in different directions. The visual measurement system is a binocular visual system or laser measurement system mounted in the stereo target. The central control system coordinates the work of all devices and realizes data interaction with upper-level manufacturing execution systems and other systems through standardized interfaces.

The mobile robot with a visual tracking function has a target tracking system, and its monocular camera is fixed on the bracket of the tracking chassis (AGV), which can obtain the position of the high-precision target on the measurement chassis in real time, thus realizing the real-time tracking and calibration of the target, converting all local point cloud data obtained each time into the unified world coordinate system, without sticking coded targets.

The above two autonomous mobile robot systems employ the AGV as the mobile chassis and adopt four-wheel drive and differential steering, which can meet the requirements of wide-range mobile measurement. These two mobile chassis (AGVs) can move collaboratively according to the paths planned by the motion planning module to achieve a wide range of automated measurement data acquisition. Compared with the traditional fixed measurement by the robot, this system has obvious advantages in terms of measurement efficiency and flexibility.

2.3. Software Platform

The central control system is the operation platform of the measurement system, which coordinates and controls the related equipment of each subsystem to complete the collaborative measurement and realize the unified management of all equipment. The mobile chassis (AGV) and robot system complete the corresponding movement under the command of the central control system. The composition of the software platform modules is shown in Figure 3.

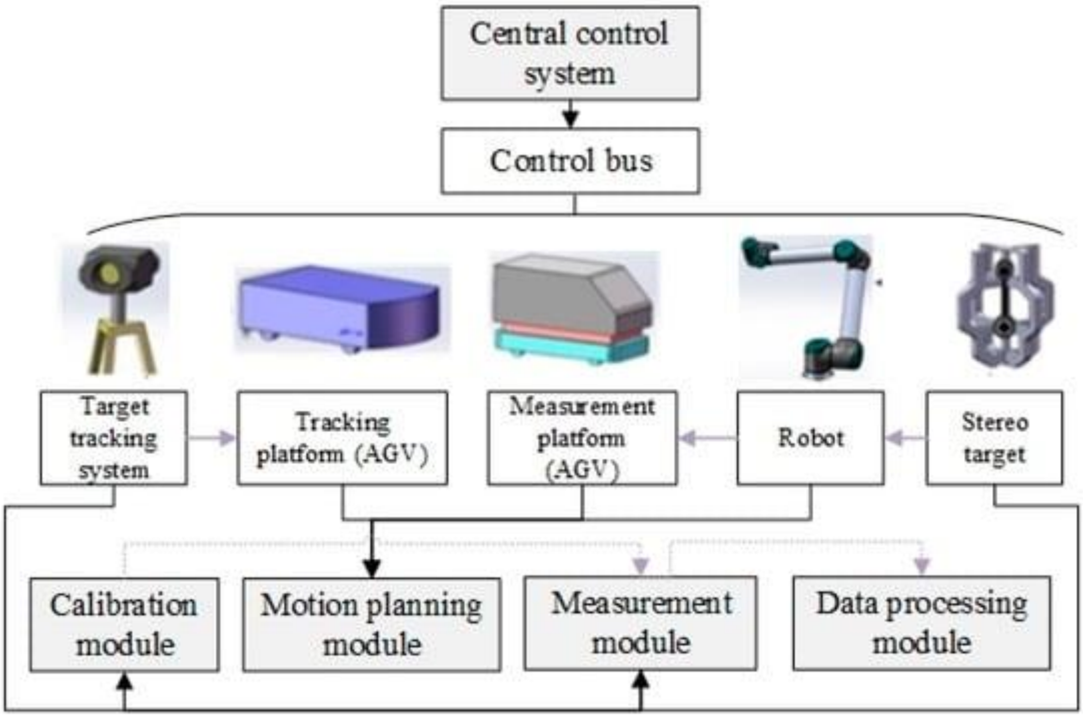

Figure 3. Schematic diagram of software platform modules.

The composition of the software platform modules is as follows:

Calibration module. The function of this module is to calibrate the pose relationship between the stereo target and the visual measurement system and perform the global calibration among multiple sites (i.e., the transformation relationship between the coordinate systems of the target tracking systems of adjacent sites after coordinate transformation). The transformation matrix worked out by calibration enables the transformation of the high-density point cloud acquired by the visual measurement system to the world coordinate system of the target tracking system.

Motion planning module. The function of this module is to perform the path and trajectory planning for the mobile chassis (AGV) and industrial robots. Specifically, the path planning of mobile chassis (AGV) is to obtain the sequence of operating points of the two AGVs. The path planning of industrial robots is to obtain the sequence of operating points of the robot's end-effector after the mobile chassis (AGV) carrying the robot reaches each point. The two cooperate with each other to cover all the points that need to be measured on the surface of the object to be measured. On the basis of path planning, trajectory planning is implemented to ensure the stability and continuity of the bulk movement.

Measurement module. The function of this module is to obtain the overall point cloud data of the complex workpiece to be measured and complete the unified stitching of the local point cloud data collected by the visual measurement system through the transformation relationship between coordinate systems of local calibration and merge them into the coordinate system of the tracking target system. After the coordinate transformation, the transformation relationship of the coordinate system obtained by global calibration is used to align and merge different point cloud segments between adjacent sites, thus obtaining the complete point cloud data to be measured.

Data processing module. The function of this module is to optimize the point cloud data. Due to the irregularity of complex workpieces and the limitations of measurement methods, the initial point cloud data obtained by target tracking and visual measurement systems may generate cumulative errors, so the data need to be optimized.

THE BLUE BRAIN

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"BLUE BRAIN"- The name of the world's first virtual brain. That means a machine that can function as human brain.

"Blue Brain"; offer a better understanding of human consciousness. lt's an actual "computer brain' that may eventually have the ability to think for itself. When it was first fed electrical impulses, strange patterns began to appear with lightning-like flashes produced by "cells' that the scientists recognized from living human and animal processes. "It happened entirely on its own—

Advantages

- **Cracking the Neural Code.**
- **Understanding Neocortical Information Processing.**
- **A Novel Tool for Drug Discovery for Brain Disorders**
- **Foundation for Whole Brain Simulations.**

The Blue Brain Project is a fascinating and ambitious initiative aimed at creating a digital reconstruction of the brain. Here's a detailed overview:

Introduction

The Blue Brain Project was founded in 2005 by the Brain Mind Institute of École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland. The project is led by Professor Henry Markram and aims to build a biologically accurate computer model of the brain to better understand its structure and function.

Objectives

The primary goal of the Blue Brain Project is to reverse-engineer the mammalian brain, starting with the mouse brain, to identify the fundamental principles of brain structure and function. The project aims to simulate the brain at a cellular level, using supercomputers to create detailed digital reconstructions.

Techniques and Methods

The project uses a combination of experimental data, theoretical neuroscience, and supercomputer-based simulations to build its models. The Blue Gene supercomputer, running Michael Hines's NEURON software, is used to simulate a biologically realistic model of neurons and their connections. The project also involves collaborations with other research institutions and laboratories.

Key Milestones

- **2006**: The project created its first model of a neocortical column with simplified neurons.
- **2007**: The initial model of the rat neocortical column was completed.
- **2015**: The project simulated part of a rat brain with 30,000 neurons.
- **2017**: The project discovered that neural cliques connected to one another in up to eleven dimensions.

Research Strategy

The Blue Brain Project employs a novel research strategy that exploits interdependencies in experimental data to obtain dense maps of the brain. This approach allows the project to build digital reconstructions of the brain at an unprecedented level of biological detail.

Implications and Future Directions

The project's findings could lead to breakthroughs in understanding neurological diseases, brain disorders, and overall brain function. The ultimate goal is to simulate the human brain, which could revolutionize neuroscience and lead to new treatments for brain-related conditions.

Conclusion

The Blue Brain Project is a pioneering effort in the field of neuroscience, aiming to unlock the mysteries of the brain through advanced simulations and digital reconstructions. Its work has the potential to transform our understanding of the brain and pave the way for new scientific discoveries.

BIG DATA: A QUALITY FRAMEWORK

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Big Data is an essential research area for governments, institutions, and private agencies to support their analytics decisions. Big Data refers to all about data, how it is collected, processed, and analyzed to generate value-added data-driven insights and decisions. Degradation in Data Quality may result in unpredictable consequences. In this case, confidence and worthiness in the data and its source are lost. In the Big Data context, data characteristics, such as volume, multi- heterogeneous data sources, and fast data generation, increase the risk of quality degradation and require efficient mechanisms to check data worthiness. However, ensuring Big Data Quality (BDQ) is a very costly and time-consuming process, since excessive computing resources are required. Maintaining Quality through the Big Data lifecycle requires quality profiling and verification before its processing decision. A BDQ Management Framework for enhancing the pre-processing activities while strengthening data control is proposed. The proposed framework uses a new concept called Big Data Quality Profile. This concept captures quality outline, requirements, attributes, dimensions, scores, and rules. Using Big Data profiling and sampling components of the framework, a faster and efficient data quality estimation is initiated before and after an intermediate pre-processing phase. The exploratory profiling component of the framework plays an initial role in quality profiling; it uses a set of predefined quality metrics to evaluate important data quality dimensions. It generates quality rules by applying various pre- processing activities and their related functions. These rules mainly aim at the Data Quality Profile and result in quality scores for the selected quality attributes. The framework implementation and dataflow management across various quality management processes have been discussed, further some ongoing work on framework evaluation and deployment to support quality evaluation decisions conclude the paper.

Introduction

Big Data refers to the vast volumes of structured, semi-structured, and unstructured data that organizations collect and analyze to gain insights and make data-driven decisions. Ensuring the quality of this data is crucial for accurate analysis and reliable outcomes. A Big Data Quality Framework provides a structured approach to assess, manage, and improve the quality of data throughout its lifecycle.

Key Components of a Big Data Quality Framework

Data Profiling: This involves examining the data to understand its structure, content, and quality. Data profiling helps identify anomalies, inconsistencies, and missing values.

Data Quality Metrics: These metrics measure various aspects of data quality, such as accuracy, completeness, consistency, timeliness, and uniqueness. Establishing thresholds and standards for these metrics helps organizations assess the quality of their data.

Data Cleansing: This process involves correcting or removing inaccurate, incomplete, or irrelevant data. Data cleansing ensures that the data used for analysis is accurate and reliable.

Data Monitoring: Continuous monitoring of data quality helps organizations detect and address issues in real-time. This proactive approach ensures that data quality is maintained throughout its lifecycle.

Root Cause Analysis: Identifying the underlying causes of data quality issues is essential for implementing long-term solutions. Root cause analysis helps organizations address the source of problems rather than just treating the symptoms.

Data Governance: Establishing policies, procedures, and standards for data management ensures that data quality is maintained consistently across the organization. Data governance involves defining roles and responsibilities, setting data quality goals, and implementing data quality management processes.

Benefits of a Big Data Quality Framework

Improved Decision-Making: High-quality data leads to more accurate and reliable insights, enabling better decision-making.

Increased Efficiency: By identifying and addressing data quality issues early, organizations can reduce the time and resources spent on data cleaning and correction.

Enhanced Data Integration: A robust quality framework ensures that data from various sources is consistent and accurate, facilitating seamless integration and interoperability.

Compliance and Risk Management: Ensuring data quality helps organizations comply with regulatory requirements and reduces the risk of data breaches and errors.

Implementation Steps

1. **Assessment**: Evaluate the current state of data quality within the organization.
2. **Planning**: Develop a comprehensive plan to address data quality issues, including defining goals, setting metrics, and establishing governance policies.
3. **Execution**: Implement data profiling, cleansing, monitoring, and governance processes as outlined in the plan.
4. **Evaluation**: Continuously assess the effectiveness of the data quality framework and make adjustments as needed.

Conclusion

A Big Data Quality Framework is essential for organizations that rely on data-driven decision-making. By implementing a structured approach to data quality management, organizations can ensure the accuracy, consistency, and reliability of their data, leading to better outcomes and improved efficiency.

ELECTRIC CARS

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An electric cars is a car that is propelled by one or more electric motors, using energy stored rechargeable batteries. Compared to internal combustion engine(ICE)vehicles electric cars are quitter, have no exhaust emissions, and lower emission overall.There are few different types of electric cars .some run purely on electricity, these are called pure electric vehicles. and some can also be run on petrol or diesel, these are called hybrid electric vehicles.

The advantages are :

These are better to the environment, electricity can be renewable, gasoline can’t

These requires less expensive and less frequent maintenance.

Electric cars (EVs) are vehicles that use electric motors for propulsion, powered by rechargeable batteries instead of traditional internal combustion engines (ICE) that run on gasoline or diesel. Here's a detailed explanation of electric cars, covering various aspects of their design, benefits, challenges, and future prospects.

1. Introduction to Electric Cars

Electric cars have been around since the late 19th century, but recent advancements in battery technology, environmental concerns, and governmental policies have spurred a resurgence in their popularity. Modern electric cars offer high efficiency, low emissions, and a quieter driving experience.

2. Components of Electric Cars

- **Electric Motor**: Converts electrical energy into mechanical energy to drive the wheels.
- **Battery Pack**: Stores electrical energy, typically composed of lithium-ion cells.
- **Onboard Charger**: Converts alternating current (AC) from the charging station to direct current (DC) for the battery.
- **Inverter**: Converts DC from the battery to AC for the electric motor.

- **Regenerative Braking System**: Captures energy during braking and feeds it back to the battery.
- **Controller**: Manages power flow from the battery to the motor and other components.

3. Types of Electric Vehicles

- **Battery Electric Vehicles (BEVs)**: Fully electric, relying solely on battery power (e.g., Tesla Model S, Nissan Leaf).
- **Plug-in Hybrid Electric Vehicles (PHEVs)**: Combine a gasoline engine with an electric motor and battery, offering both electric and traditional propulsion (e.g., Chevrolet Volt).
- **Hybrid Electric Vehicles (HEVs)**: Use a combination of internal combustion engines and electric propulsion but cannot be plugged in (e.g., Toyota Prius).

4. Benefits of Electric Cars

- **Environmental Impact**: Zero tailpipe emissions reduce air pollution and greenhouse gas emissions.
- **Efficiency**: Electric motors are more efficient than internal combustion engines, converting more energy from the battery to power the wheels.
- **Cost Savings**: Lower fuel and maintenance costs compared to conventional vehicles.
- **Performance**: Instant torque from electric motors provides quick acceleration and smooth driving.
- **Energy Independence**: Reduces reliance on fossil fuels and promotes the use of renewable energy sources.

5. Challenges and Limitations

- **Battery Life and Range**: Limited range compared to gasoline vehicles and concerns about battery degradation over time.
- **Charging Infrastructure**: Insufficient public charging stations in some areas, leading to range anxiety.
- **Charging Time**: Longer refueling times compared to conventional vehicles, though fast-charging stations are mitigating this issue.
- **Initial Cost**: Higher upfront costs due to expensive battery technology, though prices are decreasing with advancements.

6. Technological Advancements

- **Battery Technology**: Ongoing research in solid-state batteries, improved lithium-ion batteries, and alternative materials to increase energy density and reduce costs.
- **Charging Infrastructure**: Expansion of charging networks, including fast-charging stations and wireless charging technologies.
- **Vehicle-to-Grid (V2G) Technology**: Allows electric cars to feed energy back into the grid, helping stabilize the electricity network and provide additional value to owners.

7. Government Policies and Incentives

Many governments worldwide are promoting electric vehicles through incentives such as tax credits, rebates, and grants. Policies encouraging the phase-out of internal combustion engines and the adoption of renewable energy sources further support the growth of electric cars.

8. Future Prospects

The future of electric cars looks promising, with continuous advancements in battery technology, charging infrastructure, and supportive governmental policies. As the automotive industry shifts towards electrification, electric vehicles are expected to become more accessible, efficient, and integrated into the transportation ecosystem.

Conclusion

Electric cars represent a significant shift towards sustainable transportation. With their numerous benefits, ongoing technological advancements, and supportive policies, electric vehicles are poised to play a crucial role in reducing environmental impact and shaping the future of mobility.

ROBOTS IN BOARD ROOM

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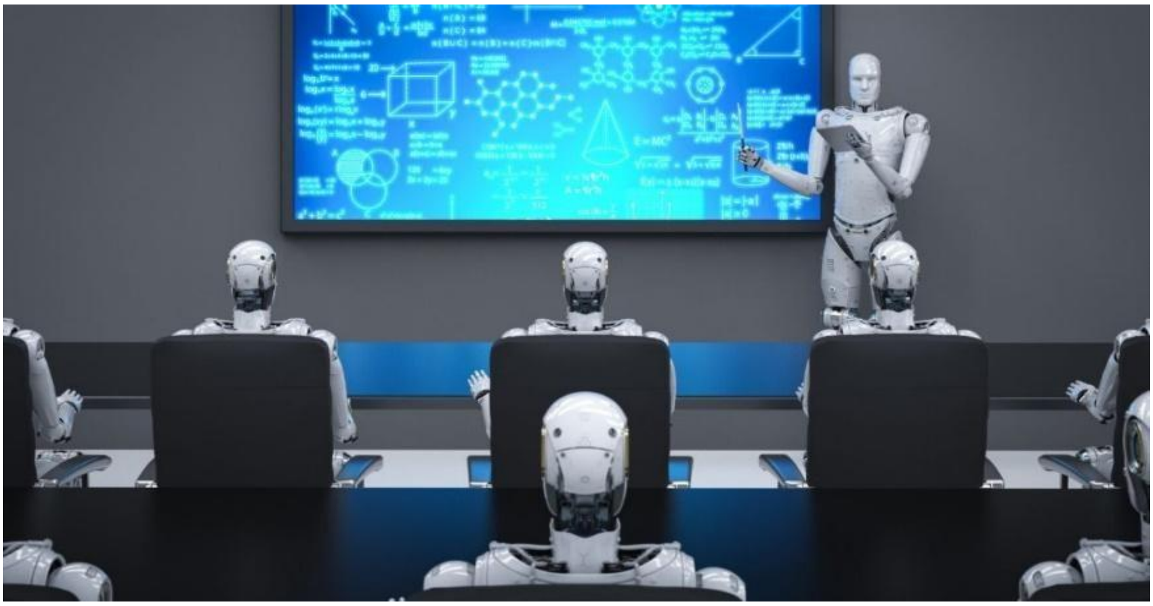

Artificial intelligence and corporate law promises to be dynamic Due to its rapid technological development, artificial intelligence will enter corporate boardrooms in the very near future. This paper explores the interplay between artificial intelligence and corporate law, and analyzes how the two fit together. Do current corporate law rules match the challenges posed by artificial intelligence, or do they need to be adapted? More specifically, the paper focuses on the directors of corporations. We consider the extent to which human directors should be allowed – or required – to rely on artificial intelligence. Moreover, technology will probably soon offer the possibility of artificial intelligence not only supporting directors, but even replacing them. Another question is therefore whether or not such a replacement is legally admissible. At any rate, the legal strategies currently adopted by corporate law are tailored to human directors. The paper tests whether those strategies would still be suitable for boardrooms filled with robo-directors. It concludes that corporate law is highly relevant for the use of artificial intelligence in corporations, but that it will also need to be adapted to the challenges posed by this technology. In that sense, the interplay between in both directions.

The concept of robots in the boardroom refers to the integration of artificial intelligence (AI) and robotics into corporate governance and decision-making processes. This trend is gaining traction as companies seek to leverage advanced technologies to enhance efficiency, accuracy, and strategic planning. Here's a detailed explanation:

1. Introduction

The idea of robots in the boardroom involves using AI algorithms and robotic systems to assist or even replace human directors in making corporate decisions. This can range from providing data-driven insights to automating routine tasks and supporting complex decision-making processes.

2. Benefits of Robots in the Boardroom

Enhanced Decision-Making: AI can analyze vast amounts of data quickly and accurately, providing valuable insights that human directors might miss. This can lead to more informed and strategic decisions.

Efficiency: Automating routine tasks and data analysis can free up human directors to focus on more strategic and creative aspects of their roles.

Consistency: AI systems can provide consistent and unbiased analysis, reducing the risk of human error and emotional biases in decision-making.

Cost Reduction: Implementing AI can reduce costs associated with human labor and improve overall operational efficiency.

3. Challenges and Considerations

Ethical and Legal Issues: The use of AI in corporate governance raises ethical and legal questions, such as accountability, transparency, and the potential for bias in AI algorithms.

Human-AI Collaboration: Ensuring effective collaboration between human directors and AI systems is crucial. Human directors need to understand and trust the AI's recommendations.

Regulatory Compliance: Companies must navigate complex regulatory environments and ensure that their use of AI complies with existing laws and regulations.

Security and Privacy: Protecting sensitive corporate data and ensuring the security of AI systems is paramount to prevent data breaches and cyber-attacks.

4. Examples of Robots in the Boardroom

Deep Knowledge Ventures: A Hong Kong-based venture capital firm appointed an algorithm named Vital to its board of directors in 2014. Vital was designed to automate due diligence and uncover trends in data that might not be immediately obvious to human directors.

AI Advisory Roles: Some companies use AI systems to provide advisory support to human directors, offering data-driven insights and recommendations for strategic decisions.

5. Future Prospects

The integration of AI and robotics in corporate governance is expected to grow as technology advances. Future developments may include more sophisticated AI systems capable of handling complex decision-making tasks and providing even more accurate and actionable insights.

Conclusion

Robots in the boardroom represent a significant shift in corporate governance, offering numerous benefits but also posing challenges that need to be addressed. As companies continue to explore the potential of AI and robotics, the role of human directors will likely evolve to complement and collaborate with these advanced technologies.

AI-BASED ON E-BALL TECHNOLOGY

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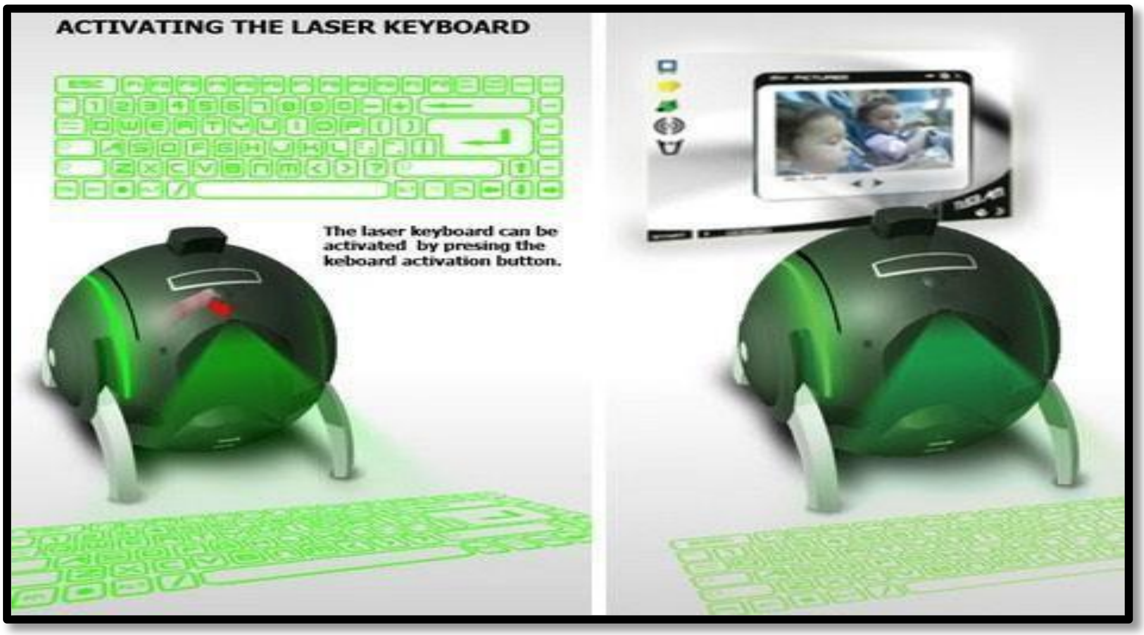

The E-ball is a sphere shaped computer concept which is the smallest design among all the laptops & desktops have ever made. The PC concept features all traditional elements like mouse, keyboard, large screen display etc. All in an innovative manner. The E-Ball is a sphere shaped computer concept which is the smallest design among all the laptops and desktops have ever made. This PC concept features all the traditional elements like mouse, keyboard, large screen display, DVD recorder, etc, all in an innovative manner. E- Ball is designed to be placed on two stands, opens by simultaneously pressing and holding the two buttons located on each side. After opening the stand and turning ON the PC, pressing the detaching mouse button will allow you to detach the optical mouse from the PC body. This concept features a laser keyboard that can be activated by pressing the particular button. There is no external display unit, a projector will pop up by pressing and holding the button and focus the computer screen on the wall which can be adjusted with navigation buttons. If there is no wall around, the paper sheet holder, divides into three pieces like an umbrella just after popping up, will help to focus the desktop on a paper sheet.

E-Ball technology is an innovative concept that introduces a spherical PC design, integrating conventional computing features within a compact, spherical shape. This technology was proposed by designer Apostol Tnokovski and aims to revolutionize personal computing with its blend of portability, functionality, and aesthetic appeal.

Key Features of E-Ball Technology

Spherical Design: The E-Ball PC is designed as a sphere, making it the smallest PC ever designed. This unique shape offers a compact and portable solution for computing needs2.

Optical Wireless Mouse: The E-Ball uses an optical wireless mouse that employs LED (Light Emitting Diode) and a light detector to detect movements relative to a surface.

Virtual Keyboard: The E-Ball incorporates a virtual keyboard, allowing users to input data without the need for a physical keyboard.

Display Unit: The display unit of the E-Ball is integrated into the spherical design, providing a seamless and immersive user experience.

Optical Mouse: The E-Ball includes an optical mouse for precise control and navigation.

AI Integration with E-Ball Technology

Integrating AI with E-Ball technology can enhance its capabilities and provide advanced functionalities. Here are some potential applications:

Voice Recognition: AI-powered voice recognition can enable hands-free operation of the E-Ball, allowing users to control the device using voice commands.

Predictive Analytics: AI algorithms can analyze user behavior and preferences to provide personalized recommendations and improve user experience.

Smart Assistants: AI-based virtual assistants can be integrated into the E-Ball to assist users with tasks, answer questions, and provide real-time support.

Enhanced Security: AI can enhance the security features of the E-Ball by implementing advanced encryption, biometric authentication, and anomaly detection to protect user data.

Benefits of AI-Based E-Ball Technology

Improved User Experience: AI integration can make the E-Ball more intuitive and user-friendly, providing a seamless and efficient computing experience.

Personalization: AI can tailor the device's functionalities to individual user preferences, enhancing overall satisfaction.

Automation: AI can automate routine tasks, freeing up users to focus on more complex and creative activities.

Advanced Capabilities: AI can enable advanced features such as real-time language translation, image recognition, and intelligent search functionalities.

Challenges and Considerations

Cost: Implementing AI and advanced technologies can increase the cost of the E-Ball, making it less accessible to some users.

Privacy Concerns: AI systems often require access to user data, raising concerns about privacy and data security.

Technical Complexity: Integrating AI into a compact and spherical design can pose technical challenges, requiring innovative solutions and robust hardware.

Conclusion

AI-based E-Ball technology represents a promising advancement in personal computing, offering a unique design and enhanced functionalities through AI integration. While there are challenges to overcome, the potential benefits make it an exciting area for future development.

BLOCK CHAIN TECHNOLOGY

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ROLL NO : 228W1A1093
CLASS : III- EIE

A block chain is a system of recording information in such a way that makes it difficult or impossible to change, hack or cheat the system. A block chain is essential a digital ledger of transaction that is duplicated or distributed across the entire network of computer systems on block chain. Block chain is a type of DLT in which transactions are recorded with an immutable cryptographic signature called a hash. The goal of block chain is to allow digital information to be recorded and distributed, but not edited, in this way block chain is the foundation for immutable ledgers, or records of transactions that cannot be altered, deleted or destroyed. It is expected that block chain will expand the scope of usability in many more sectors including finance data analysis, and the Internet of things with the advent of 5G.Usage of block chain system in different sectors a part from crypto currencies and NFTs can easily save time, money and can solve many problems. Although the block chain technology is older than Bit coin, it is a core underlying component of most crypto currency networks, acting as a decentralized, distributed and public digital ledger that is responsible for keeping a permanent record (chain of blocks) of all previously confirmed transactions. As a distributed ledger technology (DLT) the block chain is intentionally designed to be highly resistant to modification and frauds (such as double-spending).

Blockchain technology is a decentralized digital ledger that securely stores records across a network of computers in a way that is transparent, immutable, and resistant to tampering. Here's a detailed explanation:

1. Introduction

Blockchain technology was first introduced in 2008 by an anonymous person (or group of people) using the pseudonym Satoshi Nakamoto. It was designed as the public ledger for Bitcoin transactions, but its applications have since expanded to various industries.

2. How Blockchain Works

A blockchain consists of a series of blocks, each containing a list of transactions. These blocks are linked together using cryptographic hashes, forming a chain2. Each block contains:

Transaction Data: Information about the transactions.

Timestamp: The time at which the block was created.

Cryptographic Hash: A unique identifier for the block, generated using a cryptographic hash function.

When a new block is added to the blockchain, it is verified by a network of nodes (computers) through a consensus mechanism, such as Proof of Work (PoW) or Proof of Stake (PoS). Once verified, the block is added to the chain, and the data within it becomes immutable.

3. Key Features of Blockchain Technology

Decentralization: Unlike traditional centralized systems, blockchain operates on a peer-to-peer network, meaning no single entity has control over the entire system.

Transparency: All transactions on the blockchain are visible to anyone with access to the network, ensuring transparency and trust.

Immutability: Once data is recorded on the blockchain, it cannot be altered or deleted without changing all subsequent blocks and obtaining network consensus.

Security: Blockchain uses cryptographic techniques to secure data, making it resistant to tampering and fraud.

4. Applications of Blockchain Technology

Cryptocurrencies: The most well-known application of blockchain technology is cryptocurrencies like Bitcoin and Ethereum.

Supply Chain Management: Blockchain can be used to track the provenance and authenticity of products, ensuring transparency and reducing fraud.

Smart Contracts: Self-executing contracts with the terms of the agreement directly written into code, which automatically execute when conditions are met.

Decentralized Finance (DeFi): Financial systems that operate without traditional intermediaries, using blockchain technology to facilitate transactions and financial services.

Healthcare: Blockchain can securely store and share patient records, ensuring privacy and accuracy.

5. Benefits of Blockchain Technology

Reduced Costs: By eliminating intermediaries and automating processes, blockchain can reduce transaction costs.

Increased Efficiency: Blockchain enables faster and more efficient transactions by removing the need for manual processing and verification.

Enhanced Security: The cryptographic nature of blockchain ensures that data is secure and tamper-proof.

Improved Transparency: The transparent nature of blockchain fosters trust and accountability in various processes.

6. Challenges and Considerations

Scalability: Blockchain networks can face scalability issues, especially as the number of transactions increases.

Energy Consumption: Proof of Work (PoW) consensus mechanisms, like those used in Bitcoin, require significant computational power and energy.

Regulatory Uncertainty: The legal and regulatory landscape for blockchain and cryptocurrencies is still evolving, leading to uncertainty for businesses and users.

7. Conclusion

Blockchain technology has the potential to revolutionize various industries by providing a secure, transparent, and efficient way to store and share data. While there are challenges to overcome, the benefits of blockchain make it a promising technology for the future.