SUSTAINABLE DEVELOPMENT GOALS

9. INDUSTRY, INNOVATION AND INFRASTRUCTURE

Other details

Back to Main

NORMS FOR STUDENT START-UPS

1. Students will be allowed to work on setting up start-ups or work as intern/ part-time in start-ups (incubated in any recognized HEIs/incubators) while studying.
2. Students will be allowed to take a semester/year break (or even more depending upon the decision of a review committee) to work on their start-ups and re-join academics to complete the course
3. Student's entrepreneurs may earn academic credits for their efforts while creating an enterprise. A review committee will be set up to review the student start-ups, and based onthe progress made, it may give appropriate credits for academics. The decisions will be based on the guidelines developed for this purpose.
4. Student inventors will be allowed to opt for a start-up in place of their mini project/major project, seminars, summer training. The area in which a student wants to initiate a start-upmay be interdisciplinary or multi-disciplinary
5. Students entrepreneurs working on a start-up should be allowed to sit for the examination,even if their attendance is less than the minimum permissible percentage, with due permission form the institute. The decision will be based on the recommendations of the review committee set up to monitor the progress of the student start-up.
6. In case the faculty /staff holds the executive or managerial position for more than three months in a start-up, they will go on sabbatical/ leave without pay/utilize-existing leave.
7. Faculty must separate and distinguish on-going research at the institute form work conducted at the start-up/company.
8. Faculty must not involve research staff or other staff of institute in activities at the start-upand vice-versa
9. Human subject relate research in a start-up should get clearance from the ethics committeeof the institution
10. Product document and commercialization as well as participating in and nurturing start-ups will be added to a bucket of faculty-duties, and each faculty would choose a mix and match of these activities (in addition to the minimum required teaching and guidance) and then respective faculty will be evaluated accordingly for their

performance and promotion. It is desired that every facultymember should mentor at least one start-up.

EXIT POLICY FOR STARTUP FROM INCUBATION SUPPORT

Incubatee companies will leave the Chennai Institute Technology Business Incubation Forumunder the following circumstances:

- Completion of stay for stipulated period unless the stay is extended Chennai Institute Technology Business Incubation Forum - CITBIF
- Raising substantial investment from angel investor / Venture Capital Fund any other investor– Rs. 30 Lakh or more.
- Under performance or un-viability of the business proposition: criteria for the same will be decided and applied by CITBIF on the case to case basis.
- Irresolvable disputes between promoters/ founders.
- When the annual revenues of the company exceed Rs. 30 Lakh.
- When the company enters in an acquisition, merger or amalgamation deal or reorganization deal resulting substantially a change in the profile of the company, its promoters, directors, shareholders, products or business plans, or when a company plans for a public issue.
- Change in promoters'/ founders' team without concurrence of CITBIF.
- Non-compliance of term and conditions of CITBIF.
- Any other reasons which CITBIF may find it necessary for an Incubatee company to leave.
- Any other reasons Incubatee decides to CITBIF.
- Not with standing anything written elsewhere, Director - CITBIF decision in connection with the exit of an Incubatee company shall be final and shall not be disputed by any Incubatee company.
- Notice period of one month will be given to the Incubatee companies for the exit or extension either side the extension to the Incubatee companies will be provided only after the approval from the Director - CITBIF may be by circulation.
- In case of exit, physical transfer of the shares from/to the incubator should be completed and all the financial obligations should be settled from both side.
- All the resources provided to the incubates should be returned to the incubator.
- Details of new location should be provided to the CITBIF

Policy History

Policy created on	21-03-2019
Policy reviewed on	10-05-2022

Industry Inside Campus

1. KUKA

This collaborative effort of CIT & KUKA has the main objective to encourage young professionals to take up this cross disciplinary field as a career of their choice and acquaint them with latest technological developments in the field of Industrial Robotics. The centre aims to train young engineering graduates and diploma students of all engineering disciplines up to the Industry expectations and foster research in applied robotics field.The center is equipped with standard training cell comprising of KUKA KR-16 Industrial Robot with required auxiliary equipment. This training cell is capable of performing multitude of operations used for welding, painting, gluing and other essential industrial operations used by the automobile, food & beverages, packaging and other manufacturing/Production industries. In addition to this, a robotics computer simulation lab is also being established with latest industrial robotics simulation Software like SimPro & SimLayout, used to design, develop and simulate robotic operations for different manufacturing establishments.


Robot Cell 2
KUKA
KUKA


KUKA

2. Fronius India Solutions and Skill Centre

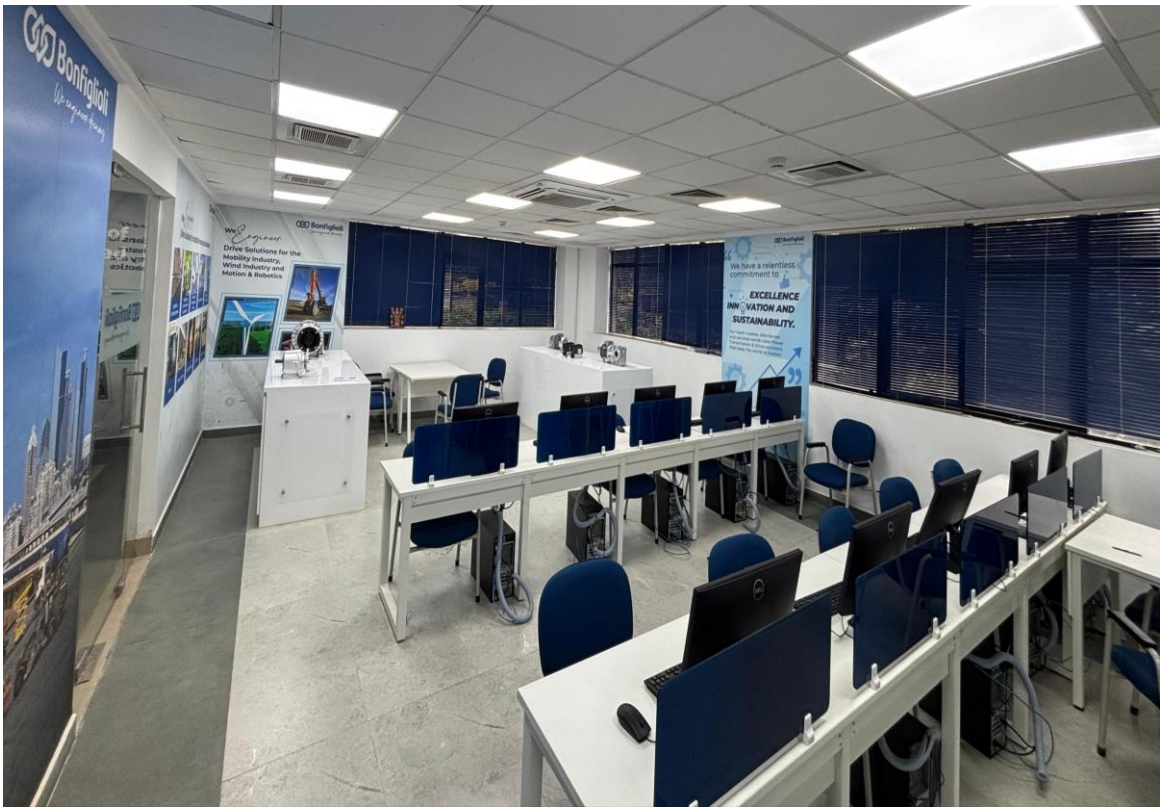
The Fronius India Solutions and Skill Centre represents a significant initiative in the field of vocational education and training, aimed at fostering advanced skills development in welding, automation, and energy technologies. Fronius, a global leader in welding technology, solar energy, and battery charging solutions, established this center to provide hands-on training and innovation opportunities for both professionals and students. The center focuses on

improving the practical skills of individuals while also providing the latest in technological advancements, making it a hub for technical excellence and cutting-edge innovation. Fronius India Solutions and Skill Centre, in collaboration with CIT , plays a crucial role in preparing the next generation of skilled professionals in welding, automation, and energy sectors. By blending industry-leading technology with academic rigor, this partnership ensures students are equipped with both the skills and the confidence needed to excel in today's fast-evolving industries.

3. Bonfiglioli

Bonfiglioli, a leading global provider of advanced gear motors, drive systems, and industrial automation solutions, has long been committed to driving innovation and fostering sustainable growth in the industrial and automation sectors. As part of this commitment, the company has focused on collaborating with educational institutions and colleges to bridge the gap between industry needs and academic knowledge. Bonfiglioli's collaboration with CIT College primarily focuses on creating a pathway for students to gain hands-on experience in the fields of mechanical engineering, automation, and robotics, among others. By working closely with the academic programs, Bonfiglioli helps to ensure that students are not only

prepared with theoretical knowledge but also have the practical skills needed to thrive in the fast-evolving world of industrial automation.




We Engineer
Drive Solutions for Industrial Processes and Automation
Logistics & Stocking Systems
Recycling & Environmental sustainability
Chemical & Pharmaceutical Industry
Textile
Rubber
Metal Processing
We Engineer
Drive Solutions for the Mobility Industry, Wind Industry and Motion & Robotics


We have a relentless commitment to
EXCELLENCE
INNOVATION AND
SUSTAINABILITY.

Industry Supported Labs

Drone Innovation Lab

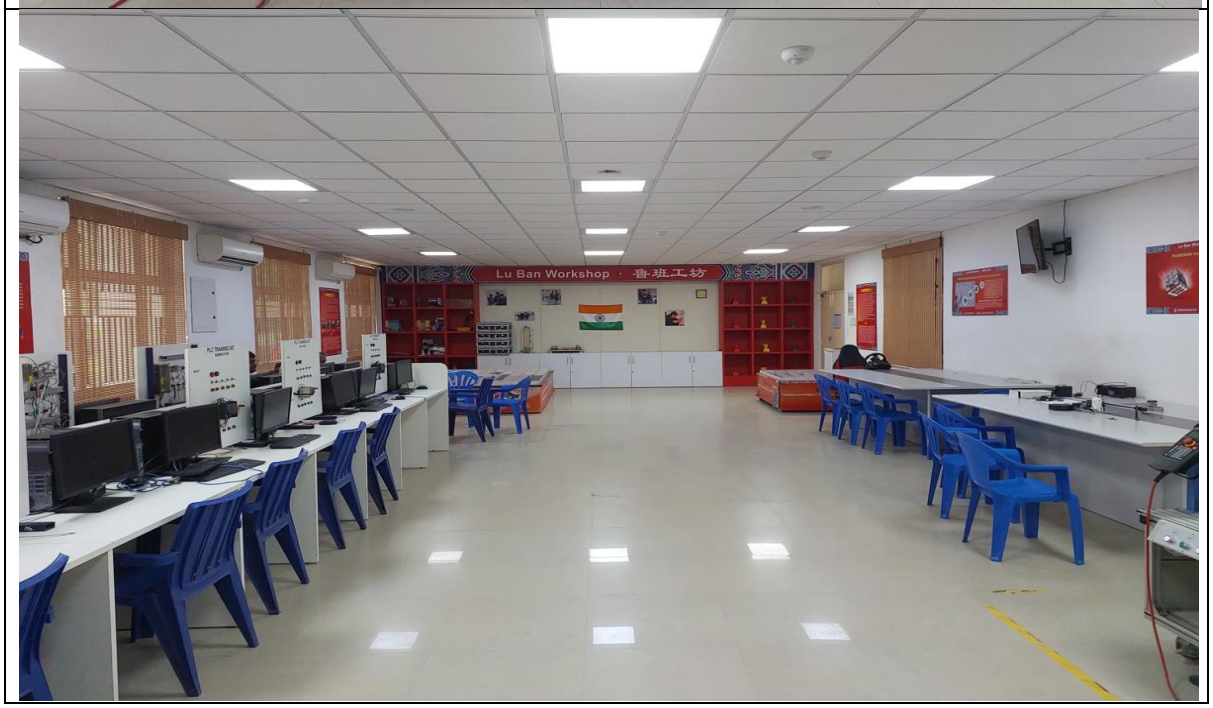
A Drone Innovation Lab plays a crucial role in pushing the boundaries of what drones can achieve, fostering a collaborative environment for researchers, engineers, and industry professionals to come together and drive innovation in this rapidly evolving field. Knowledge in Aerospace, developing new technologies, algorithms, applications for UAVs, and Certification.

Industrial Robotics Lab

Industrial robot is shaping the future of robotics – with our in-house research and development, strong partnerships with few Companies, Institutions and startups, as well as professional innovation management and a Business Innovation Lab as an accelerator for new ideas. Hands on Training in Robotic Rovers, Personal Assistance and Companion Robots.

Industrial Automation Research Centre

Industrial Automation Research Centre supports in control systems, computers, and information technology to handle different processes and machinery in an industry to replace human intervention. The primary objectives of industrial automation are to increase efficiency, improve reliability, enhance safety, and reduce operating costs. Various technologies are employed in industrial automation, and these systems are commonly found in manufacturing, process control, and other industrial settings. Focuses on technologies related to automation, Smart Manufacturing, Supply Chain Automation, Flexible Manufacturing Systems, and Industrial Communication Networks.



New energy Lab

New energy Lab is emerging and it is alternative sources of energy that differ from traditional fossil fuels. The concept of new energy is closely associated with efforts to transition to cleaner, more sustainable, and environmentally friendly sources of power. Knowledge on Advanced Materials for Energy, Circular Economy in Energy, Bioenergy, Energy Efficiency and Management, Renewable Energy Sources, Smart Grids and Microgrids.

Center for NC Technologies

The institute have world class training area for NC Technology to provide training on CAD/CAM software interfacing with CNC Turning and Milling center for NC Technology and also providing hands on experience to get better skills to participate Various National and International Competitions. We already have achieved “Excellence Award” in Industrial Products Digital Design and Manufacturing among various nations.

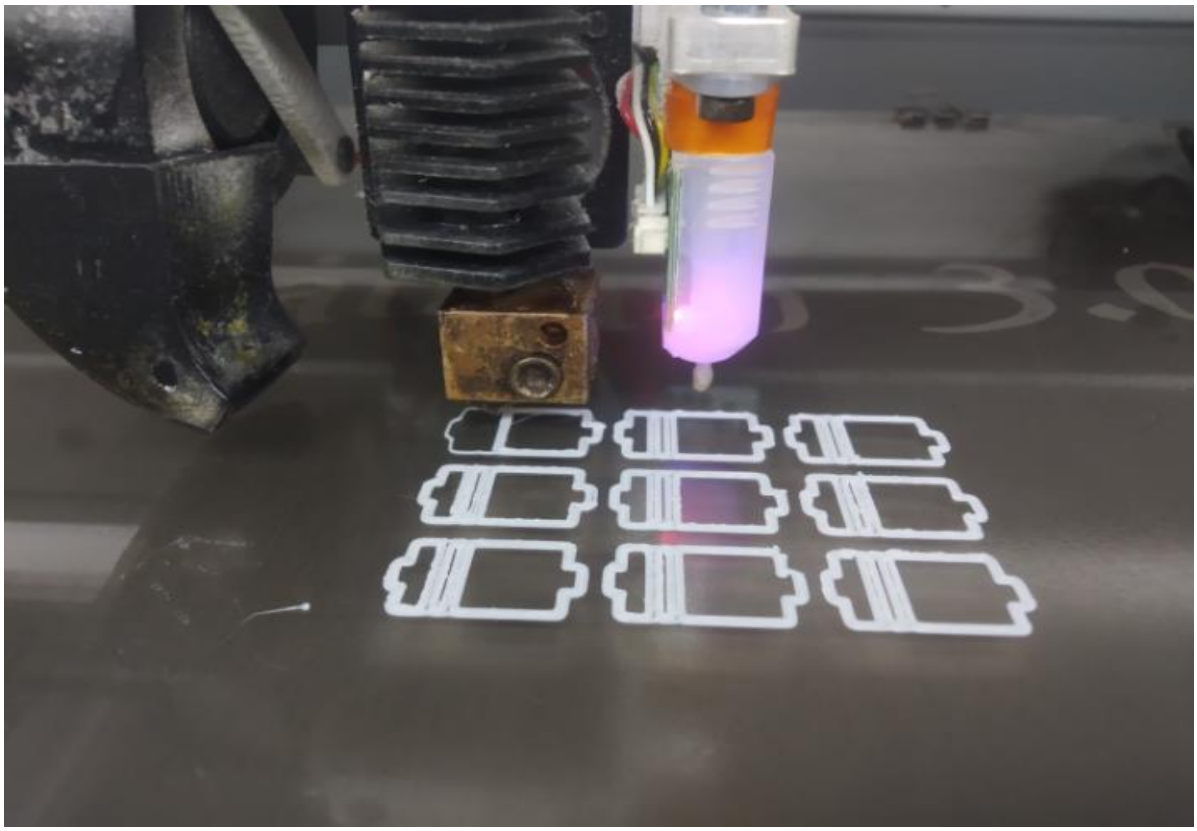
IoT Centre of Excellence

The specific focus and activities of an IoT Center of Excellence is based on the objectives and priorities of the research work taken into consideration. It plays a critical role in the advanced wireless mode of transceiving data between source and destination with high data rate, very high speed and preferably zero percent data loss. Real Time Implementations of IoT Devices, Li-Fi Technology, Health care, internal organs replacements kind of research works has been initiated from the IoT CoE.

AI Centre of Research

This centre highlights the diverse range of fields where AI research can have a significant impact, contributing to technological advancements and addressing real-world challenges. Research centres often collaborate with industry partners, academic institutions, and government agencies to drive innovation and application adoption. Knowledge in Machine Learning Algorithms, Virtual Reality (VR) and Augmented Reality (AR), Human-Computer Interaction.

Additive Manufacturing Research Centre



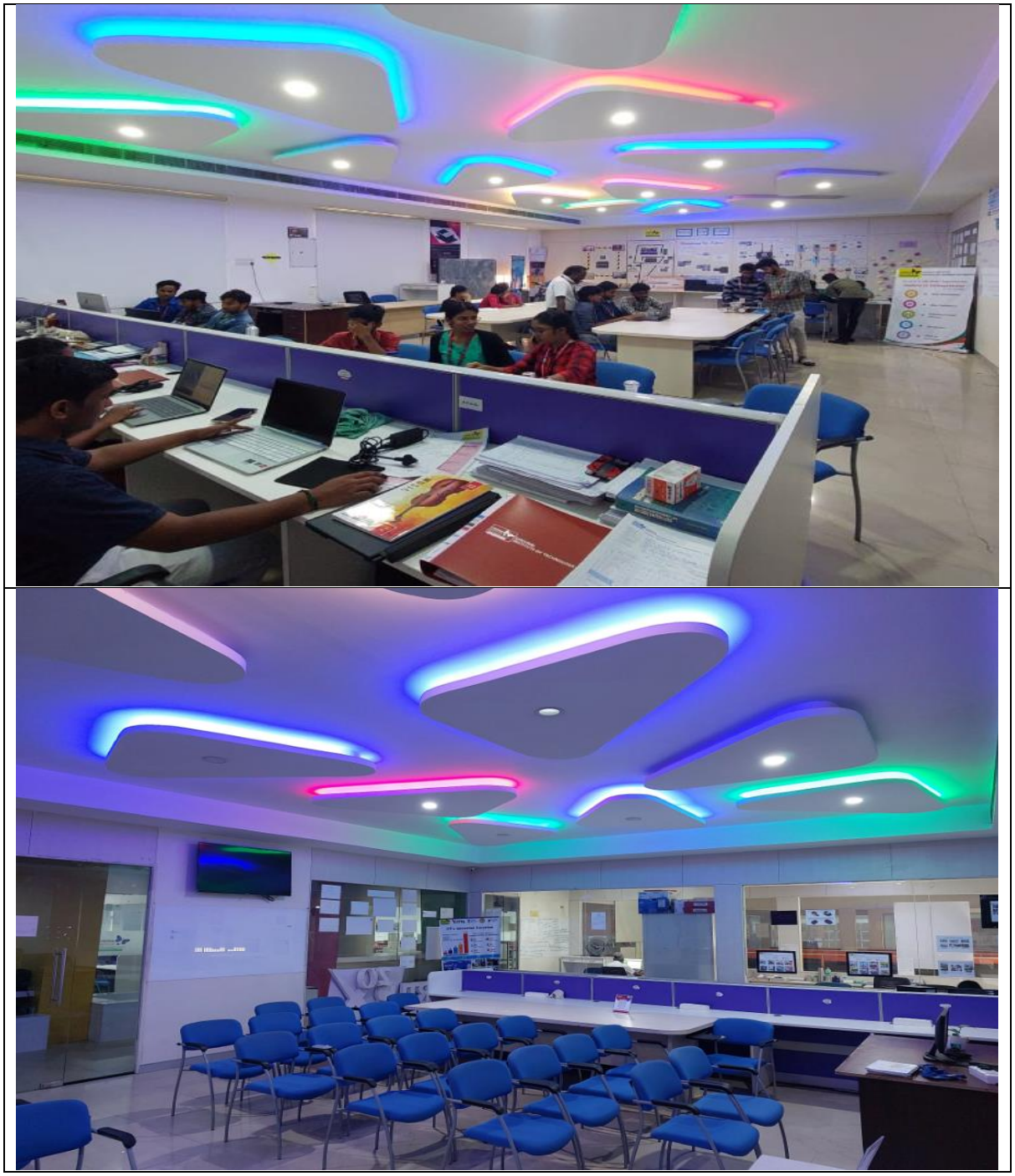
An Additive Manufacturing Research Centre, is a specialized facility focused on advancing research and development in the field of additive manufacturing, commonly known as 3D

printing. These centers are often collaborative efforts between academia, industry, and government bodies, aiming to drive innovation and enhance the capabilities of additive manufacturing technologies. 3D printers and bio printers helps startups to support health care research activities, instruments for assistive technology.

Biomedical Research Center

A Biomedical Research Center is an institution or facility dedicated to advancing research and development in the field of biomedical science and healthcare. These centers focus on a wide range of topics related to human health, medical treatments, and disease prevention. Gain knowledge about the replacement of internal organs with 3D bioprinter, production of Bio Ink, Health Care technologies.

Incubation Cell for Institute spin offs



An Incubation facility that provides support, resources, and mentorship to startup companies and early-stage entrepreneurs. The goal of our incubation is to help these fledgling businesses overcome challenges, accelerate their growth, and increase their chances of success. Incubation are often associated with fostering innovation, promoting entrepreneurship, and contributing to economic development. Create, educate, mentor and support the startup ideas to launch in the market and to grow as a successful business.

Government Funding contributing in SDG-9

S.NO	Name of the Project/ Endowments, Chairs	Name of the Funding Agency	Name of the Principal Investigator/Co-investigator
1	Development of eco-friendly hybrid dryer for fly ash based geopolymer bricks	AU-NLCIL Innovation Hub for Energy	Dr.P.Partheeban Dr.A.Dhanasekaran
2	DST FIST Project	Department of Science and Technology Government of India	Dr.P. Partheeban Dr.V.Dhinakaran
3	MODROB REG (Modernization of Universal Vibration diagnosticand Control platform)	AICTE	Dr.V.Dhinakaran
4	FUSI (Filament Utilization System) - Recycled 3-D printed filaments. - Recycle of 3D printed waste for reuse in 3D printing.	Ministry of Micro, Small & Medium Enterprises	Mr.A.Suresh Mr.Yuvaresh Chandrasekaran
5	Hydrogen Powered electric vehicle	Ministry of Micro, Small & Medium Enterprises	Mr.A.Suresh Mr.Kodavati Sumanth
6	Hydrogen fuel cell Powered electric vehicle	Entrepreneurship Development And Innovation Institute	Mr.A.Suresh
7	Development of eco-friendly hybrid dryer for fly ash based geo-polymer bricks	AU-NLCIL Innovation Hub for Energy	Dr.A.Dhanasekaran
8	Design and Fabrication of Hybrid solar LPG based for Geopolymer bricks	Department of Science and Technology (Technology Mission Division) Solar Energy Research and Development (SERD) Government of India	Dr.A.Dhanasekaran

9	Design and Evaluation of Heavy-duty gear boxes and its endurance study	Bonfiglioli, Transmission private limited	Mr.D.Prakash
10	Neural network-based control research in the path optimization of automated guided vehicle systems	MK auto components India Limited, Ambathur , Chennai	Dr.C.Ezhilarasan Mr.P.Vinoth Kumar Mr.Gokul.P.S
1	Tuberculosis detection for mass screening using chemical sensor	Ministry of Micro, Small & Medium Enterprises	Ms.Sharmili R & Ms. Janani M
12	Novel mass screening Retina Imaging for severity detection of Alzheimer's using Deep learning methods	Ministry of Micro, Small & Medium Enterprises	Dr.M.Kayalvizhi
13	FIST Program -2022	DST	Dr.M.Kayalvizhi
14	Automated Manufacturing Platform- Opearting Paradigm, Functional requirements in Architecture Design using AI	Gokul Autotech Pvt. Ltd	Dr. R.Janarthanan, Dr.B.Sundarambal
15	Experimental Investigation on the application of AI for detecting defects in spare parts	Tripower Technologies Pvt. Ltd	Dr. R.Janarthanan, Dr.B.Sundarambal
16	PLC Implementation for production management system	Coporate Solutions Redefined India Pvt.Ltd	Dr..R.Ponnusamy, Ms.S.Pavitra
17	Intelligent Driving Pattern Prediction in Truck -APC	Daimler India Commercial Vehicles Pvt Ltd	Dr.T. Jeshuadevadas, Mr.R.Ramesh
18	Collaborative and Intelligent Robot Systems	Accenture Solutions Pvt. Ltd	Dr.B.Muthukumar, Mr.G.Senthilkumar
19	Intelligent Warehouse Management System	Accenture Solutions Pvt. Ltd	Dr.T.Ramakrishna, Ms.M.Shanmuga Sundari
20	Manufacturing as a Service-POC	Accenture Solutions Pvt. Ltd	Dr. R. Taalapathy Rajasekar, Mr.S.Senthilkumar
21	ICEEMR 2021	AICTE	Dr. J.Vishnupriyan
22	Recent Trends in Power Engineering and Electric vehicle Technologies ATAL FDP	AICTE	Dr. J.Vishnupriyan
23	Design and Fabrication of Hybrid Solar – LPG base ddryer for geo polymer bricks	Ministry of Science and Technology	Dr. J.Vishnupriyan

Events contributing to SDG-9

1. A workshop on "Entrepreneurship and Innovation as Career Opportunities" was conducted on 15th September 2023 at the CIT campus, engaging 45 students. The session focused on the fundamentals of entrepreneurship, key strategies for innovation, and how to turn ideas into successful ventures. Experts in the field shared insights on building startups, funding options, and the importance of a creative mindset. The workshop aimed to inspire students to explore entrepreneurship as a viable career path and to think critically about innovation in today's dynamic job market.

2. A workshop on "Entrepreneurship and Innovation as Career Opportunities" focused on the field of ultrasound was held on 10th January 2023 at the CIT campus, with 70 students in attendance. The session explored how innovation in medical technologies, particularly ultrasound, is creating new career opportunities in healthcare entrepreneurship. Industry experts and entrepreneurs discussed the latest advancements in ultrasound technology and its applications in diagnostics, as well as the potential for starting ventures in this rapidly evolving sector. The workshop aimed to inspire students to consider healthcare innovation as a rewarding career path and to foster entrepreneurial thinking in the tech-driven medical industry.

3. A one-day hands-on workshop on **KUKA Industrial Robots** was conducted on 3rd September 2022 at the CIT campus, with 50 students actively participating. The session provided students with practical experience in operating KUKA robotic systems, focusing on their applications in manufacturing, automation, and precision tasks. Experts from the industry demonstrated key features of KUKA robots, including programming, movement control, and integration with production lines. The workshop aimed to enhance students' understanding of automation technology and inspire them to explore career opportunities in robotics and industrial automation, essential for the future of smart manufacturing.

4. On 16th February 2022, a guest lecture on **Startup Opportunities and Support by EDIITN** was organized at the CIT campus for 50 students. The session, led by experts from the Department of Industries & Commerce, focused on the various opportunities available for aspiring entrepreneurs in today's dynamic market. The lecture covered key topics such as startup funding, government schemes, mentorship programs, and the essential resources provided by EDIITN to help young entrepreneurs succeed. Students were introduced to the support ecosystem for startups, including incubation, networking, and skill-building workshops, encouraging them to explore and launch their own ventures. The event aimed to inspire and empower students to pursue entrepreneurship with the right knowledge and resources.

5. On 20th August 2022, a session on **Angel Investment and VC Funding Opportunities for Early-Stage Entrepreneurs** was conducted at the CIT campus for third-year students. The session focused on educating students about the essential role of angel investors and venture capital (VC) firms in supporting early-stage startups. Industry experts and investors shared insights on how entrepreneurs can attract funding, the different stages of investment, and key factors that investors look for in a business proposal. The session also covered practical tips on pitching ideas, building investor relationships, and understanding valuation. The goal was to equip students with the knowledge to navigate the funding landscape and inspire them to pursue entrepreneurial ventures with confidence.

6. On 10th August 2022, a specialized **Industry Upskill Program on Systematic Problem Solving Using the QC Story Approach** was held at the CIT campus for second-year students. The program was designed to address the specific needs of **automotive OEMs (Original Equipment Manufacturers)** and **auto ancillary industries**, with a focus on improving problem-solving skills in manufacturing and quality control.The session introduced students to the **QC Story approach**, a structured methodology used in the automotive industry to identify, analyze, and resolve production challenges. Through real-world case studies and hands-on exercises, students learned how to apply tools like root cause analysis, Pareto analysis, and fishbone diagrams to systematically tackle quality issues. The program aimed to enhance students' technical expertise and prepare them to contribute effectively to the automotive industry's continuous improvement processes.

7. **Startup 20X Event - A Spotlight on Innovation and Entrepreneurship** On **4th May 2023**, the **CIT Campus** (Chennai Institute of Technology) hosted the much-anticipated **Startup 20X** event, a dynamic platform designed to celebrate and support emerging entrepreneurs, innovators, and startups. The event aimed to inspire students, budding entrepreneurs, and young professionals by providing them with the tools, insights, and networks to turn their startup dreams into reality.

Event Photos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REFRESHMENT ZONE
StartupTN
CITIL
Startup

Students Project Contributing to SDG 9

S.No	Title	Abstract
1	IMPLEMENTATION OF ADVANCED LMS FILTER USING NOVEL FAST ADDER FOR DELAY OPTIMISATION	VLSI (Very Large-Scale Integration) is a technology that involves packing millions of electronic components onto a single microchip to create complex and powerful integrated circuits. Adders are digital circuits used in computer architecture to perform addition operations. It adds binary numbers and often come in several categories, including half adders (addition of two binary digits), full adders (addition of three binary digits with carry), and ripple carry adders (used for multi-bit addition). It plays a crucial role in arithmetic and data processing within computers. Adders are used in computer processors for arithmetic calculations, memory addressing, data encryption, digital signal processing, and error checking in data transmission. In the original study, XOR, NOR, and mux gates were employed to compute sum and carry signals, leading to significant time delay concerns. In innovative approach, it has streamlined the design by exclusively utilizing NAND and XNOR gates, resulting in a remarkable reduction in time delay. This advancement promises improved efficiency and performance, setting a new standard in digital circuitry. Xilinx ISE version 14.7 and MATLAB version R2023a are the software tools used for this project. Xilinx ISE 14.7 is an integrated development environment (IDE) primarily used for designing and synthesizing digital circuits, particularly targeting Xilinx Field Programmable Gate Arrays (FPGAs) and Complex Programmable Logic Devices (CPLDs). MATLAB, is a high-level programming language and interactive environment primarily used for numerical computation, data analysis, visualization, and algorithm development. The efficiency of the proposed adder with respect to gate size and power is 97%
2	PREDICTIVE ANALYSIS AND MAINTENANCE WITH STATISTICAL LEARNING MODELS IN INDUSTRY 4.0	Machine Failure posessed significant challenges in industrial settings due to its adverse effects on asset availability, production quality, and financial resources. This proposed work focused on developing a predictive maintenance system using data mining and machine learning techniques to anticipate equipment failures and optimize maintenance strategies. Equipment failures resulted in asset downtime, deviation from standard procedures, reduced quality and quantity output,

		increased labour costs, and overall loss of productivity. Quick and accurate identification of potential failures is crucial to mitigate these risks. Data mining techniques, coupled with machine learning algorithms, offer a robust approach to analyse vast and complex datasets generated by industrial machinery. The predictive maintenance system provided two key benefits. Firstly, it allowed maintenance teams to schedule preventive maintenance activities strategically, minimizing unplanned downtime and production losses. Secondly, it optimized inventory management by stocking only necessary spare parts, reducing inventory costs while ensuring timely availability of critical components. By implementing this predictive maintenance system, industrial organizations can enhanced equipment reliability, optimize resource utilization, and improve overall operational efficiency. The integration of data mining and machine learning technologies empowered equipment professionals to make data- driven decisions, ensuring smooth and uninterrupted industrial operations.
3	ENHANCING INDUSTRIAL OPERATIONS WITH IOT-DRIVEN PREDICTIVE MAINTENANCE AND AR VISUALISATION	The project aims to revolutionize the approach to maintenance practices in industrial settings by harnessing the power of cutting-edge technologies, develop a predictive maintenance system capable of detecting early signs of motor degradation and optimizing maintenance schedules. Furthermore, by leveraging AR technology for data visualization, the project aims to enhance user interaction and decision-making processes in motor health monitoring. The implementation of the predictive maintenance system involves several key components. Firstly, IoT sensors are deployed to monitor various parameters of motor health, including current, voltage, temperature, humidity, and vibration. These sensors continuously collect real-time data, which is then processed and analysed using machine learning algorithms. In particular, it utilize the Random Forest Classifier algorithm to predict the health status of motors based on the collected sensor data. The integration of AR technology allows Maintenance personnel to visualize the sensor data in a three-dimensional (3D) augmented reality environment. This immersive visualization enhances the understanding of complex data sets and facilitates quick interpretation of maintenance alerts and insights. Through the AR interface, users can interactively explore motor health metrics, identify anomalies, and make informed decisions regarding maintenance actions. The effectiveness of the predictive maintenance system is evaluated based on several performance metrics, including accuracy of predictions, reliability of alerts, and user satisfaction with the AR interface. Including Internet of Things (IoT) and augmented reality (AR).

4	DESIGN AND IMPLEMENTATION OF 32-BIT DADDA MULTIPLIER USING CSA	Dadda multipliers require less area and are slightly faster than Wallace tree multipliers. The Dadda multiplier is known for its high-performance capabilities, critical path delay optimization, and resource efficiency. The objective of this proposed work is to assess the effectiveness of the Dadda multiplier in improving multiplication operations compared to traditional multiplier architectures. The research methodology involves a thorough analysis of the Dadda multiplier architecture, focusing on the implementation of the CSA technique. The CSA technique is utilized to reduce the number of partial products required for multiplication, thus decreasing the computational complexity. Additionally, the critical path delay is optimized by employing efficient carry propagation techniques within the Dadda multiplier. Simulations and performance evaluations are conducted to evaluate the Dadda multiplier's performance in terms of computational complexity reduction, critical path delay optimization, and resource efficiency. These evaluations involved comparing the Dadda multiplier with conventional multiplier architectures, considering factors such as area consumption, power requirements, and throughput. The study demonstrates the benefits of employing the Dadda multiplier with the CSA technique, providing insights into its potential for enhancing performance and energy efficiency in computational systems.
5	REMOTE CABLE LINE MONITORING AND CONTROL PLATFORM	Underground cables are used for power applications where it is impractical, difficult, or dangerous to use the overhead lines. This work is widely used in densely populated urban areas, in factories, and even to supply power from the overhead costs to the consumer premises. The underground cables have several advantages over the overhead lines. It is more expensive to manufacture, and their cost may vary depending on the construction as well as the voltage rating. Underground cables are prone to a wide variety of faults due to underground conditions, wear and tear, rodents, etc. This proposed work is intended to detect the location of faults in underground cable lines from the base station in km using a NodeMCU. To locate a fault in the cable, the cable must be tested for faults. This prototype uses the simple concept of Ohms law. The current would vary depending on the length of the fault of the cable. In urban areas, the electrical cables run underground instead of overhead lines. Whenever a fault occurs in an underground cable it is difficult to detect the exact location of the fault for the process of repairing that particular cable. The proposed system finds the exact location of the fault. The prototype is modelled with a set of resistors representing cable length in km and fault creation is made by a set of switches at every known distance to cross-check the accuracy of the same. This prototype is more efficient in finding the exact distance of the fault. The fault occurring distance and time are displayed on ThingSpeak software interfaced with the microcontroller using a Wi-Fi module.

6	UNMANNED ROBOTIC VEHICLE WITH MULTI SENSOR INTEGRATION AND FACE RECOGNITION	The proposed work's objective is to conceptualize, design, and execute an intelligent unmanned robotic vehicle that harnesses the power of advanced sensor technologies and facial recognition to enhance border security. Through the seamless integration of a diverse sensor suite, comprising a camera, sound sensor, vibration sensor, and ultrasonic sensor, the robotic vehicle achieves a holistic understanding of its surroundings. This comprehensive environmental perception is particularly crucial in detecting potential breaches along the national border. The camera captures visual data, while the sound sensor and vibration sensor are attuned to detect auditory and physical disturbances, respectively. The ultrasonic sensor further contributes by providing distance measurements and obstacle detection capabilities. This amalgamation of sensors empowers the robotic vehicle to operate effectively in varied environmental conditions, ensuring a robust surveillance system. Simultaneously, an Internet of Things (IoT)- based alert is generated and promptly dispatched to designated officers responsible for border security. This immediate alert mechanism ensures a rapid and coordinated response to potential threats, minimizing the risk of unauthorized border crossings.
7	ENHANCING VIRTUAL REALITY: SENSOR FUSION TECHNOLOGY IN LDR-BASED VR TACTILE GLOVES	VR gloves forms the foundation to provide cost-effective and responsive solution for a wide range of applications such as physiotherapy and gaming. By addressing key challenges in motion tracking accuracy and tactile feedback, this research contributed to the advancement of VR technology and a better scope for innovative use cases in various industries. The development and integration of VR gloves is aimed at enhancing user immersion and interaction within virtual environment. Leveraging Unity software for simulation and STM32 microcontrollers for hardware interfacing, the system employed advanced sensor fusion technique - Kalman filtering, to achieve precise hand motion tracking and mitigate noise and drift issues. Additionally, the integration of LDR sensors and tactile feedback mechanisms enhanced the user experience by providing real- time finger position monitoring and a rudimentary sense of touch. This work not only advances the current state-of-the-art in VR technology but also lays the groundwork for future research and development in immersive virtual experiences. The findings presented herein serve as a foundation for further exploration into the optimization of sensor fusion techniques and the enhancement of tactile feedback mechanisms, thereby fostering continuous innovation and evolution in the field of virtual reality.
8	NETWORK INTRUSION DETECTION SYSTEM ANALYTICS	Network Intrusion Detection Systems play a critical role in protecting computer networks from various security threats and attacks. As the complexity and frequency of network attacks continue to evolve, there is a growing need foradvanced analytics techniques to enhance the detection and

	USING MEMORY BASED LEARNING APPROACHES	response capabilities of NIDS. This research focuses on the development and utilization of analytics methods for network intrusion detection systems. The goal is to leverage these techniques to improve the accuracy, efficiency, and effectiveness of NIDS in identifying and mitigating security breaches. The research begins by exploring the fundamental concepts of network intrusion detection, including the different types of attacks and the challenges associated with their detection. Various types of NIDS, including signature-based and anomaly-based systems, are discussed, highlighting their strengths and limitations. Overall, this research aims to advance the field of network intrusion detection by leveraging analytics techniques to enhance the capabilities of NIDS. The proposed methods offer the potential to improve the accuracy of attack detection, reduce false positives, enable efficient processing of big data, and facilitate automated incident response. The findings of this research will contribute to the development of more robust and effective network security systems in the face of ever-evolving cyber threats. In this project, we evaluate and compare the performance of three learning algorithm: Random Forest, Ada Boost and Extra Tree in terms of their accuracy and robustness in handling complex problems
9	IMPROVISED STEGANOGRAPHY FOR IOT NETWORK NODE DATA SECURITY PROMOTING SECURE DATA TRANSMISSION USING GANS	The Internet of Things (IoT) describes the network of physical objects or things that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. Although several IoT devices are openly accessible to all in the network, it is extremely vital to be aware of the security risks and threats of cyber-attacks; therefore, it should be secured. In Cryptography, plain text is converted to encrypted text before it is sent, and it is converted to plain text after communication on the other side. Steganography is a method of hiding secret data, by embedding it into an audio, video, image, or text file. One technique is to hide data in bits that represent the same color pixels repeated in a row in an image file. By applying the encrypted data to this redundant data in some inconspicuous way, the result will be an image file that appears identical to the original image but that has "noise" patterns of regular, unencrypted data. In this project it proposes to encrypt the IoT networks data by hiding the message inside an image file using image data hiding technique. We are going to incorporate the usage of convolutional neural networks in traditional image data hiding method to drastically increase the payload that can be transmitted through an image. Different convolutional parameters will be analysed to achieve the highest payload.
10	CLUSTER BASED MODIFIED SPIN ALGORITHM	Wireless sensor networks (WSNs) are composed of resource-constrained sensor nodes tasked with monitoring and gathering data from an area of interest. Efficient data dissemination and

		routing are critical challenges in WSNs due to the nodes' limited energy resources and bandwidth constraints. The SPIN (Sensor Protocol for Information via Negotiation) protocol addresses some of the drawbacks of traditional flooding-based approaches by employing metadata negotiation before transmitting actual data. This propsed Cluster based modified SPIN algorithm, a novel approach that enhances the SPIN protocol by incorporating the distance based clustering algorithm for optimized cluster formation and energy- efficient routing in WSNs. By combining cluster head selection with SPIN's negotiation mechanism, this work aimed to improve energy efficiency, prolong network lifetime, and ensure reliable data delivery in WSNs compared to existing protocols. Simulation results have demonstrated the superiority of CBM-SPIN in terms of reduced energy consumption, extended network lifetime, making it a promising approachfor efficient data routing in resource-constrained WSNs.
11	TRIPLE MATERIAL HETEROJUNCTION SURROUNDING GATE TFET: DESIGN AND PARAMETER ANALYSIS	The Triple Material Surrounding Gate Tunnel Field-Effect Transistor (TMSG-TFET) emerges as a dependable successor to conventional MOSFET architectures, adept at mitigating the inherent limitations of CMOS circuitry. By virtue of its innovative surrounding gate design, the TMSG-TFET effectively addresses Short Channel Effects (SCEs) such as impact ionization, Drain Induced Barrier Lowering (DIBL) and so on. Notably, this model integrates Indium Phosphide (InP) as the source material, with Hafnium Oxide (HfO2) and Silicon Dioxide (SiO2) serving as high-k dielectric components. An analytical framework has been meticulously devised to ascertain critical device parameters, encompassing surface potential, electric field distribution, and drain current characteristics. The architectural blueprint of the proposed triple material SG TFET has been crafted utilizing the parabolic approximation method, thereby elucidating solutions to Poisson's equation to delineate the surface potential and electric field profiles. Subsequently, leveraging Kane's model facilitates the estimation of drain current, thereby enabling an assessment of the tunnelling generation rate. Rigorous validation through TCAD simulation bolsters confidence in the developed model, attesting to its accuracy and reliability in encapsulating the distinctive device characteristics of the TMSG-TFET architecture.
12	ENHANCED PERFORMANCE ANALYSIS OF DUAL MATERIAL GATE TFET WITH SURROUNDING GATE	The proposed solution introduces a novel analytical model for Dual Material Surrounding Gate Tunnel Field-Effect Transistors (DMSG TFETs), incorporating both two-dimensional (2D) and three-dimensional (3D) considerations. By solving the 2D Poisson's equation with appropriate boundary conditions, the model derives mathematical expressions for the 2D potential distribution at the surface and the electric field within the DMSG TFET structure. Furthermore, the model

		incorporates a comprehensive approach to determine the drain current, involving the derivation of a mathematical expression for the band-to-band (BTB) tunneling generation rate using Kane's formula. To validate the accuracy and effectiveness of the proposed analytical model, simulated results from TCAD simulations are compared with the mathematical predictions, ensuring the model's reliability and applicability in practical device design and optimization.
13	ANALYSIS THE DRAIN CURRENT, SURFACE POTENTIAL AND ELECTRIC FIELD OF SINGLE MATERIAL SURROUNDING GATE TFET	Tunnel Field Effect Transistors, often referred to as TFETs, are progressively emerging as a promising alternative to the more conventional MOSFETs and viewed as a potential solution to overcome the operational constraints such as Short Channel Effects (SCE) that are typically associated with MOSFETs. In this study, present an in-depth examination of the design evolution of TFETs. Specifically on a Single Material Surrounding Gate TFET, with Indium arsenide (InAs)- Si heterojunction being employed as the source material. Using an analytical model and able to determine key device parameters, such as the surface potential, the drain current, and the electric field.
14	HYPERSPECTRAL IMAGE CLASSIFICATION USING TRAINING SAMPLE AUGMENTATION WITH GAN	Hyperspectral imaging has emerged as a powerful tool in medical diagnostics due to its ability to capture detailed spectral information across a wide range of wavelengths. However, accurate disease detection from hyperspectral images remains challenging, primarily due to limitations in training data diversity and abundance. This work proposes a novel approach to address these challenges by integrating Generative Adversarial Networks (GANs) into hyperspectral image classification for disease detection. The proposed methodology harnesses the capabilities of GANs to generate synthetic hyperspectral images, effectively augmenting the training dataset and enhancing its diversity. By learning the underlying distribution of hyperspectral data, the GAN generates realistic synthetic images that closely resemble real-world spectra associated with various disease conditions
15	DYNAMICAL ANALYSIS FOR SYMMETRIC CHAOTIC SYSTEM WITH FIELD PROGRAMMABLE GATE ARRAY	Simulation of nonlinear dynamical systems has received significant attention due to its potential applications in several fields. Chaotic systems are nonlinear dynamical systems that are irregular, aperiodic, unpredictable, and dependent on beginning conditions. While testing with 3D weather simulations. This process attractor generation in nonlinear dynamical systems has gained a lot of attention because of its potential applications in a variety of domains. Chaotic systems are nonlinear dynamical systems that are irregular, aperiodic, unexpected, and dependent on the initial circumstances. This work created a symmetrical chaotic system and discussed its qualitative properties. The Lyapunov exponents of the proposed system indicate that it is symmetrically chaotic, with two positive exponents. The bifurcation outlines of the symmetrical chaotic system

		are investigated to determine the parameter- dependent and quadratic nonlinearities, respectively. The synchronization of symmetrical chaotic systems has a variety of applications, including secure communications and cryptography. This introduces the approaches for adaptive synchronization of sliding mode control in symmetrical chaotic systems with known parameters.
16	CRACK IDENTIFICATION AND SEGMENTATION USING AI MODEL	An AI Model comprising of ResNet50, InceptionV3 and VGG16 was created with Python Programming Language and images of cracks in structural and non-structural components of structures were collected using High-Resolution Cameras and feeded to the model as input. The CNN Model was pre-trained with 1000 images with cracks and 1000 images without cracks which were collected from Kaggle and GitHub as Dataset for this project. After pre-training the model, the model was saved and loaded. The collected images were given as input for the model to detect cracks, perform segmentation and give the prediction of the crack trend development if cracks are present in the image which was feeded as input. Crack width of upto 9 centimeters was predicted as per the image feeded. The pixel size of the training data is 227x277 px which when converted to Centimeters will give approximate of 8.44 cm. Crack width of 1.83cm was identified with ResNet50 Model, 1.79cm with InceptionV3 and 1.86cm with VGG16. These values kept progressing as consecutive year's images were given as input sequentially.
17	EXPERIMENTAL ANALYSIS OF CRACK PATTERNS IN RCC BEAM AND CRACK PREDICTION USING AI TECHNIQUE	This project focuses on the development and implementation of an artificial intelligence (AI) model for the detection of cracks in beams, aiming to enhance structural health monitoring capabilities. The deterioration of structural elements, such as beams, can compromise the safety and integrity of infrastructures. Traditional methods for crack detection often rely on visual inspections or expensive and time-consuming testing procedures. The proposed AI model leverages advanced image processing and machine learning techniques to automatically identify and classify cracks in beam structures. The methodology involves casting 4 beams of size 70 x 15 x 15 cm in which 2 beams are of M20 mix and the other 2 are M25 mix. After casting, the beams are tested to acquire various crack images, load vs displacement and stress vs strain graphs. The maximum load acquired is 68.45KN and the maximum peak stress obtained is 0.0025KN/mm2. With the obtained crack images an AI model is developed to predict the crack patterns. Convolutional Neural Networks (CNN) are then used for the training dataset The developed AI model takes the crack images as input and gives output in the form of crack prediction, Accuracy vs loss, and testing vs loss data as graphs.
18	STRENGTH PREDICTION OF NANO MATERIAL CONCRETE	Nano silica, a promising additive in concrete, has shown potential for enhancing mechanical properties, including compressive and flexural strength. This study presents a novel hybrid

	USING HYBRID MACHINE LEARNING APPROACHES	machine learning framework for predicting the compressive and flexural strength of nano silica concrete. The proposed model integrates diverse machine learning algorithms, such as Linear Regression, Support Vector Machines, Gradient Boosting, Random Forest and decision trees, to exploit their complementary strengths in capturing intricate patterns within the dataset. Utilizing a comprehensive dataset encompassing key parameters like nano silica content, water-to-cement ratio, plasticizer, cement, aggregate and strength characteristics, the hybrid model is trained, tested and validated. The hybrid approach exhibits superior accuracy and generalization performance compared to individual algorithms. This research not only contributes to advancing predictive modelling in concrete technology but also provides valuable insights for optimizing nano silica concrete formulations in real-world construction applications.
19	OPTIMIZATION OF NANO MATERIALS IN CONCRETE USING MACHINE LEARNING ALGORITHMS	Concrete, the second most commonly used construction material after water, has certain limitations due to its brittleness, low ductility, and low tensile strength. Additionally, it is prone to early formation and micro-crack propagation caused by shrinkage at young ages. However, in the past two decades, the production of concrete has significantly increased by incorporating supplementary cementitious materials (SCMs) and nanoparticles such as SiO2, TiO2, Fe2O3, Cr2O3, and Al2O3. This work reviews the inclusion of nanoparticles in concrete and its resulting effects. To facilitate the comparison of the impact of oxide nanoparticles on concrete, graphical representations of these parameters have been provided. Furthermore, the combined use of different types of nanoparticles (NS + NC) has shown a remarkable improvement in concrete compressive strength compared to using the same percentage of a single type of nanoparticles. In this machine learning model predictions the input parameters as cement=450gms, sand=625gms, coarse aggregate=1350gms and water to cement ratio=0.4 for M20 grade concrete and found out that the optimum value of nano silica, nano-clay, silica fume and nano carbon tubes are 2.80 %, 7.0 %, 6.88% and 0.03%for which the max strength attained is 21.48N/mm2, 27.34 N/mm2, 22.20 N/mm2,22.3 N/mm2 respectively in 28th day using Linear regression models in machine learning.For M25 the maximum and minimum strength attained is 32 N/mm2 and 25 N/mm2 respectively. For M30 the minimum and maximum strength attained is 35N/mm2 and 41N/mm2 respectively. For high performance concrete the minimum and maximum strength attained is 46.2 N/mm2 and 82.3 N/mm2.
20	GESTURE INTERPRETATION	The Gesture Interpretation System (GIS) stands as a transformative leap in the realm of user-computer interaction, poised to revolutionize communication dynamics by seamlessly translating intuitive gestures into both text and speech formats. Embeddedwithin its core is a profound

		mission to not only streamline engagement within virtual environments but also to bridge the profound communication chasm existing between individuals with varying auditory capabilities, thereby fostering a more inclusive andaccessible digital landscape. This advanced system, designed for seamless interaction in virtual environments, eliminates the dependence on traditional input methods, streamlining the communication process. By incorporating advanced gesture recognition algorithms, GIS converts gestures into written text,providing users with a convenient and precise mechanism for promptly conveying intricate ideas in a digitally inclusive and accessible environment. By harnessing the power of advancedtechnology, GIS not only deciphers gestures with unparalleled accuracy but also converts them seamlessly into both written text and spoken words, thereby transcending barriers and empoweringindividuals of all auditory capacities to engage fully in virtual interactions.
21	DYNAMICS, SYNCHRONIZATION AND TRAVELLING WAVE PATTERN OF FLUX COUPLED NETWORK OF CHAYNEURON	Many complex systems, including biological and chemical reactions, can display a wide range of spatiotemporal patterns. For instance, the brain can exhibit a variety of complex patterns during cognitive processes depending on the intrinsic parameters, interactions, and its strength. To demonstrate the presence of different dynamical behaviors and their transition, we consider a Chay neuron model with the presence of electromagnetic interactions under three distinct network connectivity: Regular, small-world, and random interactions. We discover that increasing coupling intensity illustrates the dynamical transition from the desynchronization state to the asymmetric traveling wave patterns for regular network connectivity and desynchronization to synchronization for random and small-world network interactions. The emergence of synchronization and travelling wave patterns in a network of Chay's neurons is a complex phenomenon that arises from the interactions between individual neurons and the network architecture. Chay's neurons are a type of model neuron that exhibits a rich variety of dynamical behaviors, including spiking and bursting. When these neurons are connected in a network, their interactions can give rise to synchronous firing and travelling wave patterns. Synchronization occurs when groups of neurons fire together in a coordinated manner.
22	ENCODER AWARE- MOTION COMPENSATION SPATIO TEMPORAL FILTERING	The encoder-aware motion-compensated temporal pre-processing filter (EA-MCTF) is a sophisticated tool designed to optimize video encoding processes. By analyzing block-level encoding parameters such as QP, motion characteristics, and slice types, it dynamically adjusts filtering strategies to the content's spatio-temporal properties. This adaptive approach significantly enhances encoding efficiency, leading to an impressive -12.4% average VMAF BD-rate savings compared to unfiltered encodings when applied to a HEVC encoder. Particularly

		beneficial for noisy source pictures, motion-compensated spatio-temporal filtering (MCSTF) leverages previously generated motion vectors across different resolutions to identify optimal temporal correspondences for low-pass filtering. Implemented on I- and P-frames, this technique effectively reduces noise artefacts while preserving image quality. Through these innovations, video encoding processes achieve higher fidelity and compression efficiency, contributing to enhanced viewing experiences across various platforms and devices.
23	ENCODER-AWARE MOTION COMPENSATED SPATIO-TEMPORALFILTERING	We present an encoder-aware motion compensated temporal pre-processing filter (EA-MCTF) that adapts the filter on a block basis based upon the spatio-temporal content properties and block-level encoding parameters. Some sample parameters include block-level QP, variance and mean-squared error of motion compensated block difference, slice types of adjoining frames, and frequency of a block being used as a reference. Applying the EA-MCTF to a HEVC encoder yields -12.4% average VMAF BD-rate savings over unfiltered encodings. Motion compensated spatio-temporal filtering (MCSTF) is especially useful for source pictures that contain a high level of noise. It uses previously generated motion vectors across different resolutions of the video content to find the best temporal correspondence for low-pass filtering. Temporal filtering is applied to the I- and P-frames.
24	VIRTUAL MOUSE USING HAND GESTURE	The mouse is an indispensable input device that is used in the computer system. The concept of system control using hand gesture recognition. The major advantage of this concept is it reduces the direct interaction between the human and the device. The purpose of this proposed system is to help humans to control the system without directly getting interacted with the device. We first detect the user hand and its moments using ML models such as Palm Detection Model and Hand Landmark Model where the Palm Detection Model first detects the hand palm and then by using Hand Landmark Model it will detect all the hand landmark points. After detection of the hand, finding the distance between the two fingers is done by using Euclidean formula and which helps us to recognize the Hand gestures. Based on the various Hand gestures, an event will be triggered which is basically like mouse move, mouse click. The primary motive behind the paper is to build a system that helps the people to feel more comfortable and interact with devices. The system will allow the user to navigate the computer cursor using without hand bearing color caps or tapes and left click and dragging will be performed using different hand gestures. The proposed system uses nothing more than a low resolution webcam that acts as a sensor and it is able to track the users hand bearing color caps in two dimensions. The system will be implemented using the python and

		OpenCV. Shape and position information about the gesture will be gathered using detection of hand gesture.
25	Dimensional Impressions: A 3D Portfolio Journey with React Three Fiber	This abstract presents a comprehensive overview of a website developed using React 3 Fiber (R3F), GLTF technology, Sketchfab, and Blender, amalgamating cutting-edge tools for immersive digital experiences. Leveraging R3F's capabilities alongside GLTF, Sketchfab, and Blender, this project pioneers the integration of high-fidelity 3D models into web environments. Through meticulous design and development, the website offers visitors an unparalleled journey through dynamic and interactive content, highlighting the fusion of creativity and technology. By incorporating GLTF-rendered assets and animations, the website elevates user engagement, setting a new standard for online presentation. The utilization of Sketchfab and Blender enhances the creation and optimization of 3D models, ensuring seamless integration with R3F for a cohesive user experience. This abstract provides insights into the project's conception, development process, and deployment strategies, highlighting the innovative techniques and tools employed. By harnessing the collective power of R3F, GLTF, Sketchfab, and Blender, this website signifies a paradigm shift in web design, offering a glimpse into the future of immersive digital environments.
26	HYDROPHOBICITY OF ALUMINIUM ALLOY 6061 METAL WITH AL2O3 & TIO2 COATING	This experimentation aims to create hydrophobic surfaces on aluminum 6061 samples by applying Al2O3 and TiO2 oxide coatings Utilizing various machining operations such as milling, grinding, and CNC milling, we systematically manipulate surface roughness profiles. Subsequent to coating the samples using a dip coating method, we quantify hydrophobicity through contact angle measurements. Our findings unequivocally demonstrate the superior hydrophobic properties of Al2O3 coatings over TiO2 coatings across different machining operations. Specifically, Al2O3-coated samples exhibit contact angles as high as 99.670 on milling operations with a surface roughness of 1.5775µm, while TiO2-coated samples achieve a maximum contact angle of 83.750 on milling with a surface roughness of 1.7675 µm. These results underscore the efficacy of Al2O3 coatings in augmenting the hydrophobicity of aluminum surfaces, offering promising avenues for application in diverse industries. The investigation into creating hydrophobic surfaces on aluminium 6061 samples offers potential applications in aerospace, marine engineering, automotive, electronics, medical devices, building materials, renewable energy, food and beverage, sporting goods, and textiles.
27	FABRICATION OF FUNCTIONLY GRADED TRIPLY PERIODIC	Bio-composites for sustainable environment is one of the emerging domains of research, which provides improvised mechanical and transformed chemical properties. Several composites were

	MINIMAL SURFACE STRUCTURE VIA ADDITIVE MANUFACTURING FOR ENGINEERING APPLICATION	available in-terms of better mechanical properties but very few literatures were available on developing composites with both sustainability and improvised mechanical properties. Mechanical properties of egg-shell reinforced PLA material were evaluated through experiments such as tensile, compression, flexural, and hardness. Specimens to be tested were fabricated using five filaments such as0 wt%, 5 wt%, 10 wt%, 15 wt%, and 20 wt% egg-shell composites. Experimental results shows that 15 wt% composite proves to be the best among other composites. Triply periodic minimal surfaces (TPMS) are those structures which posses significant properties such as great energy absorption, lighter in weight, minimalistic material usage. A significant study wasn't carried out on most of the TPMS structures. This study deals with the compressive property evaluation of rare explained TPMS structures such as lidinoid, double gyroid, Schwarz primitive, and split-P. Six other functionally graded TPMS structures were designed by integrating each TPMS structure. Compressive property of those structures were evaluated and the best structure was found by calculating strength-to-weight ratio of each structure.
28	MECHANICAL PROPERTIES OF EPOXY BASED HYBRID COMPOSITES REINFORCED WITH FILLER ELEMENTS	Hard turning is an useful alternative method to the conventionally available fine finishing processes.The hard turning is performed in dry condition enables from the problem of disposal of cutting fluids, with an advantage of no health hazards to workers and free from environmental air and water pollution's. But the usual hard turning techniques which performed in dry conditions lead to reduced tool life because of enormous heat generations and severe mechanical loads at cutting zone and thus in turn affect some of the vital machinability aspects: surface finish of machined components, performance of cutting tools, cutting power consumption of machine tools, chip formations and other associated benefits. Hence in this research work, an attempt was made to diminish the above said difficulties through employing the eco-friendly air cooling technique in hard turning process i.e. machining with following any one cutting environment: dry condition, compressed air and chilled air. The hardened work material AISI H13 tool steels, extremely tough matrix high speed tool steel had taken and turned on rigid CNC turning center with the aid of coated ceramic cutting inserts with wiper and without wiper geometry profile. The vital process control parameters like cutting speed, feed rate, depth of cut,tool geometry, work-piece hardness, cutting environment were considered in order to study their influence on various machinability aspects: surface roughness, cutting power, power consumption, cutting force, material removal rate, tool-chip interface temperature, tool wear and chip forms during the hard turning process.

29	TESTINGANDSTUDYOFMECHANICALPROPERTIESOFSILICON WITH GRAPHENE NANOCOMPOSITES	This research investigates the fabrication of silicon-graphene composites through the stir casting technique, integrating grapheme nanopowder into the silicone matrix. The primary objective is to enhance the mechanical characteristics of silicone, including tensile strength,compression resistance, hardness, and wear resistance, leveraging the large specific surface area per volume of graphene nanopowder. Mechanical evaluations encompassing tensile, compression, and hardness tests, along with wear testing, were conducted on the developed composites with varied graphene nanopowder compositions. Additionally, Raman spectroscopy and FTIR, were employed to analyse the structural and chemical properties of the composites. The outcomes reveal notable enhancements in microhardness, tensile strength, fracture toughness, and reduced wear rate in the silicone-graphene composites compared to pure silicone. These findings underscore the efficacy of incorporating graphene nanopowder into the silicone matrix to augment its mechanical attributes, suggesting promising applications across diverse engineering and industrial sectors.
30	DESIGN AND ANALYSIS OF LINEAR BEARING	This research investigates the design and stress analysis of a point contact linear bearing under varying interference conditions. The design involved creating a unique profile for the ball race, modeled using CATIA V5 software, and simulating it in Abaqus software under static and dynamic conditions. The findings show a correlation between increased interference,stress values, and reaction forces. Additional tests validated strength of the profile shape. The study also examined backlash, measuring its effects on efficiency and precision, and conducted torsional and rigidity tests to understand mechanical characteristics. Insights from this research, enhance understanding the point contact of linear bearing, suggesting potential for improved performance and provide a basis for future work in bearing design and operation.
31	FINITE ELEMENT SIMULATION OF LAMINATED COMPOSITE PLATES REINFORCED WITH EPOXY RESIN BY FIBER ORIENTATION METHOD	This study presents a comprehensive finite element analysis (FEA) of composite materials composed of banana fiber, carbon fiber, and silicon carbide, reinforced with epoxy resin, utilizing the Ansys software platform. The motivation behind this investigation stems from the growing interest in sustainable and high-performance materials for various engineering applications. The mechanical properties of the constituents, including the fibers and epoxy resin, are first characterized experimentally to provide accurate input parameters for the FEA model. Subsequently, a finite element model is developed to simulate the behavior of the composite material under different loading conditions, considering factors such as tensile, compressive, and bending stresses. The FEA enables the assessment of the structural integrity, deformation characteristics, and failure mechanisms of the composite material. Additionally, the influence of varying fiber compositions and orientations on the mechanical properties of the composite is

		investigated through parametric studies. The findings of this research contribute to a deeper understanding of the mechanical behavior of banana fiber, carbon fiber, and silicon carbide composites reinforced with epoxy resin. The insights gained from the FEA simulations can guide the design and optimization of composite structures for applications in aerospace, automotive, and other industries, where lightweight, high-strength, and eco-friendly materials are in the demand.
32	ANALYSING THE MECHANICAL PROPERTIES OF THE EPOXY COMPOSITE USING GRAPHENE NANOFILLER	This research investigates the synergistic capabilities achieved by the intricate process of amalgamating polyester resin, hemp fibers, and 2D graphene to develop an innovative composite material with enhanced properties. By strategically combining these components, we aim to achieve a delicate balance of mechanical strength, lightweight characteristics, electrical conductivity, and environmental sustainability. Hemp fibers, renowned for their natural robustness and lightweight nature, are seamlessly integrated into the composite structure, serving as a reinforcing phase. Meanwhile, the incorporation of 2D graphene structures as nano fillers imparts remarkable mechanical properties and bestows electrical conductivity upon the material. Simultaneously, the infusion of 2D graphene structures as nano fillers injects the composite with exceptional mechanical properties while conferring electrical conductivity, thus broadening its scope of potential applications. Acting as the matrix, polyester resin lends the necessary flexibility and resilience to the material, enhancing its overall performance and durability. The resulting composite material exhibits promising characteristics suitable for a diverse range of applications, spanning from automotive components to construction materials. Its unique blend of strength, flexibility, and electrical conductivity renders it highly desirable for industries where such multifaceted attributes are paramount. This study meticulously delves into the optimization of component ratios and manufacturing processes, aiming to unlock the full potential of this composite material. Ongoing research efforts are deemed crucial for a comprehensive understanding and refinement of its properties, ensuring its efficacy across various industrial sectors. Moreover, the adoption of natural fiber-reinforced composites holds significant promise in mitigating component costs and reducing material wastage, particularly in automotive applications. By embracing sustainable materials and innovative manufacturing techniques, we pave the way towards a greener, more eco-conscious future while simultaneously meeting the evolving demands of modern industry.

33	Investigation on Mechanical and Microstructural Properties of Friction Stir Welded Magnesium AZ31B Alloy"	Friction stir welding (FSW) is a solid-state joining process that uses frictional heat and pressure to bond materials together without melting them.In FSW, a rotating tool with a specially designed profile is plunged into the joint area between two pieces of material to be joined. As the tool traverses along the joint line, it generates frictional heat, softening the material and creating a plasticized zone. The tool also applies pressure, forcing the softened material to consolidate and form a solid-state bond. In this experimental investigation, friction stir welded (FSW) Mg AZ31B alloy is being studied. Friction stir welding (FSW) is conducted at varying rotational speeds, including 900 rpm, 1000 rpm, and 1100 rpm, with corresponding feed rates set at 20 mm/min, 30 mm/min, and 40 mm/min, respectively. In this investigation, the influence of both tool material and rotational speed on the microstructure and mechanical characteristics of the joint are explored. Notably, employing an HSS tool material at a rotational speed of 1100 rpm resulted in superior mechanical properties compared to those achieved at 900 rpm and 1000 rpm. The optimal process parameters are chosen to achieve a refined grain structure in the welded plate, thereby enhancing its microstructure and improving the mechanical and physical properties of the weld through friction stir welding.
34	INTERPRETATION OF MACHINING ASPECTS OF ZINCOXIDE DOPED VEGETABLE BASED NANO FLUIDS WITH GREY RELATION ANALYSIS	The process of turning is influenced by many factors such as cutting velocity, feed rate, depth of cut, geometry of cutting tool conditions etc. In this work, an attempt has been made to analyze the influence of cutting speed, feed rate and depth of cut on machinability characteristics such as surface roughness, material removal rate and flank wear using grey- relation analysis during turning of AISI steel hardened to 46±2 HRC using tungsten carbide tool. Wear developed at the flank face of the cutting tool insert reduces the life of the cutting tool and surface roughness at the machined surface reduces the quality of the component, the improvement in material removal rate which makes this study essential. The measured results were then collected and analyzed with the help of the Taguchi grey relation. The experiments were conducted using Taguchi experimental design technique.The effect of cutting parameters on surface roughness, flank wear and material removal rate was evaluated and the optimum cutting condition for minimizing the roughness value and wear rate with increase in the Material removal rate was also determined.
35	TRIBOLOGICAL AND STRUCTURAL PROPERTIES OF HVOF SPRAYED SUBSTRATE COATINGS	Austenitic stainless steel (SS) are widely used in many fields such as metallurgical, chemical, food, nuclear and biomedical industries due to its potential properties. In recent researches in the field of surface engineering is to improve the properties (corrosion resistance and wear resistance) of 304L SS for high performance and long time durability. Most recently, diamond like carbon (DLC) covered HVOF coatings are frequently considered as hard coatings due to their attractive

		tribo-mechanical properties. In the present work, DLC covered HVOF coatings will be deposited on 304L SS substrates using ratio frequency (RF) magnetron sputtering technique through High velocity oxygen fuel (HVOF). To optimize the tribo-mechanical properties of the nc-DLC covered HVOF coatings, the substrate temperature(Ts) will be varied as RT,100Ċ,200Ċ,300Ċ and 400Ċ .The microstructure and morphology of the nc-DLC covered HVOF coatings can be characterized by X Ray diffraction(XRD),atomic force microscope(AFM) and field emission Scanning Electron Microscope(FE-SEM).The nano-mechanical properties of the nc-DLC covered HVOF coatings will be measured by nano-indentation testing method.
36	A STUDY ON ELECTRICAL DISCHARGE MACHINING OF HYBRID POLYMER COMPOSITE	This study is an experimental investigation on the development of carbon Kevlar epoxy composite (CKEC) and its subsequent machining using micro-electrical discharge machining (μEDM). The mechanical performance of the laminated composites was studied in terms of tensile strength (TS) and elongation at break (EAB). Furthermore, through micro- holes were fabricated on CKEC using μEDM technique. Due to the inherent nature of poor electrical conductivity, it is a challenging task to perform machining on CKEC. However, through proper optimization of various machining parameters such as, voltage, pulse on time, and tool speed, the micro-machining of the CKEC using μ EDM was made feasible. The highest TS of 564 MPa was shown by CKEC containing 2 layers of Kevlar fabrics. The machining performance of CKEC was compared with that of carbon fiber reinforced polymer (CFRP). It was revealed that for fabricating one through-micro-hole on the CFRP laminate of approximately 1500 μm thickness, the machining time (MT) was 700 s. The corresponding value of MT for CKEC was 785 s depicting an increase of 12.14%. The quality of the hole in terms of circularity and overcut was better at the exit. The material removal during μEDM of CKEC was assisted by the deposited pyrolytic carbon and the rotating tool. The morphological study revealed that surface damages are inevitable during μ EDM of CKEC and these damages are more around the entry of the hole due to the side surface sparking of the tool electrode. The results of the study will be beneficial to researchers and manufacturers working on the development of micro-features on polymer composites for intended applications in aerospace, automotive, and sports goods industries.
37	Manufacture and Characterization of Nano Filler Strengthened Dissimilar AISI 1010 Steel-Copper Friction Stir Welded	Alloys of Copper have the immense capability for usage in a variety of industrial sectors including marine systems, construction,transportation, for encapsulating materialwastages especially nuclear wastes etc and this usage is possible mainly because of their superior thermal and electrical conductivities, a unique combination of ductility and strength, exemplary resistance to corrosion etc. In the contemporary scenario, the need for Copper (Cu) and its alloys are inevitable

		in various industrial sectors including automotive, marine, electronics etc. For instance, in automotive industries, relative weight is a decisive precedent in deciding the suitable metalfor truck and car radiators. Even though aluminium has been widely employed owing to itslow density feature, its inferiority in resistance to corrosion, repairability and thermal conductivity demands for an alternate, appropriate metal and alloys of Cu (especially CDA101 alloy), an environmentally congruent metal is preferred for this application, due to their low chemical reactivity, extreme level of resistance towards corrosion, highest degree of recyclability etc., thereby improving the energy efficiency of Cu based radiator cores to several times when compared with that of the Al based radiator cores. In addition to this, alloys of Cu are also widely employed in marine sector applications ranging from desalination and power plants to offshore gas and oil platforms, in manufacture of electrical components, complex architectural structures including plumbing, roofing, heat exchangers, etc.
38	Examination on the Impact of Framework on Ultra Structure Transitions and Strength During Joining of CDA101 Plates Using Friction Stir Welding	Alloys of Copper have the immense capability for usage in a variety of industrial sectors including marine systems, construction, transportation, for encapsulating material wastages especially nuclear wastes etc and this usage is possible mainly because of their superior thermal and electrical conductivities, a unique combination of ductility and strength, exemplary resistance to corrosion etc. In the contemporary scenario, the need for Copper (Cu) and its alloys are inevitable in various industrial sectors including automotive, marine, electronics etc. For instance, in automotive industries, relative weight is a decisive precedent in deciding the suitable metal for truck and car radiators. Even though aluminium has been widely employed owing to its low density feature, its inferiority in resistance to corrosion, repair ability and thermal conductivity demands for an alternate, appropriate metal and alloys of Cu (especially CDA 101 alloy), an environmentally congruent metal is preferred for this application, due to their low chemical reactivity, extreme level of resistance towards corrosion, highest degree of recycle ability etc., thereby improving the energy efficiency of Cu based radiator cores to several times when compared with that of the Al based radiator cores. In addition to this, alloys of Cu are also widely employed in marine sector applications ranging from desalination and power plants to offshore gas and oil platforms, in manufacture of electrical components, complex architectural structures including plumbing, roofing, heat ex changers, etc.
39	INVESTIGATION ON MECHANICAL BEHAVIOUR OF TUNGSTEN CARBIDE / REDMUD	The research article focuses on the development of Al6061 sustainable composites with the utilization of biomass waste through the use of stir casting process. Recycling industrial waste is essential for reducing environmental impact. Thus, the remud waste came from the aluminium

	HYBRID POWDERS REINFORCED WITH ALUMINIUM ALLOY METAL MATRIX COMPOSITES	production process, which was considered for producing the sustainable metal matrix composites (MMCs). Also, Tungsten carbide (WC) nanoparticles have been used to develop hybrid aluminum composite materials. The concentrations of redmud and tungsten carbide were by 2%, 4%, and 6%, and were used to achieve the desired strength performance of aluminium MMCs. Mechanical characterizations of aluminum hybrid sustainable composites were also investigated, including tensile, compression, and microharness testing. The results show that increasing reinforcement by up to 4% increases the mechanical strength of aluminum MMCs. The tensile, compression, and microhardness of MMCs are increased by 62.2%, 70.1% and 148%, respectively, as compared to AA6061 alloy. The surface morphology of metal matrix composites was analyzed by utilizing Fourier infrared scanning electron microscopy (FESEM).
40	ANALYSING THE PROPERTIES AND BEHAVIOUR OF ALUMINIUM 4043 METAL IN CMT ON DED	This final year project focuses on the comprehensive analysis and observation of the mechanical and welding properties of aluminum metal using the Directed Energy Deposition (DED) process, specifically incorporating the Cold Metal Transfer (CMT) technology. Aluminum, known for its lightweight yet durable characteristics, plays a pivotal role in various engineering applications, especially in industries such as aerospace and automotive. The project's primary objective is to evaluate the mechanical properties of aluminum after undergoing the DED process with CMT welding. Through a meticulously designed experimental setup, the project aims to investigate factors such as tensile strength, hardness, and microstructure changes resulting from the welding process. Furthermore, the welding quality and integrity of the aluminum joints produced using CMT in DED will be thoroughly examined and analyzed. To achieve these objectives, the project employs advanced testing methodologies and equipment, including tensile testing machines, hardness testers, microscopy techniques, and welding inspection tools. The experimental process involves selecting appropriate aluminum alloys, optimizing welding parameters, and conducting systematic testing procedures to gather accurate data. The significance of this project lies in its potential contributions to enhancing the understanding and utilization of CMT technology in the DED process for aluminum welding. By analyzing the mechanical properties and welding quality, valuable insights can be gained.
41	DESIGN AND DEVELOPMENT OF COST OPERATIVE ELECTRONIC IGNITION DRIVER CIRCUIT FOR GDI ENGINE	In recent developing automotive vehicles, electronically controlled ignition timing control is one of the major control parameters towards superior combustion process and emission control strategy. The cost of the entire ignition driver circuit is higher and it’s merged with the fuel injection driver circuit along with the microcontroller board. Need to be replacing the entire electronic control unit instead of replacing only the fault ignition driver component. To overcome

		this disadvantage, the cost operative electronically controlled ignition driver circuit was developed and tested. With the developed ignition driver, the ignition timing was controlled using Arduino Uno controller, Hall Effect sensor used as CAM/Crank position sensor, and L298N motor driver circuit used to trigger the time of ignition through coil on plug type ignition coil. Using these cost operative electronic components, the ignition timing was varied effectively at different crank angles using gasoline direct injection engine.
42	Manufacturing of Functionally Graded Pipe (SS347/Inconel 625) Through Wire Arc Additive Manufacturing for Nuclear Power Applications	A major advancement in additive manufacturing technology has been made with the creation of a Functionally Graded Material (FGM) pipe made of Inconel 625 and SS 347 using Wire Arc Additive Manufacturing (WAAM) based on Cold Metal Transfer (CMT). Through process variable optimisation, this work overcame the difficulties in obtaining inhomogeneous microstructures in FGMs and produced defect-free fabrication. When combined with coarsened grains, the presence of Niobium Carbide (NbC) and Laves phases at the interface produced improved strength qualities than traditional SS 347. The complex temperature history encountered during manufacturing was identified as the cause of microstructural differences, hence clarifying the significance of process factors. The results of the simulation correctly confirmed the results of the experiments, confirming the effectiveness of the selected fabrication method. The resultant pipe has characteristics that make it perfect for harsh uses in pipeline systems and pressure vessels in the nuclear, aerospace, and marine industries. This accomplishment signals the beginning of many breakthroughs in additive manufacturing technologies and their broad industrial adoption. It also highlights the promise of CMT-based WAAM in making high-performance, customised components with customisable material properties.
43	ADDITIVELY FABRICATEDS AND WICH STRUCTURE FOR FUNCTIONAL APPLICATION	This project explores the mechanical characteristics and microstructure of multilayer components fabricated via Cold Metal Transfer (CMT)-based wire arc additive manufacturing (WAAM). Comprising layers of mild steel, stainless steel 347 (SS347), and Inconel 625, these components are designed to leverage the distinct properties of each material. Through mechanical tests (Tensile, Bend and Hardness) alongside microstructural analysis using optical and scanning electron microscopy, the study assesses the performance and integrity of the fabricated sandwich structure. The results indicate enhanced mechanical properties and well-bonded interfaces between layers, indicating the potential of CMT-based WAAM for producing functional components with tailored material properties. This research contributes to advancing the understanding of additive manufacturing techniques, particularly in the context of multilayer component fabrication. The findings highlight the feasibility of employing CMT-based WAAM

		in diverse industrial sectors requiring components with enhanced mechanical performance and specific material characteristics.
44	APPROACH AND EFFECT OF DIFFERENT CUTTING INSERT SON MACHINING EN24 STEEL FOR THE GENERATED SURFACE PROFILE AND WEAR DEBRIS	Hard turning is an useful alternative method to the conventionally available fine finishing processes. The hard turning is performed in dry condition enables from the problem of disposal of cutting fluids, with an advantage of no health hazards to workers and free from environmental air and water pollution's. But the usual hard turning techniques which performed in dry conditions lead to reduced tool life because of enormous heat generations and severe mechanical loads at cutting zone and thus in turn affect some of the vital machinability aspects: surface finish of machined components, performance of cutting tools, cutting power consumption of machine tools, chip formations and other associated benefits. Hence in this research work, an attempt was made to diminish the above said difficulties through employing the eco-friendly air cooling technique in hard turning process i.e. machining with following any one cutting environment: dry condition, compressed air and chilled air. The hardened work material AISI H13 tool steels, extremely tough matrix high speed tool steel had taken and turned on rigid CNC turning center with the aid of coated ceramic cutting inserts with wiper and without wiper geometry profile. The vital process control parameters like cutting speed, feed rate, depth of cut, tool geometry, work-piece hardness, cutting environment were considered in order to study their influence on various machinability aspects: surface roughness, cutting power, power consumption, cutting force, material removal rate, tool-chip interface temperature, tool wear and chip forms during the hard turning process.
45	DEVELOPMENT OF PARALLEL MANIPULATOR MECHANISM WITH SHAPE MEMORY ALLOY: KINEMATIC APPROACH & EXPERIMENTAL	This study presents the design, kinematic analysis, and experimental validation of a novel parallel manipulator mechanism incorporating shape memory alloy (SMA) actuators. The utilization of SMAs offers unique advantages, such as high-power density and lightweight characteristics, enhancing the overall performance of the manipulator. The kinematic approach involves a comprehensive analysis of the mechanism’s geometric configuration, examining the relationships between joint variables and end- effector pose. To validate the theoretical findings, a physical prototype of the parallel manipulator is constructed, integrating SMA actuators. Experimental tests are conducted to assess the real- world performance, including precision, speed, and energy efficiency. The results obtained from the experiments are compared with the theoretical predictions, confirming the effectiveness of the proposed kinematic approach and highlighting the practical viability of the SMA-based parallel manipulator. This research contributes to the

		advancement of parallel manipulator mechanisms by integrating innovative materials, specifically SMA.
46	ENHANCEMENT OF HPDC SPRAY BUNDEL USING DIGITALT WIN CONCEPT	In this project begins by elucidating the foundational concepts of digital twin technology and its evolution in industrial settings, emphasizing its role as a virtual replica of physical assets. Furthermore, it delves into the critical functionalities and enhancement of High Pressure Die Casting spray nozzles in industrial operations, elucidating their pivotal role in processes ranging from manufacturing to precision components. The findings underscore the transformative potential of this integration in enhancing operational efficiency, minimizing downtime, and fostering sustainable practices across industries. The integration of digital twin technology with spray nozzle systems presents a revolutionary approach to optimize industrial processes. In high pressure die casting machines the conventional spray coat bundles used for the process is replaced by single spray bundle that can be controlled in vice versa in both alignments are performed using the digital twin. Elucidate how digital twins enable precise simulations, predictive analytics, and proactive adjustments in spray nozzle behavior, ultimately leading to improved productivity, resource utilization, and cost-effectiveness. Additionally, challenges pertaining to data integration, security, and computational complexities are addressed, offering insights into mitigating these obstacles for seamless adoption and implementation.
47	ENHANCING MECHANICAL PROPERTIES OF SILICONE MATRIX REINFORCED WITH GRAPHENE	The project delves into enhancing the mechanical properties of silicone, a highly versatile material in material science. Despite its widespread use owing to its flexibility, biocompatibility, and thermal stability, silicone often lacks the necessary mechanical strength and stiffness for demanding applications. To address this, the study aims to augment the mechanical properties of silicone by integrating reinforcements such as graphene, ceramics, or polymers. Of these options, graphene is chosen due to its two-dimensional structure and expansive surface area, promising superior enhancements. Utilizing a relatively straightforward and cost-effective method, mechanical mixing (specifically, stir casting) is employed to disperse graphene within the silicone matrix. Three weight proportions of graphene (0.4wt%, 0.45wt%, and 0.5wt%) are tested to assess their impact on the mechanical properties. Various mechanical tests, including tensile strength, compression resistance, hardness, and wear resistance, are conducted post-mixing to evaluate the composite material's performance. The results demonstrate significant improvements across these mechanical properties compared to pristine silicone. Complementary techniques such as Raman spectroscopy and Fourier Transform Infrared Spectroscopy (FTIR) are employed to analyze structural changes, chemical interactions, and functional groups within the composite matrix,

		providing detailed insights into its composition and properties. These findings underscore the efficacy of incorporating Graphene nano powder into the silicone matrix for enhancing its mechanical attributes, thus suggesting potential applications across diverse engineering and industrial domains.
48	Fabrication and Electrical Discharge Machining Studies on Aluminium-Boron Carbide-Graphite Hybrid Metal Matrix Composites	This project aims to fabricate the Al-B4C-Graphite Hybrid Metal Matrix Composites- MMC (Al-B4C -Graphite) using a two-step stir casting method. Mechanical properties of Al- B4C-Graphite were evaluated and also EDM machining studies were carried out. It is observed that the hardness of the composites is strength, and impact strength. Machinability studies were carried out on fabricated composite by Electrical Discharge Machining (EDM) process. Also EDM process parameters optimization were carried out using Taguchi L9 orthogonal array with input parameter such as pulse on time, pulse off time and current density for the material removal rate (MRR) and tool wear rate (TWR) as response parameters. It is observed that current density and pulse on time is the most influential parameters increased with increasing in B4C reinforcement. It had been found that increasing the graphite content within the aluminum matrix results in significant increase in the ductility, ultimate tensile strength, yield for the MRR.
49	EXPERIMENTATION AND ANALYZING AL7075 COMPOSITES THROUGH ABRASIVE WATER JET MACHINING	Aluminium alloy composite materials are widely sought-after for highly scientific applications worldwide because of their low weight, high strength, and improved tribological qualities. Using the sand mold method in an electric resistance furnace, Al7075 hybrid composite was produced. The mechanical properties of Al7075, B4C, and C hybrid composites with a B4C weight percentage of 6% and stable C contents of 6% were investigated in this work. Microstructure analysis, hardness, and tensile and compressive strength were among the mechanical properties evaluated in both pure and cast specimens. The ASTM standard was used in this study's experimental investigation and validation of the hybrid composites' mechanical properties constructed of Al7075 alloy. Results indicated that mechanical properties including compressive strength and hardness were enhanced while tensile strength was decreased when hard ceramic particles (B4C/C) were introduced to a matrix alloy (Al7075).
50	EXPERIMENTAL CHARACTERIZATION OF METALLURGICAL AND MECHANICAL FEATURES IN ALUMINIUM COMPOSITES FOR AUTOMOBILE APPLICATIONS	Al-MMCs are renowned for their lightweight, low density, and superior high- temperature mechanical properties, making them a popular choice in diverse fields such as aerospace, structural engineering, oceanic, and automobile applications. The fabrication of these Al-MMCs was meticulously carried out through the stir casting process. The study conducted a thorough analysis of the tensile strength, impact strength, and hardness of the composites. The results revealed a notable improvement in the mechanical properties of the boron carbide and graphene-

		reinforced Al-MMC when compared to pure aluminum. A significant observation was that the addition of these reinforcements greatly enhanced the wear resistance of the Al-MMC. The results strongly suggest that the incorporation of boron carbide and graphene in the matrix alloy can significantly boost the compressive and tensile strength, as well as the wear resistance, of the aluminium hybrid composite. This research is a significant contribution to the ongoing development and optimization of materials for constructional alloys. It provides valuable insights that could pave the way for the creation of more efficient and durable materials in the future. The findings of this study have the potential to drive innovation in the manufacturing of high-performance composites for various applications.
51	DESIGN AND DEVELOPMENT OF ENGINE MOUNT ASSEMBLY TOOL WORK STATION	This Report presents a case study focusing on the product development process within an engine mounts manufacturing company. Notably, the company adopted a distinctive strategy where the design and mounts production were distinct from the design and production of the mounts. Employing a participatory ergonomics approach, a collaborative effort involving designers, production engineers from various plants, and ergonomics researchers. Multiple methods were employed to enhance the product design of the new mounts, emphasizing both productivity and ergonomics in the assembly process. The comprehensive approach included analyses of ongoing mounts production, simulations conducted by experienced workers using prototypes, and computer Rula analysis. The outcomes of this participatory ergonomics approach led to redesigns, significantly improving both the efficiency and ergonomics of assembly operations. The study concludes that this distinctive participatory ergonomics approach, denoted as Participatory Ergonomics Design (PED), alongside other methodologies, holds the potential to enhance communication and collaboration. This article delivers the ergonomic assessment of manpower by victimization methods acknowledged as RULA (Rapid Upper Body Assessment) and REBA (Rapid Entire Body Assessment).
52	EXPERIMENTAL AND NUMERICAL INVESTIGATION OF COMPRESSION BEHAVIOR OF ADDITIVE MANUFACTURED LATTICE STRUCTURES	The crystal lattice structure exhibits excellent properties of energy absorption with great stability and low mass than solid material. It can be fabricated into different structures as per the need of the hour and it makes attractive for a vast field of application like aerospace, defence, and automobile industries. It is utilized in various fields due to their high specific strength, modulus, and energy absorption. Additive manufacturing (AM) is an added advantage to the lattice structure because complicated structures can be easily fabricated which gives an ease to the design constraint. AM is far superior to conventional manufacturing process due to its wide ability, material saving, and design flexibility for fabrication. The main objective of this study is to

		discuss the compression behavior of six different schematic designs of lattice structures produced using Acrylonitrile Butadiene Styrene (ABS) in Fused Deposition Modeling (FDM). The specimens of dimension 50x50x50 mm3 are designed as a cubic system. All specimens are subjected to compression and its behavior is observed. The force displacement curves of all the lattice structures are plotted and results are interpreted by using finite element analysis methodologies and concluded by comparing with experimentation values. This study discusses design methods, compression behavior and performance of lattice structures.
53	STUDY OF MACHINABILITY ANALYSIS AND MICRO STRUCTURE CHARACTERISTICS ON IN CONEL 625 USING WIRE EDM	In modern machining process the non-traditional machining process is a milestone of machining in manufacturing industries. The non-traditional machining process like Electro discharge machining (EDM) and wire electric discharge machining (WEDM) plays a vital role in precision manufacturing industries like automobile, aerospace and sheet metal industries. The present research work is to study the effects of various process parameters of WEDM such as wire feed, wire speed, pulse time on and pulse time off on Material Removal Rate (MRR) and Surface Roughness (Ra) and to obtain the optimal sets of process parameters. This work presents a logical and systematic procedure using Grey relational analysis (GRA), Response surface methodology (RSM) and MINITAB 16 SOFTWARE are used to optimize the operating parameters of WEDM for Aluminium silicon carbide composite(Al/SiCp) and Magnesium silicon carbide composite (Mg/SiCp). The experiments are conducted in SPRINT CUT 734 DI WATER WEDM for through hole drilling on Al/SiCp & Mg/SiCp materials. The tool material was Molybdenum wire. The observations of the machining process are based on L9 orthogonal array for optimizing the process parameters for these composite. The two responses are converted into Grey relational grade (GRG) using Grey relational analysis (GRA). Validity and creativeness of the developed mathematical models have also been tested.
54	ENHANCEMENT OF WELD QUALITY FOR DISSIMILAR METAL TIG WELDING OF INCONEL 600 AND SS 304	The welding of dissimilar materials, such as Inconel 600 and SS 304, presents challenges due to their distinct metallurgical properties and compatibility issues. This study focuses on optimizing weld parameters for Tungsten Inert Gas (TIG) welding of these alloys to achieve robust and reliable joints. Inconel 600 is known for its high temperature resistance and corrosion properties, while SS 304 offers excellent mechanical strength and weldability. However, welding these alloys together demands precise control over welding parameters to ensure the integrity of the joint. The research methodology involves systematic experimentation and material testing methods such as scanning electron microscopy (SEM), tensile testing, and radiographic inspection to investigate the effects of key welding parameters, including welding current, voltage, travel speed, and

		shielding gas flow rate, on the quality and performance of the welds. By varying these parameters within specified ranges and employing statistical optimization techniques, the optimal combination of parameters is determined to enhance weld quality and mechanical properties. The findings of this study contribute to advancing the understanding of TIG welding of dissimilar alloys, particularly Inconel 600 and SS 304, and offer practical guidance for optimizing weld parameters in industrial applications.
55	ENHANCEMENT OF WELD QUALITY FOR SIMILAR METAL TIG WELDING OF HASTELLOY C276	HASTELLOY C276 is a Nickel-chromium-molybdenum wrought alloy that is considered the most versatile corrosion resistant alloy available. This alloy is resistant to the formation of grain boundary precipitates in the weld heat-affected zone, thus making it suitable for most chemical process applications in an as welded condition. Alloy C-276 also has excellent resistance to pitting, stress- corrosion cracking and oxidizing atmospheres up to 1900°F. Alloy C-276 has exceptional resistance to a wide variety of chemical environments. TIG Welding is a welding technology used to join several metal components. Tungsten inert gas produces a arc of high-intensity that is concentrated into one spot. This concentrated heat source enables fine, deep welding and high welding speeds. This experiment reports on a study of mechanical and microstructure properties of alloy C276 usingTIG welding. The scope includes conducting tests related to determine the mechanical properties of the alloy, determining the tensile and hardness strength and presenting the microstructure of metal. Alloys C276 have been given a lot of attention mainly for their innovative use in practical medical applications. These motives led to understand deformation mechanisms, particularly tensile fracture behaviors. In this research, tensile properties will be investigated for similar composition Alloy C276 samples.
56	ENHANCED PROPERTIES OF ALUMINIUM COMPOSITES VIA POWDER METAL LURGYIN CORPORATING TiB2 AND GRAPHENE	This research investigates the thermal conductivity and mechanical properties of a novel composite material comprising aluminium reinforced with titanium diboride (TiB2) and graphene nanoparticles. The primary objective is to optimize these characteristics for superior heat dissipation performance and mechanical strength. The fabrication process involves meticulous control, employing advanced manufacturing techniques, followed by stringent characterization utilizing established experimental methods. Various concentrations of graphene nanoplates (GNPs) were explored to assess interface bonding in aluminium alloy composites. Using ball milling and pressure-less vacuum sintering, graphene-reinforced hybrid nanocomposite samples were produced. Experimental results demonstrate substantial improvements in both thermal conductivity and mechanical strength due to deliberate incorporation of TiB2 and graphene nanoparticles. These findings provide invaluable insights and hold promising applications across

		diverse industries requiring robust thermal management and superior mechanical performance, contributing significantly to the field of composite material engineering.
57	FABRICATION OF ALUMINIUM AND GRAPHENE COMPONENT WITH DIFFERENT COMPOSITION AND STUDYING THEIR METALLURGICAL PROPERTIES	The Report investigates the fabrication and metallurgical properties of aluminium- graphene composites with varying graphene compositions. The research aims to understand how different graphene content affects the microstructure and mechanical behavior of the composite material. Aluminium and graphene powder will be utilized, employing fabrication techniques like powder metallurgy or rolling processes. Fabricated composites will undergo characterization to assess their microstructure, including distribution of graphene platelets within the aluminium matrix. Subsequently, the mechanical properties, such as tensile strength, hardness, and wear resistance, will be evaluated. The correlation between the composition and the observed properties will be established. All samples are subjected to SEM microscopic examination and experimental wear behavior study. The experiment's goal is to measure the wear loss of different compositions of graphene. The tribological experiment was carried out according to ASTM G 99-95 standards on pin-on-disc friction and wear testing machine with disc material: EN-31 steel. These Composites are an excellent material for a variety of applications, including aeronautical, automotive, electric, electrical, and mechanical qualities. This research is expected to contribute to the development of novel aluminium composites with enhanced functionalities by incorporating graphene's unique properties. The findings can guide future applications in various sectors demanding lightweight materials with superior strength and wear resistance.
58	DESIGN AND FABRICATION OF MIST COLLECTOR FOR CNC MACHINE	This project endeavors to address the occupational health and environmental concerns arising from the mist generated during the operation of CNC (Computer Numerical Control) machines. The pervasive issue of airborne contaminants, composed of fine particulate matter and oils, poses a threat to both the operators' well-being and the overall workshop environment. The objective of this undertaking is to design and fabricate an efficient mist collector system tailored for CNC machines, providing a cost-effective and sustainable solution. The proposed mist collector system is meticulously designed to capture and filter the mist generated during CNC machining processes. Comprehensive research into mist collection technologies, market- available systems, and CNC machine specifications informs the development of a system that balances effectiveness, durability, and economic viability. Key components of the mist collector include specially selected filters capable of capturing fine particles and oils, a high-performance fan or blower to ensure optimal airflow, and a robust housing designed to seamlessly integrate with the CNC machine.

		The ducting system is engineered for efficiency, ensuring the effective capture and filtration of mist particles.
59	STUDIES AND EVALUATION OF ABRASIVE WATER JET MACHINING TECHNIQUES OF ALUMINIUM ALLOY	Metal matrix composites are difficult to machine in traditional machining methods. Abrasive water jet machining is a state-of-the art technology which enables machining of practically all engineering materials. Abrasive water jetmachining is a very efficient machining process which overcomes tool wear issues and cutting temperature issues. This experimental investigates a particular study performed on hybrid metal matrix composites prepared by AA6082 and reinforced with 3% Wc, 1.5% Al 2 O 3 in aluminum alloy and processed with abrasive water jets that are formed with garnet 80 mesh size. All output responses majorly influence with traverse speed and roundness error only influenced with Water Pressure. Although developing the statistical models for predicting the machining characteristics and geometrical accuracy and the study carried out in this work would help to choose the parameters carefully.
60	MECHANICAL CHARACTERIZATION OF DISSIMILAR METALS AA1200-H14(AS) and AA1200-H14(RS) PLATES WELDED USING FRICTION STIR WELDING	AA1200 aluminium alloys possess some unique properties like light in weight and high strength to weight ratio. They are becoming the most popularly used medium strength aluminium alloy in aerospace, marine, automobile and structural industries. With increased use of aluminium alloys in industries, a reliable joining technique needs to be developed for the effective utilization of aluminium alloys. Friction Stir Welding (FSW) are the most extensive gas shielded arc welding processes used in joining of aluminium and its alloys due to their preferable flexibility and economy. But there are few problems like low welding speed, partial penetration and lack of the deposited metal occurred during this process. High solubility of hydrogen and other atmospheric gases in the molten state and formation of oxide layer are the major problems associated with this kind of joining process. Hence in this research, an attempt was made to increase the welding speed, to reduce the porosity and to maximize the mechanical properties of the FSW joints by the introduction the weld pool. In this investigation, Bead on plate welding is performed on AA1200 aluminium alloy plate at different combinations of input like tool rotational speed and welding speed. There are no input parameters like welding current (I), welding speed (S) and alternating frequencies of shielding gases (T). From the bead on plate welding experiments, the influence of alternating shielding gases on the bead profile characteristics like depth of penetration, area of penetration, width of weld, reinforcement height, wetting angle and percentage of dilution have been studied. FSW joints were fabricated using alternating current with the help of automated welding machines. The joints were evaluated by conducting tensile tests using universal testing machine and interface hardness were found using Vickers hardness testing equipment.

		Microscopic examinations and characterizations of the joints were done using Optical Microscopy (OM).
61	MECHANICAL BEHAVIOUR OF CERAMIC MATERIAL ADDED 3D PRINTED POLYMERIC COMPOSITE	The Fused Deposition Modelling (FDM) is one of the additive manufacturing techniques which is largely used for printing of metal / thermoplastic materials with ease of design flexibilities. Poly Lactic Acid (PLA) is to be used as polymer matrix and the ceramic particles were used as particle reinforcement for the composite preparation. By varying the parameters of the additive manufacturing process, the mechanical property of the material is to be analysed. In this project the compression strength of the PLA reinforced ceramic composite tubes has been analysed. The process optimization is done to analyse the compressive properties of the ceramic particle reinforced polymer composite with respect to various printing conditions. As a result of the project the relation between the various parameter like infill density, infill orientation, printing temperature has been varied to understand the compressive behaviour of the 3d printed composite analysed. The percentage contribution of each parameter with respect to compression strength response of the prepared sample is experimentally predicted by this study. Infill density has a major contribution of 78.97%, followed by a printing orientation of 14.56%. The remaining parameters, such as printing temperature and printing speed, have minor contributions of 2.03 and 1.56%, respectively.
62	Red Team and Intrusion detection system simulatuion	This paper presents a comprehensive approach to enhancing cybersecurity through the utilization of red teaming and intrusion detection system (IDS) simulation. Red teaming involves the proactive identification of vulnerabilities and weaknesses in a system through simulated attacks, while IDS simulation focuses on evaluating the effectiveness of intrusion detection mechanisms. By integrating these two techniques, organizations can better prepare for and mitigate cyber threats. This paper outlines the process of implementing red teaming and IDS simulation, discusses their benefits, and presents case studies demonstrating their effectiveness in real-world scenarios. The results highlight the importance of proactive cybersecurity measures in today's increasingly complex threat landscape.
63	INTELLIGENT FAULT MONITORING OF MACHINE USING SUPERVISED MACHINE LEARNING TECHNIQUES	Machine Failure, or Intelligent retrieval of machine from failure, is any event in which a piece of industrial machinery underperforms, whether entirely or partially, or stops functioning in the way in which it was intended to. Failures can happen quickly if equipment is not properly cleaned, lubricated, and maintained.Data mining is a commonly used technique for processing enormous data. Researchers apply several data mining and machine learning techniques to analyze huge

		complex data, helping equipment professionals to predict failure of the machine. Different algorithms are compared and the best model is used for predicting the outcome.
64	Quantum immunity: Fortifying digital security through postQuantum crptography	This project delves into the pressing need for quantum-resistant cryptographic algorithms in light of the impending threat posed by quantum computers to traditional encryption methods. With the advent of quantum computing, current cryptographic schemes are at risk of being compromised, potentially undermining the security of digital transactions and communications. This research endeavors to explore the transition towards post-quantum cryptography to ensure the resilience of encryption mechanisms in safeguarding sensitive data and transactions in everyday scenarios. The project commences with an in-depth analysis of the vulnerabilities inherent in conventional cryptographic algorithms, such as RSA and ECC, when confronted with quantum computing capabilities. Through a comprehensive review of emerging post-quantum cryptographic algorithms, including hash-based, lattice-based, and code-based cryptography, this study identifies promising alternatives capable of withstanding quantum attacks.
65	DIMENSIONAL DREAMS: UNLEASHING THE FUTURE WITH AUTOMATED SHOPPING!	Dream beyond traditional shopping experiences with 'Dimensional Dreams,' a groundbreaking project poised to revolutionize the retail landscape. This innovative endeavor introduces Automated Shopping, transcending conventional boundaries to immerse consumers in a dynamic and personalized purchasing journey.
66	FashioGuide: Outfit Trial and Recommendation Website using OpenCV and Deep Convolutional Neural Networks	During the pandemic, the apparel industry—a major economic force—saw difficulties, with conventional retailers particularly hard hit. Brick and mortar retailers still have to deal with problems like long lines and unhygienic in store testing even as the pandemic fades. Online shopping has become increasingly popular as a tempting alternative. Nevertheless, the trial experience continues to be challenging. In order to solve this, our platform includes a virtual try-on function that gives users a true sense of how the clothing feels in their exact size. This invention problems with conventional in-store trials and improves the online shopping experience. Our model, which makes use of ResNet50 and OpenCV, achieves a remarkable 98% accuracy, which speeds up the buying process and gives users trust. The Tryon concept, which combines ease of use, personalization, and state-of-the-art technology, is a revolution in the textile business that could have a big market influence. The platform ushers in a new age in online fashion retail by revolutionizing how consumers approach and enjoy online purchasing.
67	A Survey of Cyber Security Approaches for Prediction	This paper provides an overview of related prediction techniques used in the field of cyber security, and discusses three main types of cyber security prediction tasks: projection and intention recognition of multi-stage or persistent network attack, prediction of other network attacks, and

		network security situation forecasting. Attack intention recognition could analyse the attacker's attack intention, or predict the attacker's ultimate goal. The prediction of cyber-attacks will discuss in more detail what kind of attack will happen when and where. Network security situation forecasting refers to the prediction of the global network security situation. This paper specifically studies the methods and implementation techniques to solve these tasks. In this survey, we find that although the implementation technologies of research topics with similar theoretical background are usually complementary, the application technologies of different research directions have different selection tendencies based on the specific situation of cyber security field.
68	Optimizing evaluation metrics and image segmentation models using deep learning algorithm.	This paper presents a robust methodology for image segmentation leveraging Mask R- CNN, a state-of-the-art deep learning model. The proposed approach combines object detection, classification, and instance segmentation, providing accurate and detailed delineation of objects within images. Extensive experiments demonstrate the model's efficacy in various domains, showcasing its potential for applications in medical imaging, autonomous systems, and industrial inspection. The integration of probabilistic reasoning enhances segmentation precision, making the proposed method a versatile
69	Subnetwork lossless robust watermarking for hostile theft attacks in deep transfer learning models	Steganography, which comes from the Greek terms "steganos" (which means covered) and "graphy" (which means writing), is the technique of hiding confidential data inside of what appear to be innocent carriers, like text, audio files, or photos, in order to prevent unauthorized people from discovering it. Steganography seeks to conceal the message's very existence, as contrast to cryptography, which concentrates on encrypting messages to render them unintelligible. This method has its roots in the old practice of writing secret messages on parchment and covering them with wax. Steganography, in the digital age, is the process of embedding data into digital media files by slightly changing its content, like the amplitude of audio samples or the least important pixels in an image. Digital technological advancements have resulted in the creation of complex steganographic methods that can incorporate substantial amounts of data while being undetectable to the human eye. Steganography is used in many different domains, such as digital watermarking, forensic investigation, copyright protection, and covert communication. However, because it can support illegal operations like terrorism, espionage, and intellectual property theft, its use presents moral and legal questions. Steganography research is still essential to comprehending how information might be safeguarded and concealed in an increasingly digital environment as technology develops.

70	Symmetry breaking of pure quadric soliton with logarithmic nonlinearity in Scarff-II PT symmetric potential	Symmetry breaking phenomena has been a focal point in the study of soliton dynamics, particularly in the realm of nonlinear systems. In this report, we investigate the relationship between symmetry breaking, soliton dynamics, and logarithmic non-linearity with PT symmetric potentials. Specifically, we examine the behavior of pure quadric solitons under the influence of logarithmic nonlinearity within Scarff-II PT symmetric potentials.
71	SMS SPAM FILTERING USING ML	Short Message Service (SMS) has become an essential part of our daily lives as mobile technology has grown exponentially, allowing for quick and convenient contact. However, this convenience is frequently undermined by an endless stream of spam messages, which not only disturb users' conversation but also pose security and privacy risks. In answer to this problem, our final year computer science project focuses on the creation of an intelligent SMS spam filtering system that employs machine learning techniques Traditional rule-based filtering techniques, which are frequently used by messaging platforms or mobile carriers, generally depend on pre-established rules or heuristics to recognise and eliminate spam communications. Although these techniques might provide some protection, their capacity to adjust to the ever-changing nature of spam communications is intrinsically restricted.
72	ADVANCED COMPUTER VISION FOR AUGMENTED IMAGE AND VIDEO ANALYSIS	This document is a study to assess advanced com puter vision, which has become a rapidly evolving field that is changing the way we look at and understand images and videos. Recent advances in image and video analysis have made it possible to use these technologies to a wide range of industries, including autonomous systems, robotics, healthcare, and surveil lance. This abstract provides a summary of recent advancements in computer vision methodologies, algorithms, and techniques utilized in image and video analysis. In conclusion, the field of computer vision has seen remarkable advancements in image and video analysis. Two instances of deep learning techniques that have been applied to improve accuracy, robustness, and efficiency in a range of applications are recurrent neural networks (RNNs) and CNNs.
73	Dynamic synthesis immersive virtual environments for enhanced web -based 3D product visualization and interaction	Online shopping has transformed the retail landscape, offering unparalleled convenience and functionality. With the freedom of unlimited opening hours, customers can browse and purchase products at their convenience, unrestricted by traditional store hours. Additionally, online platforms provide a vast array of products and services, complemented by easy access to reviews and comparisons, thereby enhancing the overall shopping experience. However, challenges such as complex categorization and limited product visualization persist, potentially resulting in dissatisfaction or returns.

74	BARBARIK : The reconnaissance guardian - A comprehensive security analysis tool	In today's interconnected world, proactive cybersecurity is paramount. Reconnaissance Guardian is a comprehensive security analysis and reconnaissance tool designed to empower individuals and organizations to fortify their digital defenses. This innovative tool blends the power of Open Source Intelligence (OSINT) with advanced Python-based techniques to deliver a suite of essential security analysis features. Reconnaissance Guardian delves into the complexities of username analysis, network traffic monitoring, and password strength assessment, uncovering potential vulnerabilities that could be exploited by malicious actors. Beyond simply identifying weaknesses, Reconnaissance Guardian delivers actionable insights. It intelligently analyzes investigation findings and provides tailored recommendations to help users craft stronger passwords, implement robust file encryption, and optimize network security configurations. Reconnaissance Guardian emphasizes the value of proactive reconnaissance, empowering users to stay ahead of evolving cyber threats and take a proactive stance in safeguarding the integrity of their sensitive information and online assets.
75	A Custom neural network paradigm for intricate anomalous activity identification in supply chain analytics.	In this study, we aimed to detect fraudulent activities in the supply chain through the use of neural networks. The study focused on building two machine learning models using the MLPClassifier algorithm from the scikit-learn library and a custom neural network using the Keras library in Python. Both models were trained and tested on the DataCo Supply Chain dataset. The results showed that the custom neural network achieved an accuracy of 97.67% in detecting fraudulent transactions, demonstrating its potential to minimize financial losses for organizations.
76	Unleasing creativity: The potential of an AI image generator	The AI Image Generator is a cutting edge deep learning model that harnesses the power of artificial intelligence to create high-quality images from textualdescriptions. Similar to DALL E, the model is based on a transformer architecture and is trained on a vast dataset of image-caption pairs. During training, the model learns to map textual descriptions to visual features, which allows it to generate images that are both specific and nuanced. This capability opens up new possibilities for creative applications such as digital art, graphic design, and visual storytelling. One of the key strengths of the AI Image Generator is its ability to generate images that are tailored to specific needs and preferences. For example, the model can create images of objects in specific colors, sizes, and shapes or produce images that reflect particular moods or emotions. This flexibility enables designers and content creators to generate custom images quickly and easily, without the need for specialized training or expertise. As a result, the AI Image Generator has the potential to transform the field of digital content creation, making it more accessible and inclusive.

77	AI ART GENERATION USING GAN	Generative Adversarial Networks (GANs) have be come increasingly prominent for their ability to generate diverse and realistic images. These neural networks hold significant potential across various domains, demonstrating their efficacy in practical applications and can be related to [1]. This paper provides an overview of GANs, elucidating their underlying mechanisms and efficiency when integrated with complementary technologies. Furthermore, it explores the application of GANs in transforming textual input into visually compelling images, high lighting their versatility and adaptability in creative endeavors. Through a comprehensive examination, this paper elucidates the multifaceted capabilities of GANs and their role in advancing image generation technologies
78	DEVICE CONTROL USING HAND GESTURES AND SPEECH RECOGNITION	"Device Control Using Hand and Speech Recognition" is a significant advancement in human-computer interaction. It employs advanced algorithms to recognize hand gestures and speech commands, providing a versatile control mechanism for devices. The system is user- friendly, adaptable, and operates in real-time, offering immediate feedback. It demonstrated high accuracy during testing and has potential applications in various fields, including home automation and healthcare. While the project has shown promising results, there is scope for future work in exploring more complex recognition algorithms, integrating with a wider range of devices, and enhancing user experience and customization.
79	Intrusion detection system using memory based learning approach	Network Intrusion Detection Systems (NIDS) play a critical role in protecting computer networks from various security threats and attacks. As the complexity and frequency of network attacks continue to evolve, there is a growing need for advanced analytics techniques to enhance the detection and response capabilities of NIDS. This research focuses on the development and utilization of analytics methods for network intrusion detection systems. The goal is to leverage these techniques to improve the accuracy, efficiency, and effectiveness of NIDS in identifying and mitigating security breaches. Various types of NIDS, including signature-based and anomaly-based systems, are discussed, highlighting their strengths and limitations. Overall, this research aims to advance the field of network intrusion detection by leveraging analytics techniques to enhance the capabilities of NIDS. The proposed methods offer the potential to improve the accuracy of attack detection, reduce false positives, enable efficient processing of big data, and facilitate automated incident response. The findings of this research will contribute to the development of more robust and effective network security systems in the face of ever-evolving cyber threats.

80	INDOOR NAVIGATION SYSTEM FOR VISUALLY IMPAIRED PEOPLE USING LIFI AND DEEP LEARNING	Indoor navigation system for virtually impaired individuals utilizing deep learning techniques. The system addresses the challenge of navigating complex indoor environments by leveraging visible light communication technology to provide real time navigation system. The proposed system encompassesing, modeling selection, training, evaluation, and testing phases. Through iterative improvement and user feedback, the system achieves enhanced performance and usability. Integration into user friendly applications enables seamless deployment in various indoor settings, empowering visually impaired individuals to navigate independently and safely. This system contributes to advancing assistive technologies and promoting accessibility for individual impairments. Throughout the process, factors such as robustness, adaptability to different indoor environments, real time performance and user interface design for accessibility. Additionally, ensuring privacy and security of user data crucial when developing and deploying such systems. Indoor navigation poses significant challenges for visually impaired individuals, hindering their autonomy and mobility.
81	AN AUTONOMOUS VEHICLE BASED ON V2V EFFULGENCE WITH DEEP LEARNING STANDARD FOR COMMUNICATION	This proposed work presented the design and implementation of an advanced autonomous vehicle system integrating Vehicle-to-Vehicle (V2V) communication with Visible Light Communication (VLC) technology, alongside deep learning algorithms for image identification. The system comprised intricate hardware components including an ESP32 microcontroller serving as the central processing unit, ultrasonic sensors for proximity detection, motor drivers for DC motors enabling speed control and obstacle avoidance, and toggle switches for signalling turns. The deep learning software component encompassed convolutional neural networks (CNNs) for real-time image recognition, enabling the vehicle to interpret and respond to complex traffic scenarios accurately. The VLC communication system facilitated high-speed and secure data exchange between vehicles, enhancing coordination and safety measures on the road. Through the synergy of hardware mechanisms and sophisticated software algorithms, this work aims to establish a robust autonomous vehicle platform capable of navigating diverse traffic environments with optimal safety and efficiency
82	DEEP LEARNING-EMPOWERED CHANNEL ESTIMATION AND CSI FEEDBACK FOR ENHANCED RELIABILITY IN 6G NETWORKS	This system delved into the realm of Deep Learning (DL) for channel estimation, focusing on crucial aspects such as DL model selection, training set acquisition, and the design of the RESNET50 architecture. With the increasing integration of automated services, machines, vehicles, and sensors, DL is poised to become a predominant paradigm in the 6G era channel estimation. This system advocated for advanced DL techniques to address diverse challenges, including various frequency bands, wireless resources, and geographical environments. It

		highlighted transfer learning for training DL models and explored federated learning for collaborative task accomplishment. This comprehensive system aimed to guide MIMO communication researchers in integrating DL into their wireless channel estimation applications, fostering robustness and adaptability in diverse environments. By leveraging advanced DL techniques, such as transfer learning and federated learning, researchers can address the complexities of channel estimation across different frequency bands and wireless resources. The adoption of the RESNET50 architecture offers a promising framework for efficient and accurate estimation, further advancing the capabilities of future 6G communication systems. ResNet 50 had the highest accuracy of 99.75% with a loss rate of 0.33, while the other models achieved 98.16%, 98.47%, and 98.56%, respectively. Furthermore, ResNet 50 achieved a validation accuracy of 99.69%, precision of 99.50%, F1- score of 99.70, and AUC of 99.83%.
83	AUGMENTED REALITY RETAIL: NAVIGATING THE VIRTUAL SUPERMARKET LANDSCAPE	Augmented Reality (AR) has emerged as a powerful technology, opening up new possibilities in various domains. The proposed work introduces an innovative AR application designed to create a virtual supermarket experience. Users can enter the augmented supermarket, explore virtual aisles, inspect product details including nutrient levels, and seamlessly add items to their virtual shopping cart. The application tream lines the shopping process by automating the addition of selected items to the cart and concludes with an integrated payment system at a virtual bill counter. Through the AR Virtual Supermarket, users enjoy the benefits of traditional grocery shopping without the constraints of time, location, or physical space. The proposed work exemplifies the potential of AR technology to transform the retail industry, offering a glimpse into the future of shopping experiences that are immersive, interactive, and tailored to individual preferences.
84	Experimental and Numerical Investigation on 3D Printed PLA/Ceramic Reinforced PLA Based Functionally Graded Multilayered Materials	Analyze the mechanical properties (tensile strength, flexural strength, compressive strength) of 3D printed specimens made of PLA, CRPLA, and FGMLM composite structures. Employ Finite Element Analysis (FEA) to simulate the behavior of the materials under different loads until fracture. Conduct microstructural analysis using scanning electron microscopy to understand bonding and fracture morphology. Perform calorimetry analysis (DSC) to determine glass transition temperature (Tg), crystallization temperature (Tc), and melting temperature (Tm) of the materials. Investigate mesh convergence to determine the minimum number of elements required for accurate results. Define failure through a ductile damage model in the simulation process.
85	A MULTI-MODAL APPROACH FOR DEEPFAKE DETECTION SYSTEM USING LSTM AND MLP IN CNN	In the rapidly advancing landscape of machine learning, the detection of deepfake videos has become an imperative challenge. The proposed introduces a novel approach everaging the synergies of Dense Net v2, LSTM, and MLP architectures in a multi-modal system for enhanced

		deepfake detection. In an extensive review of existing work in deepfake detection, identifying key parameters and methodologies. The project model integrates the strengths of Long Short-Term Memory (LSTM) networks and Multi-Layer Perceptron (MLP) classifiers with the feature extraction capabilities of Dense Net v2, creating a robust and efficient framework. The training process involves optimizing key parameters to ensure model accuracy, and discuss the tools employed for data preprocessing and model evaluation. In experimental results, it present a comprehensive performance analysis using precision-recall curves, confusion matrix heatmaps, F1 score comparison bar charts, and accuracy box plots. The proposed multi-modal approach demonstrates superior detection capabilities compared to existing models, showcasing its potential for real-world applications. The study contributes not only to the field of deepfake detection but also to the broader discourse on the intersection of machine learning and video analysis.
86	PERFORMANCE ENHANCEMENT OF VIDEO SURVEILLANCE IN FORTIFYING BANKING SECURITY THROUGH DARKNET ANALYSIS	This research delves into the fusion of the YOLO v5 (You Only Look Once) object detection framework with the Darknet architecture to create an advanced Intelligent Video Image Processing and Monitoring Control System tailored explicitly for enhancing security in the banking sector. Leveraging the real-time object detection capabilities of YOLO v5, the system enables efficient monitoring and surveillance across various areas within bank premises. Darknet, functioning as a neural network framework, serves as the foundational structure for implementing and optimizing YOLO v5 within the proposed system. This integration ensures robust real-time performance, allowing for seamless monitoring and control mechanisms throughout banking environments. By utilizing Darknet's capabilities, the system can effectively handle the complexities of processing video feeds in real-time, enhancing overall security measures within banking facilities. The primary objective of the proposed system is to bolster security measures within banking environments by providing instantaneous and accurate alerts for potential security threats or anomalous activities Through the amalgamation of YOLO v5 and Darknet, the system aims to offer comprehensive surveillance capabilities, enabling banking institutions to proactively identify and respond to security incidents promptly. This innovative approach to video image processing and monitoring control holds promise for significantly enhancing security protocols within the banking sector.
87	AUTHENTICATED ACCESS CONTROL FOR VEHICLE	Fingerprint identification is one of the most popular and reliable personal biometric identification methods. The proposed system consists of a smart card capable of storing the fingerprint of particular person. While issuing the license, the specific person’s fingerprint is to be stored in the

	IGNITION SYSTEM USING RF ANDFINGERPRINT TECHNOLOGY	card. Vehicles such as cars should have a card reader capable of reading the particular license. The same automobile should have the facility of fingerprint reader device .A person, who wishes to drive the vehicle, should insert the smartcard in the vehicle and then swipe his/her finger. If the fingerprint matches with the fingerprint stored in the smart card then it goes for alcohol detection and seatbelt checking. After passing all authentications, the vehicle will be ignited. The vehicle will not be ignited, if any one of the authentications fails and will not proceed the next step. This increases the security of vehicles and also ensures safe driving by preventing accidents. The prototype of the ignition system is used by the Master controller (Cortex M3 based Micro controller) is implemented along with the vehicle prototype is developed and the results are attached. Biometric authentication is an emerging technology that has found its application in various domains. One of the domains that have recently gained attention is vehicle ignition. This technology is used to prevent unauthorized access to the vehicle and ensure that only the authorized driver can start the vehicle. The biometric authentication system typically uses a combination of physiological and behavioural traits to identify the driver, such as facial recognition, fingerprint scanning, recognition, voice recognition, and gait analysis. This paper aims to provide an overview of the biometric authentication system for vehicle ignition, including the advantages, disadvantages, and challenges of implementing such a system. The paper also discusses the different biometric modalities that can be used for authentication, the algorithms used for recognition, and the security aspects of the system. The results show that biometric authentication for vehicle ignition has the potential to increase the security of the vehicle and prevent theft. However, there are still some technical and social challenges that need to be addressed before this technology can be widely adopted.
88	BORDER DEFENSE MECHANISM CLASSIFICATION USING DEEP LEARNING TECHNIQUES	The Advancements in deep learning are set to transform border defense, leveraging attention mechanisms and meta-learning to enhance threat detection accuracy. Integrating diverse sensor types, including aerial imagery, satellite data, social media analytics, and IoT devices, offers a comprehensive surveillance approach. This multi-modal data fusion enables nuanced threat assessments, improving situational awareness. Real- time processing, facilitated by edge computing solutions, ensures swift responses to potential threats by handling high-volume streaming data efficiently. Despite technological strides, ethical considerations remain paramount. Transparency, fairness, and privacy protection are imperative in border security applications. Implementing accountable decision-making processes and privacy-preserving techniques in data processing pipelines is essential. Engaging stakeholders ensures societal concerns are addressed,

		balancing security needs with individual rights. Ultimately, the future of border defense classification holds promise for more accurate, efficient, and responsible systems. By prioritizing ethical principles alongside technological innovation, borders and sensitive areas can be safeguarded effectively while upholding fundamental rights and values.
89	PERFORMANCE ANALYSIS SPACECRAFT ANOMALY DETECTION AND MITIGATION FRAMEWORK	The Autonomous Spacecraft Anomaly Detection and Response System aims to enhance the operational efficiency and safety of spacecraft missions by employing advanced algorithms and AI techniques for real-time anomaly detection and response. This proposals are addressed the critical need for autonomous systems capable of identifying anomalies in spacecraft systems, ranging from hardware malfunctions to environmental disturbances. Leveraging data acquisition and pre-processing methodologies, the system integrates various anomaly detection algorithms, including statistical methods and machine learning models, to effectively identify deviations from expected behavior. Decision-making frameworks facilitate prompt and appropriate responses to detected anomalies, mitigating potential risks and ensuring mission continuity. Through integration and testing phases, the system's performance and reliability are evaluated, with case studies demonstrating its effectiveness in detecting and responding to diverse anomalies. Discussions highlight challenges encountered, comparative analysis with existing systems, and avenues for future enhancements. Ultimately, this proposal contributed to advancing spacecraft automation, offering a robust solution for autonomously managing anomalies in space missions. Autonomous Spacecraft Anomaly Detection and Response system represents a significant advancement in spacecraft autonomy, offering a proactive and adaptive approach to anomaly management that enhances mission resilience and operational efficiency in dynamic space environments.
90	WEARABLE FRACTAL ANTENNA FOR FIRE FIGHTERS USING BODY AREA NETWORKS	Body Area Network technology is rapidly evolving presenting a future where wearable devices seamlessly integrate with our lives, fostering a new era of personalized health care through wearable devices. These devices requires antennas which can withstand the human motion and the immune to noise and produce precise results. The antennas should be flexible and compact in size. The substrate play a deciding role in flexibility of antenna. This paper presents a miniaturized wearable patch antenna for body area network (BAN) applications. The antenna utilizes a crown fractal design technique to achieve a size reduction of 31% compared toconventional designs. Additionally, a flexible Rogers RT Duroid 5880 substrate is employed, making the antenna suitable for wearable biomedical devices. The designed antenna operates in the 2.45 GHz ISM band and exhibits a gain of 4.54 dB and a bandwidth of 145 MHz, covering the entire band.

		imulations analyze the antenna's performance through return loss (S11), directivity, radiation pattern, The results making it a strong candidate for wearable BAN applications.
91	Driver drowsiness detection system	In today's tech world, our project serves as a versatile assistant, integrated with smart devices like Google and Siri. It handles voice input and output for tasks such as medical advice, organization, notes, calculations, and searches. Using microphones, it accesses the web for information, employing Natural Language Processing for communication.
92	Enhanced cloud based infrastructure for secure and efficient medical services with ECC	Smart architecture is the concept to manage the facilities via internet utilization in a proper manner. There are various technologies used in smart architecture such as cloud computing, internet of things, green computing, automation and fog computing. Smart medical system (SMS) is one of the application used in architecture, which is based on communication networking along with sensor devices. In SMS, a doctor provides online treatment to patients with the help of cloud-based applications such as mobile device, wireless body area network, etc. Security and privacy are the major concern of cloud-basedapplications in SMS. To maintain, security and privacy, we aim to design an elliptic curve cryptography (ECC) based secure and efficient authentication framework for cloud-assisted SMS.
93	CUTTING EDGE FPGA BASED APPROACHES FOR LANGUAGE TRANSCRIPTION WITH ADVANCED NEURAL NETWORK ARCHITECTURE	Edge computing, particularly in embedded systems and the Internet of Things, has gained significant traction in recent times. Deep learning, with its wide-ranging applications, has become increasingly prevalent in this technological landscape. Leveraging application-specific hardware, such as Field-Programmable Gate Arrays (FPGAs), offers a cost-effective approach to deploying highly efficient deep learning models in edge computing scenarios. In countries like India, characterized by linguistic diversity, the development of a system capable of recognizing handwritten characters across multiple languages holds considerable significance. However, the implementation of large neural networks poses challenges due to their resource-intensive nature. In this study, a cascading methodology for neural network implementation is proposed with the aim of enhancing resource efficiency. The focus is on efficiently recognizing handwritten characters from three languages: Hindi, Tamil, and English. This approach involves initially classifying input data into one of the three languages using a smaller neural network, followed by routing the data to language- specific neural networks for character recognition. The performance of this cascading method is compared with that of a single neural network, which directly classifies input into respective characters. The results of the proposed work indicate the improvement in efficiency while maintaining accuracy. This approach to multilingual handwritten character recognition demonstrates its potential for practical deployment in real-world

		applications. Additionally, the findings reveal that the cascaded network utilizes 29 neurons less than the combined network, representing a reduction of 3.545% in neuron count compared to the combined CNN model and gives more than 90% accuracy similar to the combined CNN.
94	PERFORMANCE ANALYSIS SPACECRAFT ANOMALY DETECTION AND MITIGATION FRAMEWORK	The Autonomous Spacecraft Anomaly Detection and Response System aims to enhance the operational efficiency and safety of spacecraft missions by employing advanced algorithms and AI techniques for real-time anomaly detection and response. This proposals are addressed the critical need for autonomous systems capable of identifying anomalies in spacecraft systems, ranging from hardware malfunctions to environmental disturbances. Leveraging data acquisition and pre-processing methodologies, the system integrates various anomaly detection algorithms, including statistical methods and machine learning models, to effectively identify deviations from expected behavior. Decision-making frameworks facilitate prompt and appropriate responses to detected anomalies, mitigating potential risks and ensuring mission continuity. Through integration and testing phases, the system's performance and reliability are evaluated, with case studies demonstrating its effectiveness in detecting and responding to diverse anomalies. Discussions highlight challenges encountered, comparative analysis with existing systems, and avenues for future enhancements. Ultimately, this proposal contributed to advancing spacecraft automation, offering a robust solution for autonomously managing anomalies in space missions. Autonomous Spacecraft Anomaly Detection and Response system represents a significant advancement in spacecraft autonomy, offering a proactive and adaptive approach to anomaly management that enhances mission resilience and operational efficiency in dynamic space environments.

Back to main