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Inspirational Research Quotes

"I believe in innovation and that the way you get innovation is you fund research, and you learn the basic facts."

- Bill Gates.

"The measure of greatness in a scientific idea is the extent to which it stimulates thought and opens up new lines of research."

- Paul Dirac.

Research means that you don't know, but are willing to find out.

- Charles F. Kettering.

From the Editor's Desk…

India, while battling against the ongoing COVID pandemic, still managed to rise in 2021 with its remarkable scientific developments. This is proof of the potential and determination for its ambitions. Irrespective of multiple setbacks in health, economy, politics, it performed well in science.

The Defence Research and Development Organisation developed an anti-drone technology that can detect and counter UAV's and has a radar system that covers 360 degrees. This system was made for VIP(Very Important Person) protection duties in 2020 and 2021. It would help the armed forces detect, intercept, and destroy the enemy's drones. These systems have a laser-based kill technology and are fit for soft-kill (for jamming the communication links of drone) and hard kill(laser-based hard kill to destroy the drone) of enemy drones. The Anti-Drone System has Electro-optical (EO) and Infrared (IR) sensors that can identify micro drones till 2Km of distance. If connected with machine vision and artificial intelligence (AI) algorithms, these sensors reduce the risk of unclear decisions. DRDO Anti-Drone Technology has been transferred to Bharat Electronics Limited (BEL). Transfer of Technology (ToT) of the Anti-Drone System is also offered to other companies.

The CSIR-CMERI has developed oxygen enrichment technology for treating

Anti-drone system developed by DRDO

Launch of PSLV-C51

Covid-19 patients that require an oil-free reciprocating compressor, Oxygen grade zeolite sieves and pneumatic components. The Oxygen enrichment unit can be placed in the hospital's isolation ward and can be helpful for the ones who need oxygen. Council of Scientific and Industrial Research (CSIR)-Central Mechanical Engineering Research Institute(CMERI) in collaboration with the Ministry of Small and Medium Enterprises-Development Institute (MSME-DI) conducted a seminar on Oxygen Enrichment Technology on 25th April 2021 where Dr Anupam Sinha, Sr. Principal Scientist, CSIR-CMERI, Durgapur stated that the Oxygen enrichment unit had been transferred to two industries. This unit has the potential to give mechanical air to the range of 15LPM with oxygen purity of more than 90%. In the case of requirement, this unit can also give up to 70LPM at purity of 30%.

ISRO launched PSLV-C51 and Amazonia-1, and other 18co-passenger satellites on 28th February 2021 from Satish Dhawan Space Centre (SDSC), Sriharikota. After 1 hour 38 minutes, all the 18 co-passenger satellites were separated successfully from the PSLV in a pre-decided sequence.

VISION OF THE INSTITUTION

To be part of universal human quest for development and progress by contributing high calibre, ethical and socially responsible engineers who meet the global challenge of building modern society in harmony with nature.

MISSION OF THE INSTITUTION

1. To attain excellence in imparting technical education from the undergraduate through doctorate levels by adopting coherent and judiciously coordinated curricular and co-curricular programs
2. To foster partnership with industry and government agencies through collaborative research and consultancy
3. To nurture and strengthen auxiliary soft skills for overall development and improved employability in a multi-cultural work space
4. To develop scientific temper and spirit of enquiry in order to harness the latent innovative talents
5. To develop constructive attitude in students towards the task of nation building and empower them to become future leaders
6. To nourish the entrepreneurial instincts of the students and hone their business acumen.
7. To involve the students and the faculty in solving local community problems through economical and sustainable solutions.

VISION OF THE R & D CELL, MJCET

To empower the faculty and students in the area of Research & Development by providing seed funds for implementing their innovative research and product development ideas.

MISSION OF THE R & D CELL, MJCET

i. To motivate faculty and students to undertake Research and Development activities as a means of nourishing innovative thought process
ii. To encourage interdisciplinary R & D projects leading to solutions to real world problems through synthesis of diverse ideas and skills.
iii. To serve as a medium for three way interaction between the Institute, R & D Organizations and Industry.
iv. To assist the faculty, Ph. D. scholars and students to apply for funding under various Government, Professional Chapter or Private Sector schemes.
v. To encourage publication of technical papers in National / International refereed Journals and Conferences based on the research carried by the faculty and students
vi. To register under Intellectual Property Rights like Patents & copyright for the outcome of R & D work carried out by the faculty and students of the Institution and Technology transfer of the granted IPR
vii. To facilitate signing of MOU with industries and R & D Organizations for research and product development

NEWS BIT

MJCET is the recognised Ph.D research centre for Civil, Computer Science, Electronics & Communication, Electrical & Electronics and Mechanical engineering programmes under Osmania University. At present, there are 67 research scholars pursuing their Ph.D in MJCET research centres. There are 27 research supervisors recognised by Osmania University.

R & D CELL COMPLETED PROJECTS

AUTOMATED NAVIGATION SYSTEM WITH INDOOR ASSISTANCEFOR THE BLIND (ANISAB)

Project team:

1. Saba Ahmed Jalal (1604-15-737-001)
2. Mogal Hidayathulla Baig (1604-15-737-043)
3. Abdul Aziz (1604-15-737-117)
4. Mohd Mudabbir Ahmed (1604-15-737-109)
5. Sameera Begum (1604-15-737-002)

Project guides: (i) Dr. Mousmi Ajay Chaurasia, Head & Prof., ITD and (ii) Mr. Shaik Rasool, ITD

Sanctioned amount: Rs. 45,350/-

The Internet of Things (IOT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these things to connect and exchange data. Machine Learning with IOT can be applied in cases where the desired outcome is known (Guided Learning). With the advent of IOT and Machine learning, there is great scope for providing solutions for navigation assistance for all individuals. The problem of navigation for visually challenged individuals is of great concern. In an attempt to aid visually challenged people for navigation, the project aimed to build an automated navigation system with obstacle detector along with voice assistance to guide a blind individual to navigate.

Often people with complete blindness or low vision have a difficult time self-navigating in outside environments. In fact, physical movement is one of the biggest challenges for blind people. Because of this, many people with low vision will bring a sighted friend or family member to help them to move around in unknown environments.

The system developed enables the blind people to move with the same ease, and confidence as sighted people.Since the system is linked with computer vision with colours module, it provides the direction information by detecting colours, avoid the obstacle based on ultrasonic sensor, facilitates easier communication in case of emergency by implementing the concept of image processing in navigation for accurate results and to make a self-learning system. It is a project specifically developed for people who are visually impaired and contribute to the society with research knowledge.

Demonstration of ANISAB project the Distinguished Members

ISMART- AUTOMATED CLASSROOM USING IOT AN INITIATIVE TOWARDS THING SPEAK

Project team:

1. Mohasin Ahamed Chinnapattan (1604-14-733-094)
2. Mohd Abdul Mubeen (1604-17-742-010)
3. Ayesha Nazneen Ahmed (1604-15-733-007)
4. Mohd Hussam Ali (1604-17-742-018)

Project guide: (i) Dr. Uma Dulhare. Prof., CSED

Sanctioned amount: Rs.45,880/-
ISMART – is an automated classroom that can be a very useful intelligent Infrastructure for education.

ISMART classroom project is to find and create a best practice i.e., reducing the energy consumption in a classroom and having more efficient sessions. It creates sustainable and efficient system for classrooms, conference rooms, labs, etc., which help in conservation of energy and helps increase efficiency by streamlining the processes and reducing human interface.

Today people are looking at ways and means to better their life-style using the latest technologies that are available. Any new facility or hope appliance that promises to

enhance their life-style is grabbed by the consumers. The more such facilities and appliances are added such as SMART Display. The Raspberry Pi is the main unit for the automation part where it interfaces with all the sensors and hardware's, with the raspberry pi 3 model b it is easy to connect to the Wi-Fi network as the pi comes with the inbuilt Wi-Fi model. Using the Wi-Fi, we'll be able to connect our setup to the cloud service for data analysis and storage and retrieve for the application. The following way the system will work.

• To setup SMART Display should be able to display the current activities of the class. Activities such as Time Table, Ongoing Class information, Electronic appliances, projector Status & temperature.

• To automate the projector and user interface. When a lecturer's RFID tag is scanned the projector, screen is lowered and projector is switched on and automatically navigates to the respective lecturer's folder which contains presentations. The ongoing class and the respective faculty's name is also displayed on SMART Display outside of classroom.

the traditional world with the ability to learn and play chess is the aim of this TREBAX chess board.

• To create an automated system for tube light and fans such that they are economical and power efficient. This system is then integrated with our smart display such that information regarding fans and lights, such as the number, status, etc. are displayed.
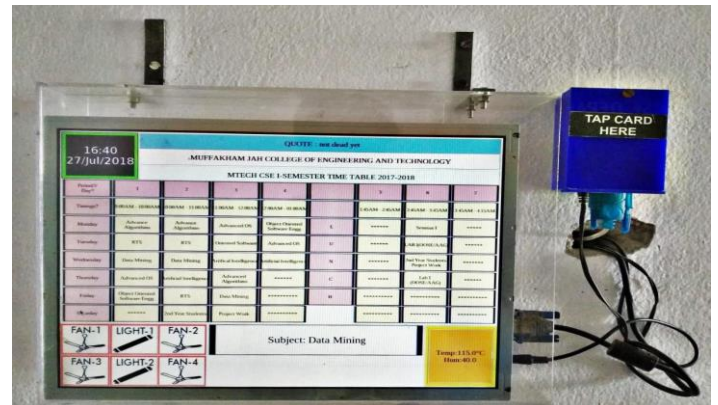
SMART Display Showing the Current Time table, temperature, Humidity and Current status of Class

TREBAX CHESS BOARD

Project team:
1. Ibrahim Mohammed Sakawath Ali (1604-16-738-003)
2. M. Mujtaba Khan (1604-16-737-028)
3. Abdul Rahman Malik (1604-16-737-034)
4. Anshul Bhatia (1604-16-737-042)

Project guides: (i) Dr. Devasish Pal, Professor, ITD and (ii) Mr. M.A. Rasheed, Asst. Prof., ITD

Sanctioned amount: Rs.23,700/-

Chess is predominantly a board game that requires strategy and keen decisions. It has advanced over the years from being played on an actual board to becoming digitized and played all across the world via the web. In order to rekindle the game play at a personal level, the team has designed a smart chess board, which takes the benefits of digitized chess and brings it to life on an actual physical board.

Automated and magnetic movement of chess pieces such that they don't collide with each other is one of the features of this chess board. Taking People off the screen back to

For the development of this TREBAX chess board the technology domains utilized are Internet Of Things (IOT) and Arduino IDE.

The project demonstrates the amalgamation of technology and sports for the better performance and practice of the player.

Project demonstration by the team to Dr. Basheer Ahmed, Advisor cum Director, MJCET and to the other dignitaries

AWARENESS WORKSHOP ON RESEARCH PUBLICATIONS IN SCOPUS/ WEB OF SCIENCE

Muffakham Jah
College of Engienering and Technoogy

Report

Workshop conducted on
Research Publications in Scopus / Web of Science

Objective

Create awareness among the faculty members and research scholars of MJCET to Publish Quality Research Papers in Scopus / Web of Science Indexing Journals

Topics Covered

1. Scopus / Web of Science Data Base
2. NIRF Ranking Colleges Publications
3. Conference Proceedings
4. Journal Search
5. Types of Journals
6. Highly Cited Documents
7. Journal Impact Factor
8. Submission and Review Process
9. Fake Journal Identification
10. h-index Author and Institution
11. Citation Overview
12. Plagiarism Checking
13. Rejection Factors
14. Open Access and Subscription

Participants & Date of workshop

1. Basics Sciences & Humanities   05-3-2022
2. ECE and Civil Engineering   16-3-2022
3. EEE, EIE and Mechanical Engineering   23-4-2022
4. CSE,IT, CS&AI Engineering   21-5-2022

Speaker & Organized by
Dr. Shaik Kareem Ahmmad

Associate Professor, coordinator of physics & Publications, MJCET

CSE, IT and CS&AI Departments

CIVIL & ECE Departments

EEE, EIE & Mechanical Engineering Departments

Basic Sciences & Humanities Department

Workshop schedule and conduction for the various departments of MJCET

Workshops have been conducted for various departments of the MJCET to create awareness about how to carry out research publications and especially in Scopus and Web of Science recognized journals. The workshop also enlightened the faculty about how to increase the cite score so as to improve their H-index thereby H-index of the institution. The workshop speaker and organizer was Dr. Shaik Kareem, Coordinator, Publications, MJCET and Head, Physics.

EFFECT OF NANO PARTICLES IN THERMAL AND MECHANICAL PROPERTIES OF ORDINARY PORTLAND CEMENT

Project team:
1. Syed Taqiuddin Ahmed (1604-15-732-081)
2. Md Hashim (1604-15-732-082)
3. Shaik Mohd Salman (1604-15-732-061)

Project guides: (i) Dr. Shaik Kareem Ahmmad, Physics Dept., and (ii) Dr. Mohd. Hamraj, Head & Prof., CED

Sanctioned amount: Rs.22,000 /-

In this study, dry powdered mixing of nanoparticles was adopted for both OPCs and PPCs and appreciable improvement of compressive strength was observed in case of OPCs. No Superplasticizer was used in this experiment and the water/binder ratio was maintained constant due to low dose of Nano Silica in cement mortar mix. The increase in water demand of Nano-doped mortar mixes contributed to the low contribution of strength gain of mortar in case of PPCs. The high water/binder ratio also caused a reduction in compressive strength. The workability of the mortar mix was not affected due to low dose of Nano-Silica in the mix. The quantity of Nano-Silica used as an additive in Cements is also a critical factor in strength improvement and up to 2% has been the optimum percentage of its addition with further increase in percentage leading to reduction in strengths. This study incorporated 0.5 % of Nano-Silica as an additive which caused an increase in Compressive Strengths of OPCs but differ in case of PPCs.

Samples prepared to determine the compressive strength of ordinary Portland cement after mixing of Nano- particles

FABRICATION OF OXIDE NANOPARTICLES FOR GAS SENSOR APPLICATIONS

Project team:
1. Abdul Majeid (1604-14-735-017)
2. Syed Arif (1604-14-735-301)
3. Syed Imaduddin Ahmed (1604-16-736-020)

Project guides: (i) Dr. Shaik Kareem Ahmmad, Physics Dept., and (ii) Mr. Mohd. Abdul Raheem,Asst. Prof., ECED

Sanctioned amount: Rs.30, 500 /-

ZnO and Ti-doped ZnO nanoparticles were successfully prepared using sol-gel technique. Different concentrations of triethanolamine (TEA) were utilized as the preparation procedure to act as complexing agent that enhances the doping probability of the formed Ti-doped ZnO nanopowder. Thick films of the prepared nanopowders were fabricated with spinner coating. Morphological characteristics, phase structure, chemical composition, thermal stability, and optical properties of the prepared nanopowders were measured and analyzed. The average crystallite size of ZnO and ZnO:Ti powders ranged between 19–28 nm according to the XRD calculations and TEM observations. The gas sensitivity of the homemade devices based on Ti-doped ZnO nanoparticles towards and gases as a function of temperature was measured and compared with undoped ZnO films. The gas sensitivity of the films was greatly improved after doping with Ti and reached its maximum value of ~86% for gas at 93:7 wt% of Zn:Ti.

FABRICATION OF ELECTRONIC KIT USING SPECTROPHOTOMETRIC METHOD TO DETECT CONTAMINANTS IN OILS SUCH AS OLIVE OIL AND VEGETABLE OIL

Project team:
1. Nameera Jabeen (1604-16-733-012)
2. Syed Imaduddin Ahmed (1604-16-733-020)

Project guide: (i) Dr. Shaik Kareem Ahmmad, Physics Dept.

Sanctioned amount: Rs. 13,000/-

The present oil samples were subjected to UV-Vis spectroscopy and both the absorption and transmission spectra were recorded as per the objectives. Transmission obtained for mixing the samples, Fortune and Gold drop in the proportions, 1:1,1:2,1:3,2:1 and 2:3 respectively.

From these spectra obtained by mixing the samples in different proportions and comparing further with the individual samples in their unmixed form, we could see the changes in the peak positions getting prominent at certain wavelengths. These results were in accordance with the fact that addition of a contaminant in a pure sample brings about changes in the UV-Vis spectral profile of the sample in a very considerable level following an increase in the shift corresponding to the maximum intensity as the concentration of the contaminant is increased. This accounts for the identification of contamination in such edible oil samples. Hence by introducing a suitable mathematical approach, it is convenient to quantify the contaminants in a given edible oil following this method of sensing the adulteration in edible oils. Drawing similar conclusions from the absorbance plot was found difficult. Through the experiment done and the graph obtained between concentration and the absorbance, we obtain a method to measure the concentration of unknown solution by calculating is absorbance.
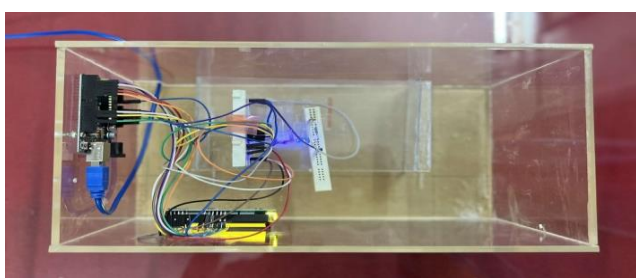
Electronic kit prepared using spectrophotometric method for detection of Contaminations in oils

Student Team of the Electronic kit for detection of contaminations in oils

THE NEXT GENERATION BAND

Project team:
1. Renish Sundrani (1604-16-737-047)
2. Shahid Dhamani (1604-16-736-064)
3. Kiran Lakhani (1604-17-737-002)
4. Syed Absaar Ul Haq (1604-16-736-109)

Project guides: (i) Dr. Mousmi Ajay Chaurasia, Prof., ITD (ii) Mr. Shaik Rasool, Asst. Prof., ITD and (iii) Dr. Ishrat Meera Mirzana, Prof., MED

Sanctioned amount: Rs. 37,000/-

The objective of this project was to make a band that will help lost soldiers communicate with base, inform generals about the whereabouts of all soldiers at all times, have a safe zone established in territory and have an emergency kit and torch for soldiers all with waterproof technology that works in all terrain or can also be utilized by common man for their kids when they visit overcrowded places. The existing models all work in the presence of network but the proposed next generation band works offline as well, which has offline GPS tracking system which makes it unique from the existing systems.

Making band that will help lost people communicate with dear ones (offline), have a safe zone established in territory and with waterproof technology that works in all terrain, along with fitness mapping features is the unique feature of the developed band. It utilizes the low range radio frequency to send encrypted signals to the receiver. The location tracking will be enabled by GPS which works offline at all places. All electronics will be waterproof by potting compound which will always provide mechanical durability.

Demonstration of Next Generation band

SIX LEGGED ROV

Project team:
1. P. Mohd. Ikramullah (1604-15-736-076)
2. Md. Faseehuddin (1604-15-736-069)
3. Amayna Mohammadi Sajida (1604-16-739-003)
4. Meraj Saleem (1604-16-739-011)

Project guide: (i) Dr. Ishrat Meera Mirzana, Prof., MED

Sanctioned amount: Rs.1,19,000/-

A hexapod robot is a robot with six legs. Hexapods can be used in applications with uneven, unpredictable terrain from stair-climbing inside a house to search-and-rescue operations in hazardous disaster zones. Wheeled robots are faster on flat surfaces compared to legged robots. However, they are horrible on uneven terrain in which legged robots excel.

Legged robots like hexapods can traverse uneven ground, step over obstacles and can choose footholds to maximize stability and traction unlike wheeled robots that need even flat surfaces. A hexapod can still travel by changing its walking mechanism even if some of its legs malfunction or gets damaged. Hexapods can also use one or more of its legs as hands to perform dexterous tasks while maintaining stability even when travelling.

Compared to wheeled or tracked robots, legged robots like hexapods have less environmental effects because their leg tips have very low surface area that touch the ground compared to tires or tracks.

Display of the Six-Legged ROV during ADSOPHOS

WANDERWAY- AN IMPROVED SEGWAY

Project team:
1. Syed Muzzamil Uddin Qureshi (1604-16-736-028)
2. Md. Idrees Hussain (1604-16-736-036)
3. Md. Wael (1604-16-735-114)
4. Syed Taha (1604-16-735-112)
5. Absar Ul Haq (1604-16-736-109)
6. Abdullah (1604-16-736-103)
7. M. Mujtaba Khan(1604-160737-028)

Project guides: (i) Mrs. O. Hemalatha, Asst. Prof., MED and (ii) Mrs. B. Sucharitha, Asst. Prof., ECED

Sanctioned amount: Rs.88,000/-

Segway is an electric scooter of future technology. It senses the tilt angle of the person riding it. It senses the tilt using accelerometer and keeps the vehicle stable using gyroscope. Segway is using gyroscope sensor, accelerometer along with an Adriano board, mechanical and electrical hardware. The Segway has a new handle, support stand and other amenities like storage space along with a smoother riding experience. It has optimum speed of 6 to 8 KMPH. To avoid the theft of the Segway, it has been secures with an IOT connection, which will be necessary to start the Segway.

Working of Wanderway being tested by Janab Syed Aamer Javeed, Member, BOG, SUES

The components used in fabrication were well researched and calculated so that they meet the specifications of the Segway to be fabricated. In a world where commuting in large indoor spaces can be tiring, our product makes going from one end to another of a large airport, mall or campus easy and relaxing. The product is a modified Segway, called the Wanderway, which is a 2-wheeler self-transporting vehicle that works on the principle of self-balancing. It is an affordable electric scooter designed to provide smooth transportation without pollution and easy balancing to the user. It is a suitable alternative to walking or cycling to a desired destination in a large place. Also, in cases of emergency, it allows the responsible personnel to reach the place without exhausting themselves by running to the place of distress. The IoT locking system that we have implemented makes the vehicle save from unauthorized usage. The Wander way is designed with Oblu IMU sensor, Analog buttons and, Mudguards and fabricated with lightweight Aluminum material. It is a Cost effective Wanderway.

SYNTHESIS AND CHARACTERIZATION OF NANO MAGNETORHEOLOGICAL FLUIDS FOR ENGINEERING APPLICATIONS

Project team:
1. Syed Imaduddin Ahmed (1604-16-736-020)
2. Murtuza Khat (1604-16-736-007)
3. Syed Murtuza Quadri (1604-16-736-042)

Project guides: (i) Mrs. G. Sailaja,Asst. Prof., MED and (ii) Dr. M.G.V. Satyanarayana, Asst. Prof, Chemistry

Sanctioned amount: Rs.50,000/-

In the last three decades or so, there has been a great deal of interest in the use of control systems to mitigate the effects of dynamic vibrational hazards on both Mechanical and Civil Structures. Magnetorheological (MR) Fluids are controllable fluids that respond to an applied magnetic field with a dramatic change in rheological behavior. An MR Fluid is a free-flowing liquid in the absence of magnetic field, but under a strong magnetic field its viscosity can be increased by more than two orders of magnitude in a very short time (milliseconds) and it exhibits solid-like characteristics. MR Fluid Dampers, based on MR Fluids, have been shown to be semi-active control devices that mesh well with application demands and constraints to offer an attractive means of controlling the intensity of vibrations in structures due to their mechanical simplicity, high dynamic range, low power requirements, large force capacity and robustness. The focus of this work is to study the dynamic behavior of an aluminum structure using the Magnetorheological dampers with and without applying magnetic field. A large variety of combinations of nanoparticles and heat transfer fluids can be used to synthesize stable nanofluids with improved thermal transport properties. Nanoparticles of metals, oxides, carbides and carbon nanotubes can be dispersed into base fluids (heat transfer fluids), such as water, ethylene glycol, hydrocarbons and fluorocarbons with or without the presence of stabilizing agents. In most experimental studies, nano fluids are synthesized in a two-step process, which is the first and the most classic synthesis method of Nano fluids. In the first step, nanoparticles are prepared by mechanical comminating, chemical reaction, vapor condensation or decomposition of organic complex. Then it is followed by the second step in which the as-produced nanoparticles are dispersed into base fluids with mechanical agitation (stirring) or ultra-sonication.

When absorbed on the surfaces of solid particle, the surfactant molecules can produce a barrier to prevent aggregation of nanoparticles and impart solubility to particles in base fluids, so that the prepared nanofluids can sustain the stability without visible precipitation for months or even years. Oxide nanoparticles are firstly used for nanofluids, mainly because they are easy to produce, chemically stable and easy to be dispersed into water due to their surface hydrophilicity. The presence of surfactants in the carrying liquid can further suppress the agglomeration of nanoparticles. After preparation of fluid it can be used in various applications like dampers, clutches, brakes and few biomedical applications like MR dampers in (artificial) leg.

Preparation of CuO Nano fluid using Ultrasonic probe sonicator

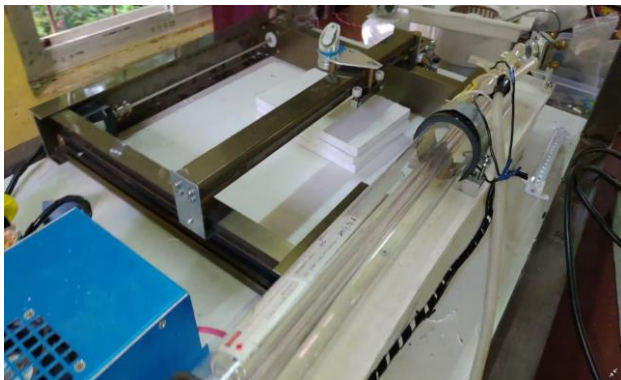## LASER ENGRAVER

Project team:
1. R. Sai Aakash Reddy (1604-16-738-008)
2. Abdul Sohail (1604-16-738-004)
3. Altaf Hussain (1604-16-738-030)
4. Nihal (1604-16-737-120)
5. Hadi Ali Farooqui (1604-16-737-056)
6. Mohammed Faisal (1604-16-735-079)
7. Varha Khan (1604-16-733-011)
8. Md. Rehan Hussain Khan (1604-17-735-053)
9. Md. Moin Khan (1604-17-735-111)

Project guides: (i) Dr. Mohd. Viquar Mohiuddin (Prof., MED) and Ms. Maliha Naaz (Asst. Prof., ECED)

Sanctioned amount: Rs 97,000/-

In the most basic sense, laser engraving deploys the use of the heat of the laser in order to perform the engraving techniques on the surface of the material. The heat of the laser burns the surface, making it appear different from the surrounding areas. Laser cutting is a thermal separation technique which is achieved by prolonging the beam on the target area for a specified amount of time, dependent on the material.

Laser cutting is thermal separation which uses high intensity beams as compared to low intensity, used by the laser engraver. The machine deploys a 150W red laser. Simulation analyses are performed in the CAD software "LASER draw" in order to simulate each part of the machine. It was helpful in rooting out any errors found during the simulation and for remodelling the moving bed, or the job holder. It is low cost and easy maintainable set up that can be utilized for Laser engraving.

CO_2 Laser Engraver Setup

FLEXIBLE MANUFACTURING SYSTEM

Project team:
1. Zohaib Khan (1604-15-736-090)
2. Mohd Moazzam Mustafa (1604-15-736-093)
3. Mir Mohib Ali Quadri (1604-15-736-104)
4. Mohd Faiz ur Rahman (1604-15-736-106)
5. Mohammed Abdul Khaliq (1604-15-736-109)
6. Talha Mohiuddin Rafeeq (1604-15-736-119)

Project guide: (i) Mr. Hakeemuddin Ahmed, Asso. Prof., MED

Sanctioned amount: Rs. 85,491/-

Now industries are being replaced by Automation and robotics. All process and work are carried out by machines and robotics process automation. Today the development of technologies made it possible to introduce industry automation systems into almost all manufacturing fields every industrial sector like manufacturing, process industries, chemical, food & beverages, Oil Gas, Transport, machine tools everywhere Industrial automation is used.

Demonstration of Flexible manufacturing system

The advent of Industry 4.0 has enabled rapid prototyping and manufacturing using Automation and robotics. The concepts of Artifical Intelligence, IoT, Machine Learning is being integrated with PLC SCADA, which is used for controlling and monitoring the systems with logical programming. The FMS developed in-house utilizes the concepts of PLC for its controlling and automation of the manufacturing system. There are four stations that have been considered for which the automation has been carried out based on the principles of flexible manufacturing system.

3D MAP GENERATING AUTONOMOUS BOT

Project team:
1. Umair Asharaf (1604-15-736-070
2. Safoora Khan (1604-15-737-010)
3. Tabassum Sultana (1604-16-733-018)
4. Hadi Ali Farooqui (1604-16-737-056)
5. Rahila (1604-16-736-002)
6. Ayesha Manzoor (1604-16-737-003)
7. Syed Muzammil (1604-16-736-028)

Project guides: (i) Dr. Ishrat Meera Mirzana, Prof., MED and (ii) Mrs. Munavvara Tahaseen, Asst. Prof., ITD

Sanctioned amount: Rs.75,000 /-

The procedure of collecting 3D data via an input device and processing it to a virtual 3D model is called 3D reconstruction. It is a widely used technique in visual computing, since modern applications like games or visualizations tend to be more and more photo-realistic leading to high costs in content creation. By using 3D reconstruction high quality geometry can be generated out of real objects. However, to obtain good reconstructions special hardware is needed which is very expensive.

Since Microsoft released the Kinect camera, which has a depth sensor in addition to the RGB- sensor, a quite cheap hardware is available that is able to extract 3D data of its surroundings. Kinect Fusion also developed by Microsoft is a technique that uses the Kinect camera for 3D reconstruction in real-time. In order to achieve real-time speed, the algorithm is executed almost exclusively on the graphics card. The project presents a method of building 3D indoor maps using the Kinect (RGB-D cameras) in which a depth camera and a color camera are lined up.

The procedure is to first extract SURF (Sped Up Robust Features) from the input colour images and match the current features with the previous ones. The matched features are then transformed to 3D coordinate points data using depth information. The 3D points data sets of two consequent images are combined by the ICP (Iterativ Closest Points) algorithm to estimate the camera pose, and finally a 3D map is built.

To show the effectiveness of the presented method, the map accuracy has been evaluated through comparison of the real environment and the 3D map built during indoor traveling of a Kinect equipped mobile robot.

The 3D map has much more information than the case of 2D map. So, it would be helpful to improve the performance of motion control and localization of a robot in indoor environment where the GPS cannot be used. This study has taken one step towards vision-SLAM by create 3D map.
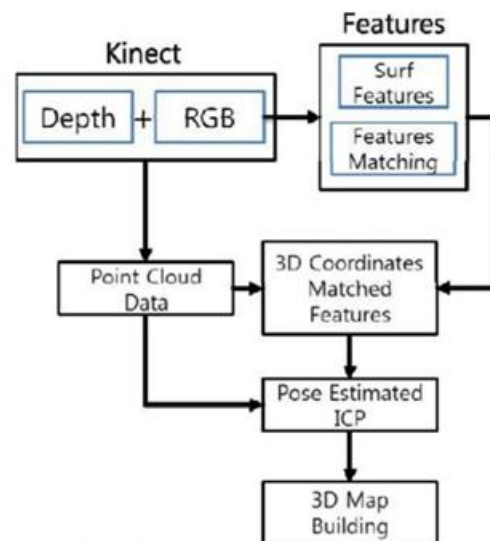
Flow Chart of working of 3D Map Algorithm

The working model of 3D Map Generating Autonomous Bot

IoT BASED VEHICLE PARKING SYSTEM WITH CLOUD COMPUTING

Project team:
1. Altaf Hussain Qadar (1604-15-739-050)
2. Affan Kareem (1604-15-739-048)
3. Wasi Uddin (1604-15-739-041)

Project guide: (i) Mrs. Narjis Begum, Asst. Prof., EEED

Sanctioned amount: Rs.20,000 /-

IoT based vehicle parking system with cloud computing feature

The main objective of this project was to design a solution for overcoming the parking issues that exist in public places such as malls, multiplexes etc., especially on weekends. The aim is to achieve this by using the concept of Internet of Things (IoT), wherein an Android Application is created for the customer, whose details are constantly updated by the hardware/server at the location. The features include unique identification for each vehicle, display of available parking slots on the mobile application, possibility of making reservations for the same, maintenance of a database (for the management). This vehicle parking system can also be executed for our campus.

GIMMIC- A SEMI-HUMANOID FACE RECOGNITION ROBOT

Project team:
1. Mogal Abdul Sameer Baig (1604-15-735-112)
2. Sameena Begum (1604-15-735-065)
3. Nazia Fatima(1604-15-735-070)
4. Mohammed Abdul Nayeem (1604-15-736-115)
5. Mohammed Sohail Khan (1604-15-736-110)
6. Mohammed Saad Khan (1604-15-733-105)
7. Syed Imad Ul Hasan (1604-15-733-035)
8. Suhaib Nizar Ahmed (1604-16-736-037)
9. Abdul Sohail (1604-16-738-004)
10. Abdul Haseeb (1604-16-738-016)
11. Tabassum Sultana (1604-16-733-018)
12. Juveria Khatoon (1604-16-733-062)
13. Hadi Ali Farooqui (1604-16-737-056)

14. Aneequr Rahman (1604-17735-024)
15. Mohd Mudassir Ahmed (1604-16-737-049)
16. Mohd Safwan Hussain (1604-17-735-023)
17. Mohammed Azeemuddin (1604-16-737-032)
Project guides: (i) Dr. Mohammed Arifuddin Sohel (Prof., ECED), (ii) Mrs. B. Sucharitha (Asst. Prof., ECED) and Mr. Shaik Irfan Sadaq (Asst. Prof., MED)

Sanctioned amount: Rs.1,00,000 /-

The advancement of technology and sophistication in the field of automation and robotics has revolutionized every field of life. Machines that offer greater efficiency combined with the precision of the robotic systems are minimizing human involvement in dangerous areas and eliminating the limitations that bind the human body and brain. A Semi-Humanoid robot is a robot with its upper body shape built to resemble that of the human body. A design of Anthro is not only for functional purposes, such as interacting with humans and environment, but also for experimental purposes, such as the study of omni wheel mechanism for locomotion, or for other purposes.

In this project we have focused on developing Face Recognition feature and Speech Recognition. Now a days, Face Recognition and Speech Recognition are being acknowledged across the world for providing extremely safe and reliable security technology. The aim of our project is to develop a Semi - Humanoid robot which can perform recognition of faces and act as Voice Assistant.

Team with their Project Display

A Semi-Humanoid Robot may work with or without human assistance. Humanoid Robots can be classified into two types. The Autonomous humanoid robot is programmed for autonomous operation and employ feedback loops to the controller which ensures proper

operation. These robots do not require any human assistance once programmed. The other type of humanoid robot is the manual humanoid robot which is controlled by the user through various methods like controllers, switches, motion sensors and other sensory devices.

Demonstration of the Model to distinguished dignitaries

This robot can be utilized in applications such as greeting guests, working like a chat bot performing face recognition giving a personalized experience while acting as a security & surveliiance robot. The image recognition part is built around Raspberry Pi Hardware with Python Programming. Such a mobile robot with further improvements can also be used for defensive applications, diffusing bombs, during nuclear and chemical warfare and as a rescue-bot during fires and natural disasters.

I. EXPERIMENTAL STUDY OF EFFECT OF FIBER DENSITY ON SHEAR STRENGTH OF RC BEAMS WITH EXTERNALLY BONDED FRP WRAPS

II. EXPERIMENTAL STUDY ON EFFECT OF FIBER DENSITY ON FLEXURAL PERFORMANCE OF RC BEAMS WITH EXTERNALLY BONDED FRP WRAPS

Project team:
1. Mohammed Rehan Ali (1604-17-741-002)
2. Mohammed Nadeem Uddin (1604-17-741-013)

Project guide: I. (i) Mr. Toufeeq Anwar., Asso. Prof., CED and II. (i) Mr. Syed Jawwad Ahmed, Asst. Prof, CED.

Sanctioned amount: Rs.1,00,000 /-

Strengthening of RC structures, nowadays has become a crucial part of the construction industry in many countries. Need for strengthening arises due to committing of mistakes in design and construction, exposure to unpredicted loads, changing the usage pattern of the structure, deterioration of concrete structures mainly due to corrosion, revision of design codes. Conventional strengthening methods such as reinforced jacketing, bonded steel plates etc., do not always offer the most appropriate solutions. Use of fiber reinforced polymers (FRP) as strengthening method provides a more economical and technically better option to the conventional methods in many cases. The FRPs have higher strength-to-weight ratios, more durable than conventional materials such as steel and requires less manpower and less equipment-intensive strengthening work. Present study investigated the behaviour of RC beams in shear and flexure, by strengthening with externally bonded basalt FRP fabrics. Basalt fiber reinforced polymer (BFRP) is relatively newcomer to the FRP line-up and has advantages as low cost, excellent resistance towards corrosion, sound mechanical properties but scanty studies using BFRP as strengthening material are found in literature.

Preparation of Beams for carrying out the testing

In this study, a total of thirty-six reinforced concrete (RC) beams of dimensions 100x175x1000mm were cast. The work was divided into two parts. For the first part twenty-one beams were used to study shear strength increment and for the second part fifteen beams were used to study flexural performance of beams. Of the part one twenty-one RC beams three beams were used as control beams, next nine beams were strengthened in

shear zone with full continuous basalt FRP fabrics of density 200gsm, 320gsm, 400gsm and had shown 21.3%, 24.7% and 34.4% increase in shear capacity as compared to control beam respectively. The remaining nine beams were strengthened in shear zone using basalt FRP strips of density 200gsm, 320gsm, 400gsm and had shown 5.7%, 11.9% and 12.6% increase in shear capacity as compared to control beam respectively. In the second part of the work fifteen beams were divided into five sets. Set-I beams were referred as unstrengthen control beams. Set-II beams were strengthened with NSM technique. Set-III beams were strengthened with EB of BFRP fabric. Set-IV beams were strengthened with hybrid (NSM-EB) technique. Set-V beams were strengthened with U-wrapping plus hybrid technique. The increase in the ultimate load carrying capacity of the strengthened beams ranged from 15.13% to 36.94.% of the control beam.

FORWARD / REVERSE MECHANICALLY LATCHED CONTRACTOR

Project team:
1. Syed Yousuf Abdullah (1604-16-734-301)
2. Syed Mohd Dawar Hussain (1604-16-734-310)
3. Mohammed Noorul Hassan Salman (1604-16-734-051)
4. Mirza Akram Baig (1604-16-734-039)

Project guide: (i) Mr. Mohammed Sajid, Assistant Professor, EED

Sanctioned amount: Rs.26,500/-

The major concerns while buying industrial electrical equipment are Cost of equipment, Cost of operation and Complexity of its implementation. Therefore we intend to reduce the cost and complexity of electrical contactor by introducing a new type of contactor called "**Pulse Controlled Contactor**" and it's extended version "**Pulse Controlled Forward/Reverse Contactor**" for forward and reverse motor operation of 3-phase Induction motor.

These contactors are latched differently than the conventional contactors i.e. by a Push-Latch mechanism. This mechanism helps in latching through mechanical means rather than the electrical energy, thereby remarkably decreasing the power loss due to electrical latching. This Push-Latch also reduces the cost of wiring, complexity of wiring and an extra contact for electrical latching of a contactor. The Pulse Controlled Forward/Reverse Contactor is the combination of two "Pulse Controlled Contactors" with some variations in design and static contacts connections. It is basically a single unit performing the work of two contactors, two add-on auxiliary blocks and complex logic control circuit which are required in conventional way of forward/reverse operation of 3-phase induction motor. Hence it is economical, simple and efficient. We hope our project will aid the industries by reducing the cost of equipment, cost of operation and complexity of wiring of contactors.

Project display by the team

SINGLE USE PLASTIC TO FUEL CONVERSION SYSTEM

Project team:
1. Shahid Dhamani (1604-16-736-064)
2. Uroosa Fatime (1604-16-736-003)
3. Deeksha Rana (1604-16-736-001)
4. Mohd. Raheemuddin Ahmed (1604-16-736-063)

Project guides: (i) Dr. Ishrat Meera Mirzana, Professor, MED and (ii) Dr. M.G.V. Satyanarayana, Assistant Professor, Chemistry Dept.

Sanctioned amount: Rs.85,000/-

The plastic processing industry is estimated to grow to 22 million tonnes (MT) a year by 2020 from 13.4 MT in 2015 and nearly half of this is single-use plastic, according to a Federation of Indian Chambers of Commerce and Industry study and over 1.3 billion metric ton of plastic are being manufactured every year to meet the demands of the modern world. Plastic is synthetic or semi-synthetic organic compounds made by polymerization of hydrocarbons. These hydrocarbons are typically high molecular mass and may contain some

other additives to enhance the capabilities of the final product.

Plastic is an important material that is strong, durable, and cheap and has numerous other properties. Disposal of waste plastic is of great concern for everybody as it takes decades to decompose if left at its own. Moreover, a continuous increase in industrialization and urbanization has created a measurable rise in the demand for fuels. Nowadays it has become the need to make use of the unconventional energy resources in the place of non-renewable fuels due to modernization. Moreover, renewable energy provides reliable power supplies and fuel diversification, which enhances energy security, lowers the risk of fuel spills, and reduces the need for imported fuels.

Renewable energy also helps conserve the nation's natural resources. In this scenario, the Conversion of plastics to fuel is a hope to solve both the problems. Pyrolysis is a process that involves thermochemical decomposition of organic material at elevated temperatures in the absence of oxygen. It simultaneously involves the change of physical phase and chemical composition and is an irreversible process. Products of this process are Pyrolysis Oil, Carbon Black, and Hydrocarbons.

The project focussed on the most systematic and efficient method of converting plastics to fuels through pyrolysis by performing its fabrication and experimentation in a controlled environment.

Plastic to Fuel Conversion set up

EXPERIMENTAL AND CFD ANALYSIS OF VARIOUS AIRFOIL PROFILES USED IN WIND TURBINES

Project team:
1. R. Venkat (1604-18-736-063)
2. Akshay Kolli (1604-18-736-064)
3. Mirza Rizwan Ali Baig (1604-18-736-065)
4. Mohd. Abdul Mateen (1604-18-736-086)
Project guide: (i) Mr. S. Irfan Sadaq, Assistant Professor, MED

Sanctioned amount: Rs.43,050/-

The R&D project involved the manufacturing of an airplane. The airplane was manufactured using Balsa wood which was laser cut according to specifications and then wrapped with metal sheet. The aircraft used a Brushless DC motor to propel itself. It used a 10-inch propeller with an 8-degree twist. A Lithium Polymer Battery was used to power the aircraft.

It used a 6-channel radio transmitter and receiver for communications. All of the control surfaces such as the ailerons and tail rudder were controlled using metal wire and servo motors. The wing was constructed by first laser cutting "ribs" from Balsa wood. These ribs were then connected using a 1.25-meter carbon rob and all of the ribs were attached to it using glue. This entire assembly was wrapped by a metal sheet and heat was applied to make it smooth and uniform.

The plane after being manufactured was taken to IIT chennai for the Boeing IIT aeromodelling competition. After reaching the venue, first technical inspection was conducted for the plane. It produced a thrust of 750 grams, while weighing around 1.1 kg. It had a wingspan of 1.25 meters. The plane successfully passed technical inspection.

Model in making using Balsa wood with Laser cutting

Final model

LAIRA (GIMMIC 3.0)- LOW END ARTIFICIAL INTELLIGENCE ROBOTICS ASSISTANT

Project team:
1.Rizwana Tabassum(1604-16-735-066)
2.Bushra Fathima(1604-16-735-072)
3.Mohd. Tanzil Bilal(1604-16-735-090)
4.Mohammed Rehan Hussain Khan(1604-17-735-053)
5.Mohd. Safwan Hussain(1604-17-735-023)
6.Md. Aneeq Ur Rahman(1604-17-735-024)
7.Moin Khan(1604-17-735-111)
8.Mohd Abdul Aziz(1604-17-735-020)
9.Syed Sohaib Ali(1604-17-735-026)
10.Mohammed Shoeb(1604-17-735-019)
11.Mirza Ibrahim Baig(1604-17-738-303)
12.Mohd Shahzaib Ashher(1604-18-735-044)
13.Mohammed Ameer(1604-18-735-019)
14.Mohd. Abdul Khader(1604-18-735-096)

Project guides: (i) Dr. Mohammed Arifuddin Sohel, Professor & Head, ECED and (ii) Mrs. B. Sucharita, Assistant Professor, ECED

Sanctioned amount: Rs. 75,184/-

This project is the continuation of the previous R and D Cell Project titled GIMMIC-A Semi Humanoid Robot. Gimmic was controlled using PS2 controller and smart phone Bluetooth control. But in LAIRA, the control has been done through voice commands using Amazon's Alexa and can be flexibly used as home assistant. It could be connected to the internet with an IOT module and hence work in numerous applications.

The special features this project are as follows:
- It can also be controlled using hand gestures, with help of kinect sensor.
- The humanoid robot could also be given the feature of self-charging. The robot detects low battery and automatically plugs itself to the charging point.
- It can assist in patient support as a serving robot by carrying food and medicines to COVID affected patients thus avoiding direct contact with patients.
- It is a method of identifying or verifying the identity of an individual using their face. Face recognition systems can be used to identify people in photos, video, or in real-time. There are two main softwares used separately for application building and face recognition namely Kodular and Smart Luxand Face Recognition API
- The other key feature is the movement introduced in the jaw and eye blink to introduce the face response

of the robot when any voice is being emitted from the Alexa device embedded in the robot.
- Another advanced implementation of LAIRA is that it has been designed to do space localization and move from a particular area to a target area using ROS.

A three-wheel design offers greater traction as any reactive force is distributed through only three points and the robot is well balanced even on uneven terrain. The entire robotic structure was 3D printed for the dimensions given below.
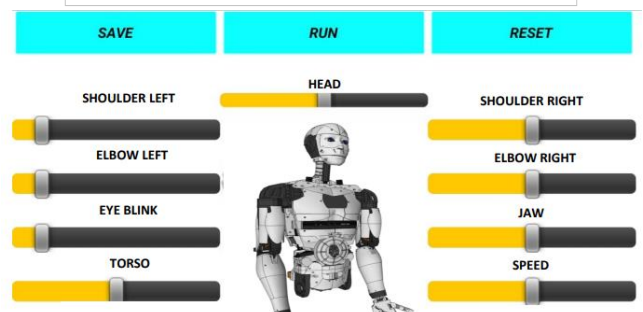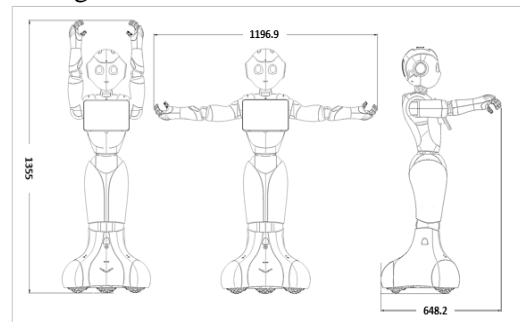
Structure of LAIRA

SMART MIRROR

Project team:
1. Hafsa Taneem (1604-16-733-066)
2. Uroosa Sania (1604-16-733-080)
3. Syed Shah Nooruddin Hussain (1604-16-733-087)
4. Moiz Ali Bhayani (1604-16-733-119)
5. Syed Abdul Saboor Sohail (1604-16-736-023)

**Project guide:** (i) Mr. Mohammed Abdul Raheem, Assistant Professor, CSED

Sanctioned amount: Rs.36,000/-

Smart IoT devices are built to stand the test of time, their only motive is to make Human Lives easier. Project Smart Mirror is Inspired by the future, It's an AI-Powered Mirror from the ground up. Our Project focuses on adding convenience to our daily lives.

The Mirror is 40 inches in size, It is backed up with a crisp 1080p display and is attached with a 720p webcam and is powered by a raspberry pi 3b. The device in its final form will be able to interact with us just like a human.

The Smart Mirror can verify distinctive faces, by doing a scan and recognizing facial data that has been collected when signing up for face recognition by the user. It greets a simple Good Morning and then proceeds to give personalized news and a run-down of all the events in the user's Google calendar, meetings, and tasks for the day. It displays temperature. Overall, Google API provides us with the flexibility for integrating our facial modules and makes Project Smart Mirror a reality, creating a new IoT device to be a morning friend.
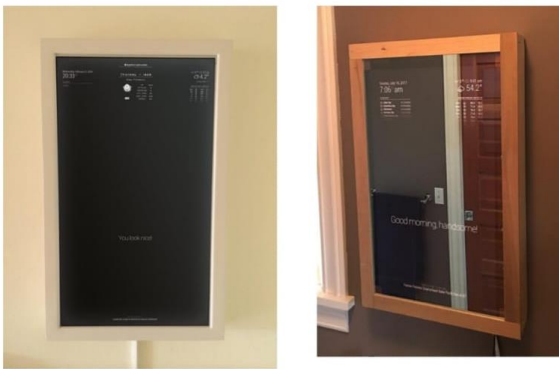
Smart Mirror

UPPER EXO-SKELETON

Project team:
1. Syed Absar ul Haq(1604-16-736-109)
2. Abdullah(1604-16-736-103)
3. Taha Naveed Shibli(1604-16-736-097)
4. Muralidhar Nallapati(1604-16-736-105)
5.Mujtaba Khan(1604-16-737-028)
6. Mohammed Fazal Rahaman Pasha(1604-17-735-113)
7.Syeda Azra Mohi(1604-17-735-068)

8.Mohammed Waseem(1604-17-735-032)
9. Khaja Asad Ullah (1604-17-735-034)
10. Mohammad Ghouse Mohiuddin(1604-17-735-096)
11.Kausar Zaidi(1604-17-735-005)
12.Syed Ishaq Shehzad(1604-17-736-028)
13. Hafsa Taneem(1604-16-736-005)

Project guides: (i) Dr. K. Hemalatha, Assistant Professor, MED, (ii) Mrs. B. Sucharitha, Assistant Professor, ECED and (iii) Mr. Shaik Rasool, Assistant Professor, ITD

Sanctioned amount: Rs.60,000/-

There are a multitude of developments ongoing in the sector of industrial automation as researchers have begun to explore the various ideas related to building exoskeletons, which were once a part of science fiction, today are very much a part of our reality, owing to technological advancement. Essentially an Exoskeleton is an electro-mechanical device which can be worn by one so as to enhance/assist one's physical capabilities and manoeuvre. Presumably in near future exoskeletons will become a part of one's day to day life.

We stand on the brink of industrial revolution that will fundamentally alter the way Industry functions, evolves and relates to. This industrial revolution 4.0 which according to us represents not merely a prolongation of the Third Industrial Revolution but rather the arrival of a Fourth and a very distinct one comes with its own unique challenges. At the core of it are the developments of Exoskeletons besides Robotic arms powered by the artificial intelligence of the day. On the one hand it can be argued the introduction of robots has the potential to disrupt the employment of the workforce, The introduction of exoskeleton is bound to enhance the capabilities of labour while maintaining the dexterity and mental agility of humans there by compensating the formerly mentioned problem.

The need for exoskeleton is evident from the fact that they are now being widely adopted in several industry sectors to augment, amplify, or reinforce the performance of workers - primarily the lower back and the upper extremity. Industrial exoskeletons may also play a role in reducing work-related musculoskeletal disorders arising from lifting and handling heavy materials or from supporting heavy tools in overhead work. One of the central problems associated with accessibility of exoskeletons is their expensive nature. This expensive price label makes it inaccessible and sparse in the industry. Making a low-cost efficient Exoskeleton will be a new feat in accessibility of technology in all sectors.

Since the key focus is to design a capable system all the while being inexpensive, the whole design methodology was to be reengineered from the selection of the materials, the actuator to the very mechanisms. The anticipatory end result is an adaptable, versatile, industrially relevant inexpensive exoskeleton that enhances the human capabilities of lifting load by about 60% while providing some special capabilities.

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Arm Model With 90° Extension with emg sensors

Structural Arm Model with Linear Actuator

AERIAL SURVEILLANCE ROBIRD

Project team:
1. Syed Ishaq Shahzad (1604-17-736-028)
2. Kausar Zaidi (1604-17-735-005)
3. Mohammad Ghouse Mohiuddin (1604-17-735-096)
4. Khaja Asad ullah (1604-17-735-034)
5. Syed Azhar Hussain Quadri (1604-17-733-082)

Project guides: (i) Dr. (Mrs.) G. Sailaja, Assistant Professor, MED and (ii) Mrs. B. Sucharita, Assistant Professor, ECED

Sanctioned amount: Rs.61,581/-

The construction of flying models should follow the principles of simplicity, slightness and robustness. Thus,

the wooden raft, given to its low density and the enormous easiness which it can be worked out, is one of the basic materials in the construction of flying models. A main part of the bird is the wing. It is responsible for generating the forces that will raise the bird of the ground. It's in the construction of the wing, therefore, that becomes necessary to deposit a well-taken care and special attention. The wings had been made with wooden raft and carbon rods giving a good resistance and low weight. To give form to the wings, we connected the various airfoils made in raft with laths of raft and carbon tubes to strengthen the structure

To be able to have a wing movement similar to the one of real birds we used a set of springs and hinges in order to construct a mechanical spring mechanism in the wrist them. After receiving the start signal, all the motors will go to this position. As said before, contrarily to the standard servos used in the other joints, for the wing beat we used digital servos allowing a better relation force/speed. These servos can make, without any load, a rotation of 60 in 0.06 seconds. In the first test, we didn't use the flexible plastic film to simulate the effect of feathers. We made a great wing beat speed of approximately 640 ms per cycle.
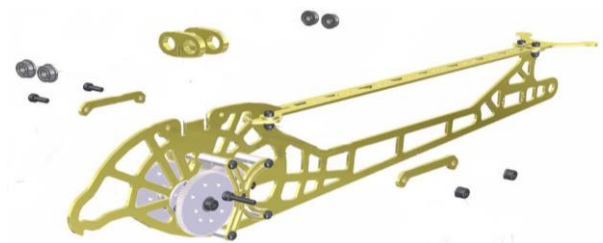
Stages and final model of Robird

EXPERIENTIAL LEARNING IN AUTOMOBILE FABRICATION AND PARTICIPATION IN BAJA, SUPRA COMPETITIONS

Supra Team MJCET at Buddh International Circuit, Noida, New Delhi, 2017

Go-KARTING 2017

MegaATV championship 2018

Supra Team MJCET - Technical Inspection Bay at Buddh International Circuit, Greater Noida, 2019

MJCET team stands at 7th rank in the final endurance test nationwide and achieves   1st rank in Telangana and Andhra Pradesh States in the overall ranking in SAE BAJA 2020

SAE BAJA 2021 – Virtuals Participation   **SAE BAJA 2022 unveiling**

SMART OXYGEN CONCENTRATOR

Investigators:

1. Dr. Mohammed Arifuddin Sohel, Head,ECED
2. Dr. Mohammed Abdul Raheem, Asst. Professor, ECED
3. Mr. Mohammed Muneeruddin, Asst. Professor, ECED

Sanctioned Amount: Rs. 49,915/-

The R and D project titled smart oxygen concentrator was the outcome of the COVID pandemic that affected humanity. The aim of project is to Sense the level of oxygen in the patient's body and automatically increase the outlet of oxygen from the oxygen concentrator, if the level is going down. Also, an alert will be sent to the caretaker/nurse for information and feedback control. The doctor will be able to open an app in his mobile phone and see the current patient oxygen level, he can then press soft keys on the app and increase the output of the concentrator in terms of LPM and monitor its affect in real time. This will reduce the exposure of doctor, nurse or caretaker to the patient. Though multiple solutions have existed earlier, the innovative aspect of this design lies in the real time control of remote equipment which can lead to life saving impact.

The starting point of the design is a pulse oximeter that is connected to Wi-Fi through a node MCU board and live tracking of patient oxygen levels can be done. An alert message will be sent to the mobile phone of doctor, nurse or caretaker. The design specialty is that it can be retrofitted on any commercially available concentrators. The design consists of a 3D printed setup that holds a pi camera which is connected to a raspberry pi board that will transmit live images of the concentrator levels to the mobile phone app. The control mechanism involves a stepper motor whose shaft is connected to the control knob of the concentrator using a belt drive mechanism. The doctor can press the increase and decrease buttons on the mobile screen that will rotate the motor in clockwise and anticlockwise direction and manage the LPM output of the concentrator.

## DESIGN AND FABRICATION OF AI BASED MR DAMPER FOR GUN MOUNTED DRONE

Investigators:
1. Dr. G Sailaja, Associate Professor, MED
2. Dr. Mahaboob Shaik, Associate Professor, EED
3. Dr Mohammed Sajid, Associate Professor, EED

Sanctioned Amount: Rs. 60,000/-

In most experimental studies, nano MR fluids are synthesized in a two-step process. The first step is the most classical method of synthesis, where nanoparticles are prepared by mechanical comminuting, chemical reaction, co-precipitation method, vapor condensation or decomposition of organic complex. Then it is followed by the second step in which the as-produced nanoparticles are dispersed into base fluids with mechanical agitation (stirring) or ultra-sonication.

The present study deals with the synthesis of $NiFe_2O_4$ based nano magnetorheological (MR) fluids prepared under probe sonication with varying carrier oils. To observe the flux line formations, the samples were tested for analytical ferrography. The study also explores the magneto viscous, viscoelastic and rheological measurements to analyze the responses of the colloids. The sweep measurements were carried out with varying shear rates and magnetic fields. The present article can find significance in design and development of nano magnetorheological (MR) fluids. The commercially purchased surfactant was added to silicone oil. Then the dispersion medium was mixed with an ultra-probe sonicator at room temperature. Then the nickel ferrite nanoparticles with diameter ranging from 40 – 80 nm were dispersed in silicone oil under continuous sonication. The test results of nano MR fluid samples show the excellent chain formations. The agglomerated chain formations were noticed for MR fluid samples

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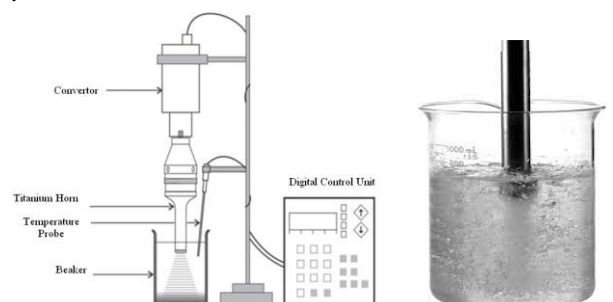
Probe sonicator line diagram and microcavity formation in the sample

INDIAN UTILITY PATENTS

PATENTS GRANTED TO THE COLLEGE

SOLAR SPINNING WHEEL

MJCET, Hyderabad has developed the automation technology through solar powered drive system. The technology package can be retrofitted to the manually operated charkha making it solar powered charkha. This technology is suitable for all types of conditions. Solar power system of larger capacity can be adopted to operate a greater number of machines. Physically challenged people can also operate it. More employment opportunities will be created in villages. It contributes in raising income of spinners and weavers and roll with economic revolution.

The components involved in retro-fitting of conventional charkha into Solar powered spinning wheel are: Solar panel, DC motor, Speed regulator, Solar charge controller and Solar batteries. Solar panel is installed to harvest the electric energy from sun light. Solar batteries are used to store the energy and supply the same during the night times and in poor day light situations. DC motor supplies smooth and uniform drive to the charkha. Variable speed control is used to regulate the machine speed. Belt and pulleys are used for power transmission. Solar charge controller device is used to distribute the electrical power to motor from battery and solar panel. The machine can be fitted with LED lights for working in the nights.

Charkha is fully operated with solar power at free of energy charges. Solar panel and charged solar batteries can support uninterrupted 24 hours of power supply. DC motor provides smooth and uniform machine operation. Varieties of thread sizes are made using variable speed drive. Solar power system supports the additional stand by machine. The main benefits are: Human efforts are substituted with solar power, productivity and earnings are enhanced, and thread quality is improved with minimum wastage of cotton.

On 30/08/2019, a patent has been granted to MJCET for an invention titled "SOLAR POWERED SPINNING WHEEL" by the inventor Dr. **A. Satyanarayana Reddy** for the term of 20 years from 21st of October, 2014 in accordance with the provisions of the Patent Act, 1970. The inventor has been felicitated by the SUES management.

Solar Spinning Wheel

Felicitation of the Inventor– Dr.A.S. Reddy

Technology Transfer team of Solar spinning Wheel

Efforts are being carried out for the technology transfer of the solar spinning wheel, in this process, the team has approached industries to adopt this technology as a part of their CSR activity and also, they have forwarded their proposal to NITI Aayog, which in turn advised to National Research Development Corporation (NRDC). A proposal has been submitted to NRDC in standard format. For the technology transfer a detailed brochure and video of the process have also been prepared.

PROCESS AND SYSTEM FOR EFFICIENT BIODIESEL PRODUCTION

One of the successfully completed R & D project is "Bio-diesel Production Process". This project was filed for patenting in December, 2019 and got published in January, 2020. The Government of India has granted a patent for the same on 19th July, 2021 for a term of **20 years from 31st December, 2019**. The Patent No. is **372207** titled "**Process and System for Efficient Biodiesel Production**". This is the second utility patent granted in the name of MJCET.

The process for efficient biodiesel production, comprising: preparing of a feedstock for biodiesel production, whereby the feedstock is a reactant mixture for trans-esterification process; transferring the feedstock into a reactor flask, whereby the trans-esterification reaction is performed by heating via a microwave irradiation technique under constant stirring along with reaction temperature monitoring; separating the catalyst post reaction completion from a mixture of products and excess ethanol is distilled to retrieve the excess 15 ethanol from the mixture of products for reuse; separating a product mixture containing biodiesel and glycerol in a gravity separator.

The patented "**Bio-diesel Production Process**" project was accomplished in different phases, starting from extraction of biofuels from algae, then extraction of biodiesel from waste cooking oil, improvement in the extraction process to increase the yield using Microwave and glass reactor, then automation of biodiesel pilot plant using continuous flow process. The produced bio-diesel was tested on VCR and it produced good results as a dual fuel combination of Biodiesel and diesel. The inventees of the patent are: Dr. M.G.V. Satyanaryana of Chemistry Department and Dr. Ishrat Meera Mirzana of Mechanical Engineering Department. The project and patenting was funded by R & D, Cell and was encouraged and supported by Advisor cum Director, MJCET- Dr. Basheer Ahmed. The inventees were felicitated and appreciated by Hon. Secretary, SUES- Janab Zafar Javeed Saheb. The SUES management felicitates each inventor of the Utility patent granted with a cash prize of Rs. 25,000/-.

Felicitation of the Inventees and the Bio-diesel Set up

Technology Transfer team of Bio-diesel Project

A PNEUMATIC QUADRUPED ROBOT AND A METHOD OF PREVENTING ACCIDENTS THEREOF

Pneumatic Quadruped robot is MJCET R & D sanctioned project of 2017-18. The designed Quadruped robot consists of rectangular chassis, base block, thigh link, knee link and clevis joints and stopper. Each leg consists of knee and thigh links that are actuated by pneumatic actuators. The assembly set up consists of link with actutators, pneumatic storage tank. For the foot of the quadruped robot, spherical ball structure is utilized that helps them to mobilize on any type of terrain.

The frame structure of the pneumatic quadruped robot enables to have any accessory attachments to it. Thus, it can have an arm attachment with sensory system that can enable them to detect the mines and remove them to avoid any accidents. The structure of the pneumatic quadruped robot has an ability to take payloads upto 80kgs, that enables it to attach accessories mounted easily on it that can help it as an equipment to avoid accidents or accomplish any other tasks.

It has won second prize in the Anveshana (A Science and Engineering Fair) – A competition conducted by AGASTYA International Foundation and won a cash prize of Rs.25,000/- conducted on 30th January, 2018.The Team was among the 30 teams selected at the south zonal competition among the 1100+ teams conducted at Bangalore DRDO and it has been selected as the top team in the south zone. The team has participated at Pune, DRDO for the National level competition held on 24th and 25th May, 2018. The project guides are Dr. Ishrat Meera Mirzana, Professor, Mechanical Engineering Department and Dr. Kaleem Fatima, Professor, Electronics and communication Engineering Department, MJCET.

Seeing the potential, our Advisor cum Director, **Dr. Basheer Ahmed** suggested for patent filing of the project. With the support and encouragement of management of SUES, especially Hony. Secretary **Janab Zafar Javeed Sahab**, we filed a patent of 31/12/2019, published it on 03/01/2020 and got patent granted for a period of 20 years on 16/12/2021.

MUFFAKHAM JAH COLLEGE OF ENGINEERING AND TECHNOLOGY

A PNEUMATIC QUADRUPED ROBOT AND A METHOD OF PREVENTING ACCIDENTS THEREOF
Indian Patent No. 384439 Date of Grant-16/12/2021

PATENTS PUBLISHED BY THE COLLEGE

S.No.	Application No.	Title	Date of Publication	Name of the Inventors
1	201941054824	Method for detecting optimal location and coordinated control of DSTATCOM in a Radial Distribution Network	17/01/2020	Mr. J.V. R. Vittal and Mr. Rafi
2	202141008948	Personal safety system to protect individual from attackers	06/08/2021	Mr. Arhsad Mohammed, Mr.Mohammed Rizwan,Ms.Samreen Unnisa and Ms.Shahana Sarwath
3	202141059784	Magneto Rheological Fluid Clutch System and Method of Synthesis Thereof	28/01/2022	Dr. Hemalatha and Dr. D. Srinivasa Rao
4	202241011486	Structural Vibration Mitigation Damper and Its Working	11/03/2022	Dr. G. Sailaja

AUSTRALIAN INNOVATION PATENT GRANTED TO THE COLLEGE

An Australian Patent titled "A Method to Enhance Optical Properties of a Zinc Arsenic Tellurite Glass" has been granted from 29th July,2021 for a period of eight years with a Patent Number – 2021104728 on 13th April,2022, whose inventee is Dr. Shaik Kareem Ahamad, Head, Physics Department and Coordinator, Publications, MJCET.

DESIGN PATENTS GRANTED TO THE COLLEGE

S.No.	Design No.	Title	Name of the Inventors	Date of Registration
1	339601-001	Testing Kit	Mr. Mohammed Arshad	01/11/2021
2	337524-001	Case for Thermal Camera	Mr. Mohammed Arshad	03/12/2021

DESIGN PATENTS FILED BY THE COLLEGE

S.No.	Application No	Date of Filing	Title	Name of the Inventors
1	342386-001	14-04-2021	MR Damper	Dr. G Sailaja
2	345887-001	08-07-2021	Contactor	Mr. Mohammed Sajid

COPYRIGHT REGISTERED BY THE COLLEGE

MJCET has secured its first registration of COPYRIGHT u/s 45(2) of the Copyright Act, 1957 valid for life long. Copyright is registered with registration number – A-141416/2022 on 15/03/2022, for the Printed Circuit Board (PCB) designed and fabricated for the R&D project "MIMOSA SUIT". Author is Mr Arshad Mohammed Assistant Professor, EED.

SIR J C BOSE MILLIMETER WAVE EXPERIMENT

Dr. Shaik Kareem Ahmmad, Head, Physics reproduced the working model replica of 'Sir J C Bose Millimeter Wave Experiment'. The project was sponsored by IEEE in association with World Trade Center, Bangalore, on the occasion of the 160th anniversary of Sir Jagadish Chadra Bose on 17th February, 2019. It is a IEEE sponsored project


TAKE OUT ROBOT PROJECT – A COLLABORATIVE PROJECT BETWEEN HBL POWER SYSTEMS LIMITED AND MJCET

As R & D work has been extensively carried out in the college in the field of robotics, HBL was impressed about the same when it had a visit to the college to sign an MoU with MJCET. Thus, a commercial order for design and fabrication of the "**Take out Robot"** was offered to Mechanical and ECE departments for the execution of the same for Injection molding machine utilized for the battery covers.

One of the most widely used technologies in industries is robotics. The increasing demands and development require complex procedures and precise approach especially in the manufacturing. This is achieved by the introduction of 3-axis servo robot in such workplaces. The most effective usage of the robot is when it is completely autonomous and is intelligent enough to perform the required operations on different types of objects. Take-Out robot presents this usage by implementing the concepts of picking and placing an object to a required area. The objects present in the workspace are determined with their coordinates in the workspace. The Z-axis of Take-out robot reaches the object's position using mechanical power transmission, picks the object with its end effector, and places it at the desired position within the workspace. Thus, Take-Out robot is an efficient manipulator.

The objective is to incorporate automation into the system by using a PLC, the coordinates of the object in the workspace are determined. This gives the joint angles through which the axis of the Take-Out robot is to be actuated, to reach the object. Hence the arm executes the pick and place task. One of the tasks involved over here is communication. The final key point of this project is the integration of the above-mentioned tasks to form a robust and complex 3-Axis servo robot system that is very strong enough to pick up objects for the task of placing as would be done by a human being.

The Take-out Robot will be utilized for Injection Molding Machine, first two phases of the project have been completed and the next phase consists of the procurement of materials by HBL, which will be assembled and tested at MJCET facility. There are four phases of project – Design of the robot, preparation of industrial drawings and BOM, Procurement of materials and fabrication and testing of the robot. The project is being accomplished by Mechanical and ECE department faculty and students. The project will be completely executed by the month of November, 2022. Based on the strategical execution of this project, four more projects have been offered by the HBL power systems limited to the Mechanical Engineering Department for research and execution.
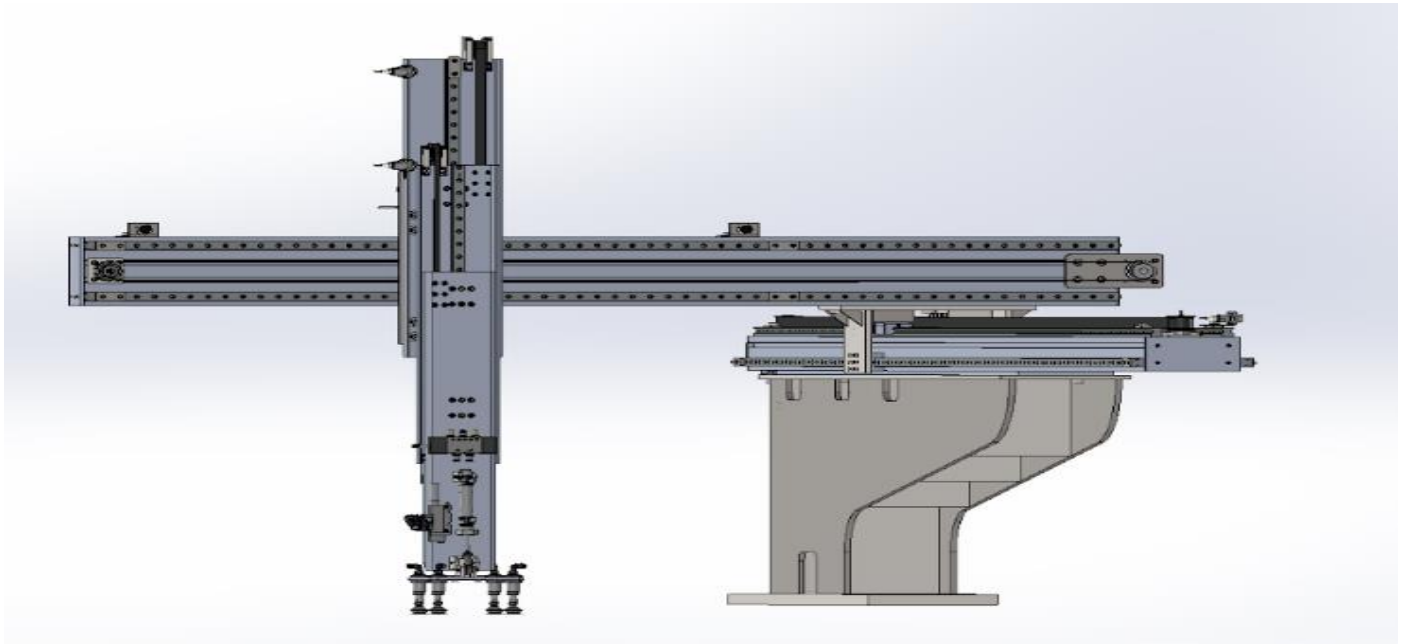
AICTE-ISTE SPONSORED INDUCTION/ REFRESHER PROGRAMME
ON
NANOTECHNOLOGY APPLICATIONS IN MECHANICAL ENGINEERING

Mechanical Engineering Department has successfully conducted AICTE-ISTE sponsored refresher program on "Nanotechnology Applications in Mechanical Engineering", 10th -16th December, 2021. They received a funding of **Rs.93,000/- from AICTE** for the conduction of the program. Nanotechnology is an emerging area which has applications in every walk of life. This emerging technology can be applied in any field of science with the aid of applied in any field of science with the aid of the core engineering like mechanical engineering. Thus, this refresher program is focused on nanotechnology applications in mechanical engineering. The inaugural session was graced by Col. Venkat, Director, FDP, AICTE, Dr. Venkat Subbaiah, Vice President, ISTE, New Delhi and Dr. Manipal Singh Rawat, Principal, MJCET. This six day online refresher program has eminent resource persons from academia like Dr. Absar Ahmed, Director, Interdisciplinary Nanotechnology centre, AMU who is recognized as top 2% scientists in nanotechnology by CSIR, Pune, Dr. Manorama, Scientist, CSIR, is considered as top 5% scientist by Stanford University, Prof. Anandh Subramaniam & Prof. Shantanu Bhattacharya from IIT Kanpur, Prof. Ghanashyam Krishna and Prof. Dibakar Das from University of Hyderabad, Prof. D. Ravi Shankaran from University of Madras, Prof. P.V. Rao from IIT Delhi, Prof. Aravind Kumar from IIT Hyderabad, Prof. A. R. Bhattacharya from IIT Bombay and from research organizations – Dr. Menaka Jha, Scientist, INST and Mr. D. Gokul, Scientist, ISRO. The sessions on NEP 2020 were taken by Dr. Adam Khan and on Stress management by Dr. Mangal Dhend, founder of Vihangam Techno Holistic Organization. As per norms of AICTE-ISTE only 100 participants were selected to attend the refresher program. The participants are from PAN India i.e., Jammu and Kashmir to Kerala, Manipur to Maharashtra. The participants were from Delhi, Chhattisgarh, Gujarat, Karnataka, Telangana, Andhra Pradesh, Tamilnadu etc. The program was successfully organized by the program coordinator, Dr. Ishrat Meera Mirzana, with the support of organizing team – Dr.Syed Ferhatullah Hussainy, Dr. Mohd. Viquar Mohiuddin, Dr. G. Sailaja, Dr. Raheem Junaidi. The valedictory was graced by the chief guest - Prof. T. Ramamohan Rao, Executive council member, ISTE. The department of mechanical engineering is thankful to AICTE and ISTE for providing funding to organize the refresher program and Janab. Zafar Javeed saheb, Hon. Secretary, SUES and Dr. Basheer Ahmed, Advisor cum director, MJCET for their support and encouragement.
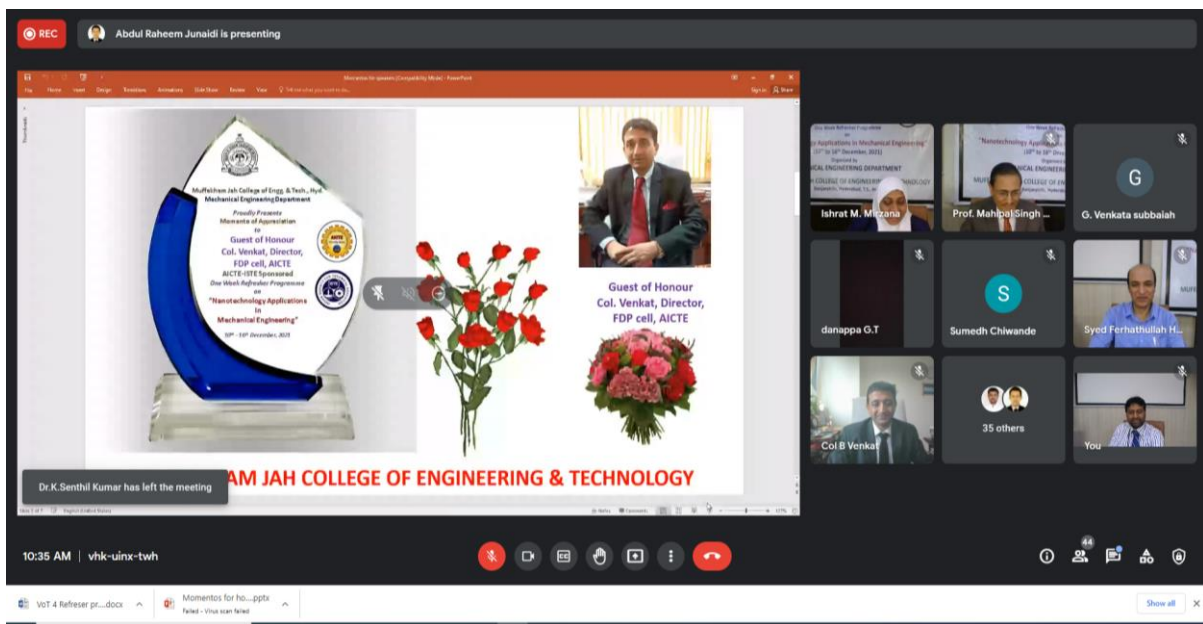
ACTIVITIES OF R AND D CELL, MJCET

1. The Drone Dance Championship was organized by Board of International Aviation Games (BIAG). Students of Electrical Engineering Department had participated and **ranked 2nd in Central India Zone.** Student Team consists of B. Sidhant , Buddhavaram Chaitanya Roy,Mohammed Sohel and Syed Aziz Ahmed. The mentor of the team was Dr. Mohammed Sajid, Associate Professor, EEED

Team with their Dancing Drone

FORTHCOMING EVENT

A IPR awareness program is being conducted in association with AICTE-KAPILA on 17th June, 2022 from 4.30 PM to 5.30 PM (online). The registration link for the program is - https://forms.gle/UnpvAoRQRBoAzc459.

IMPORTANT INFORMATION

MJCET is registered with KAPILA and encourages the faculty to publish their utility patents in association with college.

MJCET is registered with I-STEM and encourages the researchers to register and utilize the research facilities across INDIA

ROBOTICS ACTIVITIES

ROBOCON 2021

ROBOCON 2020

SYNERGITIC ARTICULATED ROBOTIC MANIPULATOR (SARM)

Project team:
1. Mohammed Zia Ahmed Khan (1604-17-736-070)
2. Kausar Zaidi (1604-17-735-005)
3. Mohammed Waseem (1604-17-735-032)
4. Khaja Asadullah (1604-17-735-034)
5. Syed Azhar Hussain Quadri (1604-17-735-082)
6. Misbah Zarrar (1604-17-735-084)

Project guide: (i) Dr. Kaleem Fatima, Professor, ECED
(ii) Ms. Maliha Naaz, Assistant Professor, ECED

Sanctioned amount: Rs. 77,500/-

The complete SARM is designed and manufactured from the scratch within the TRM Lab at college through 3D printing using PLA material. With proper metal reinforcement in the links and use of the Cycloidal gears the arm is able to lift up the desired payload achieving minimum required torque and precision at each joint using the stepper motors. One of the key implementations in this project is the use of MoveIt tool and FindObject2d library integrated within the developed framework using ROS. FindObject2d processes the captured data from the camera and compares with the stored dataset. This image processing involves the SIFT and SURF algorithms.This involves • Detection of interest point • Assignment of orientation to interest point • Calculation of descriptors associated with interest point The result of processing is the x,y coordinates of the object in the captured image in real time. The end effector is required to move to these coordinates to pick the object, for this, the links should rotate upto certain angles so that the end effector reaches the destination. MoveIt provides these angles called as "Joint States" by performing the Inverse kinematics analysis and calculations for the design feed in the form of URDF. These joint states are then passed to the Arduino Due microcontroller which is responsible for issuing the driving commands to actuate the stepper motors and servo motors. Thus, the arm moves to the object and picks/places it autonomously.

Also, the complete path followed by the links in 3D space is simulated and visualized in Gazebo and RViz environment in ROS framework. Attached image shows SARM following a path visualized in RViz tool.

The object detection algorithm is implemented to detect the object present in the workspace. Image localization is implemented to find the coordinates of the detected object. Communication between two computing boards i.e., Raspberry Pi and Arduino is also achieved The coordinates of the object are used by the inverse kinematics script to solve the equations for joint angles. The calculated joint angles are sent to the Arduino microcontroller using the serial bus. The BAUD rate 115200 is used to transmit the data through serial communication between Raspberry Pi and Arduino Board. The microcontroller rotates the stepper motors, picks the object from the workspace and places it at a defined place and thus the functioning of the inverse kinematics algorithm that we have developed was also tested on the SARM.

SARM in its workspace

AI BASED PEST DETECTION AND CONTROL SYSTEM USING THERMAL IMAGE SENSING

Project team:
1. Mohammed Imroz Khan (1604-16-739-030)
2. Abrar Mohammed (1604-16-739-050)
3. Mohammed Afrozuddin (1604-16-739-036)
4. Mohammed Abdul Gafoor (1604-16-737-104)
5. Syed Muzammil Hussain (1604-16-737-099)

Project guide: Mr. Arshad Mohammed, Assistant Professor, EED

Sanctioned amount: Rs.35,500/-

Thermal Camera

The main purpose of this project is to identify the pests as well as Rodents using Thermal imaging systems by analyzing their heat signatures and using techniques like Gaussian filter Algorithm. The Lepton FLIR thermal sensor is integrated on a TEENSY3.6 microcontroller is enabled to shoot thermal images and display them on the touch display embedded within.

TESTING KIT

Investigator: Mr. Arshad Mohammed, Assistant Professor, EED

Sanctioned amount: Rs.10,000/-

The multipurpose testing kit is designed for First-year students to do Basic Electrical Engineering laboratory experiments. The Kit is basically a self-powered and easy to assemble which gives much flexibility to the freshers a lead to conduct the experiments at ease. A total of five experiments on basic electrical circuits can be conducted on this kit to realise basic theorems. With a cost of Rs.500/- a total of five kits were designed and manufactured by the Electrical Engineering Department.

TESTING KIT

MIMOSA SUIT

Investigator: Mr. Arshad Mohammed, Assistant Professor, EED
Sanctioned amount: Rs.15,400/-
The women's protection suit "MIMOSA SUIT" is basically a low-budget protection suit for the women who typically needed protection from the eve-teasers. The suit is lined up with electrical conductivity fibre which does give natural look to the suit and flows high voltage in it without harming the wearer. When the wearer feels any threat, by simply pressing the button at the cuff, arms the suits. Whenever the intruder tries to touch the wearer, the intruder will be subjected to a high

voltage which may stun the intruder and gives ample time and scope to the wearer to do needed protection. The High Voltage generation circuit is a three-stage innovative circuit which multiples the 12volts to 3Kilo Volts which is just needed to stun the attacker and protect the wearer.

DEMONSTRATION OF MIMOSA SUIT

OBJECT TRACKING AND SURVEILLANCE USING QUADCOPTER

Investigator: Mr. Arshad Mohammed, Assistant Professor, EED

Sanctioned amount: Rs.46,400/-
The main objective of this project is to overcome the listed drawbacks by attaching a camera to the Quadcopter and developing an OpenCV - Python code using MobileNet Single Shot Multibox Detection (SSMBD) algorithm for object detection, which is used for processing incoming real-time video feed from quad-copter onto ground station (PC). The project will serve as a bridge to detect objects in real-time situations in areas that cannot be navigated easily by security personnel or where cameras cannot be employed. The Quadcopter will be used to hover and transmit a real-time video feed to the ground station, which performs precise processing and analysis of the stream. Due to the quad-copters capability of flying over different altitudes, it can generally be used in areas with rugged terrains or over water bodies for a time-dependent on its power capacity. SSMBD algorithm uses VGG 16 architecture as a base network due to its strong performance and high-quality image classification tasks.

Quadcopter setup

IPR AWARENESS ORGRANIZED BY MJCET

WEBINAR IN ASSOCIATION WITH RGNIIPM

RESEARCH FUNDING AWARENESS PROGRAM

MJCET- Awareness Program on "Institutional Research Funding" Speaker: Prof. A Ravinder Nath, Professor Emeritus, Institute of Science and Tech., JNTUH (13-10-2021)

STRATEGIC PLANS FOR 2022-23

➢ Technology Business Incubation (TBI) Center will be established Shortly for encouraging Students Start-ups.

➢ Drone Center will be established to facilitate training and project execution in drone technology

➢ To get external funding from government, non-government. Industry and alumni. In this process, funding has been accrued from Alumni for research projects in ECE, Mechanical and Civil Departments

SULTAN-UL-ULOOM EDUCATIONAL SOCIETY IS PROVIDING Rs. 40 LAKHS AS RESEARCH GRANT (R & D) FOR PROJECTS, PATENTS, DRONE, ROBOTICS, TBI