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- 108 MOUs
- 288 patents

Department of *Mechanical Engineering* Presents,
3rd International Conference on

"Recent Advances in Mechanical Engineering"

on 15th & 16th December 2023

(ICRAME-2023) **PROCEEDINGS**

Editor in Chief
Dr.P.Santosh Kumar Patra

nirf Ranked Institute

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Department of Mechanical Engineering

3rd International Conference on "Recent Advances in Mechanical Engineering" (ICRAME–23)

ISBN No: 978-93-91420-80-2

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Group Director, SMEC

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Sri. M. LAXMAN REDDY
Chairman

MESSAGE

I am extremely pleased to know that the Department of Mechanical Engineering of SMEC is organizing an 3rd International Conference on "Recent Advances in Mechanical Engineering" (ICRAME-23) on 15th and 16th of December 2023. I understand that a large number of researchers have submitted their research papers for presentation in the conference and for publication. The response to this conference from all over India and Foreign countries is most encouraging. I am sure all the participants will benefit from their interaction with their fellow researchers and engineers, which will help with their research work and subsequently to society at large.

I wish the conference meets its objective and confident that it will be a grand success.

M. Laxman Reddy
Chairman

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Sri. G. CHANDRA SEKHAR YADAV
Executive Director

MESSAGE

I am pleased to state that the Department of Mechanical Engineering of SMEC is organizing the 3rd International Conference on "Recent Advances in Mechanical Engineering" (ICRAME-23) on 15th and 16th of December 2023. For strengthening the "MAKE IN INDIA" concept many innovations need to be translated into workable product. The concept of commissioning is a long route. Academicians can play a major role in bringing out new products through innovations. I am delighted to know that there are a large number of researchers who have submitted papers on Interdisciplinary streams. I wish all the best to the participants of the conference additional insight into their subjects of interest. I wish the organizers of the conference great success.

G. Chandra Sekhar Yadav
Executive Director

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Dr. P. SANTOSH KUMAR PATRA
Group Director

MESSAGE

I am delighted to be the Patron & Program Chair for the 3rd International Conference on **"Recent Advances in Mechanical Engineering" (ICRAME-23)** organized by the Department of Mechanical Engineering on 15th and 16th of December 2023. I have strong desire that the conference to unfold new domains of research among the Mechanical Engineering fraternity and will boost the knowledge level of many participating budding scholars throughout the world by opening a plethora of future developments in the field of Mechanical, Engineering. The Conference aims to bring different ideologies under one roof and provide opportunities to exchange ideas, to establish research relations and to find many more global partners for future collaboration. About 57 research papers have been submitted to this conference, this itself is a great achievement and I wish the conference a grand success.

I appreciate the faculties, coordinators, and Department Head of Mechanical Engineering for their continuous untiring contribution in making the conference a reality.

Dr. P. Santosh Kumar Patra
Group Director

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Dr. M. SRINIVAS RAO
Principal

MESSAGE

Contemporary Society is technological and relies on technology for various aspects of daily life . There is no life without digital platforms, Internet, apps, codes, etc. Navigating the complexities of a technological society requires a balance between embracing innovation and addressing the challenges that come in the way. Considering the immediate needs of the technical Society, SMEC has been organizing International Conferences every year which really help a candidate in acquiring technical skills and making themselves familiar with the new inventions.

International Conferences are a Perfect Platform for enthusiastic researchers to come up with their innovative ideas, and I am delighted that Department of Mechanical Engineering is organizing 3rd International Conference on "Recent Advances in Mechanical Engineering" (ICRAME-23) on 15th and 16th of December 2023 to enhance the skills of desiring participants. The showcase of new ideas and the latest technological advancements through this Conference would facilitate the transfer of technology, helping participants to get updated with the latest tools and methodologies. I firmly believe that this Conference serves as the catalyst for change by bringing attention to pressing issues in different fields, encouraging discussions, fostering collaboration, and promoting initiatives that address different challenges on a global scale. It is an excellent opportunity to broaden our knowledge, establish meaningful connections, and contribute to advancing engineering research. I assure you that the commitment to excellence in education and research is reflected in this Conference, providing a unique platform for learning and growth. Around 57 research papers were submitted to this Conference. I wish the authors a promising future and the Conference a grand success.

I appreciate the continuous efforts and dedication of Dr. D.V. Sreekanth and faculty members for their invaluable contribution to advancing global discourse. My most profound appreciation to the organizers and coordinators for organizing a conference of such caliber.

Dr. M. Srinivas Rao
Principal

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Dr. D.V. SREEKANTH
Convener & Dean Administration

MESSAGE

The world is always poised to move towards new and progressive engineering solutions that results in cleaner, safer and sustainable products for the use of mankind. India too is emerging as a big production center for world class quality. Mechanical Engineering has always played a vital role in this endeavor.

The aim of the 3rd International Conference on "Recent Advances in Mechanical Engineering" (ICRAME-23) being conducted by the Department of Mechanical Engineering of SMEC, is to create a platform for academicians and researchers to exchange their innovative ideas and interact with researchers of the same field of interest. This will enable to accelerate the work to progress faster to achieve the individuals end goals, which will ultimately benefit the larger society of India. We, the organizers of the conference, are glad to note that 57 papers have been accepted for presentation during this conference. Steps have been taken to publish these papers with ISBN number in the Conference Proceedings and all the selected papers will be published in Scopus / UGC recognized reputed journals. The editorial Committee and the organizers express their sincerity to all authors who have shown interest and contributed their knowledge in the form of technical papers. We are delighted and happy to state that the conference is moving towards a grand success with the untiring effort of the faculties of the Department of Mechanical Engineering of SMEC and with the blessing of the Group Director and Management of SMEC.

Dr. D.V. Sreekanth
Professor & HOD, ME

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Dr. S.V.S. RAMA KRISHNAM RAJU
Dean Academics

MESSAGE

It gives me immense pleasure to know that St. Martin's Engineering College, Department of Mechanical Engineering is organizing 3rd International Conference on "Recent Advances in Mechanical Engineering" (ICRAME-2023). I am sure that this conference will provide a forum for national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers, and researchers immensely and widen the horizons of their knowledge and work experience in the field of Mechanical Engineering.

I sincerely appreciate the humble efforts of the Institute in providing a platform for students, academicians, researchers, and industrialists to share their ideas and research outcome through the forum of this Conference.

I give my best wishes to all delegates and the organizing committee to make this event a grand success.

Dr. S.V.S. Rama Krishnam Raju

Dean Academics

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Dr. SANJAY KUMAR SUMAN
Dean R&D

MESSAGE

Research, curiosity and discovery has been in existence ever since man's presence on this planet millions of years ago, civilization has been characterized by curiosity and discovery. Therefore, the curiosity to explore what will happen, how it happens, is there a better way to do it, has been the driving force behind all research efforts. During the past few decades, the engineering faculties have taken a number of initiatives to reorient the engineering machinery to play leading roles in the industrial development process.

I am delighted to acknowledge the "3rd International conference on Recent Advances in Mechanical Engineering" organized by the Department of Mechanical Engineering. I appreciate the organizing team for showing their keen interest in organizing a successful conference to provide a platform for contributors to explore new ideas and exchange research findings among researchers. I thank the support of all students, authors, reviewers, conference team, faculty members, and conference Convenor for making the conference a grand success. Best Wishes

Dr. Sanjay Kumar Suman

Dean R&D

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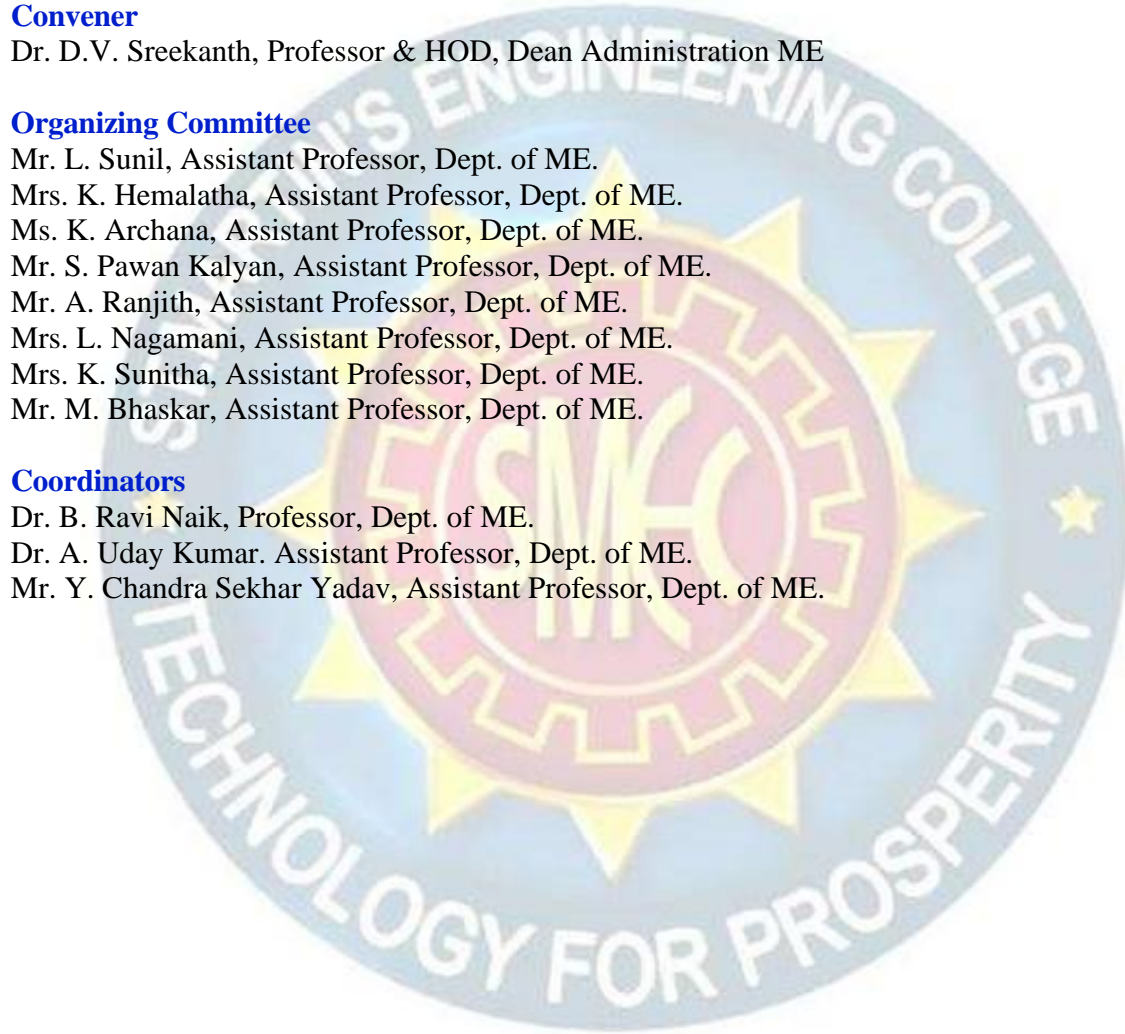Mrs. K. Sunitha, Assistant Professor, Dept. of ME.
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DESIGN OF INVIGILATION ROBOT

B. Bhargav Raman [1], Ch. Sadhanandha [2], K. Madhusudhan [3], N. Sumanthi Reddy [4], Dr. D.V.Sreekanth[5*]

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ABSTRACT

Nowadays, school exams and various professional tests have become an important platform to test candidates' academic ability or professional skills. However, exams or tests, especially when a large number of people are involved, are usually associated with high manpower costs. These manpower costs arise from the large number of human invigilators deployed in the exam setting. This project will focus on the design and development of the invigilating robot. That will serve in the examination setup and ensure the proper operation while the exam is in progress. It will not only minimize the manpower costs but also the unnecessary human error caused. It can replace human invigilators to distribute papers ,verify candidates identity, communicate with candidates when problems arise. It has huge potential market values and can be widely used in all types of exams with some modifications to it functions . Only one main invigilator is needed to control the robot. To design this , the interfaced devices are PIC microcontroller, camera , DC gear motors and IR sensor ultrasonic sensor.

Keywords: Invigilation Robot, PIC microcontroller, camera.

DESIGN OF INTELLIGENT AUTONOMOUS SIX-LEG ROBOT

Ajay Thumma [1], Rohith Kothuru [2], Babaji Byri [3], Anand Annepu [4], S. Pavan Kalyan[5*]

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ABSTRACT

The design and analysis of Six-legged robot by using Catia software. This robot can navigate effectively and autonomously in a wide range of environments. At that point it should be noted that nature inspired optimization techniques have been widely studied for autonomous navigation of six legged robots. An intelligent robot that easily operates on uneven surfaces with six-legged arms. Legged robots are appropriate to stroll on troublesome landscapes to the detriment of requiring complex control frameworks to walk even on level surfaces. The field of robotics has witnessed significant advancements in recent years, with a particular focus on creating intelligent and autonomous robots. This hexapod robot boasts advanced sensors granting it unparalleled autonomy. Its six legs enable exceptional mobility in various terrains, making it an ideal choice for applications like search and rescue, agriculture, and environmental monitoring. We explore the robot's intricate design, from its locomotion system to sensory capabilities. The Intelligent Autonomous Six-Leg Robot combines state-of-the-art technologies, including advanced sensors, and innovative mechanical design. Its six-legged locomotion system enables it to traverse challenging terrains, such as rough terrain, rubble, and uneven surfaces, with remarkable stability and efficiency. The robot's autonomous capabilities allow it to make real-time decisions, avoid obstacles, and adapt to changing environments, making it an invaluable tool in scenarios where human access is limited or hazardous. The Intelligent Autonomous Six-Leg Robot represents a significant advancement in the field of robotics, offering a platform for intelligent and autonomous exploration and intervention in challenging environments. This research explores the fundamental technologies and applications of this innovative robotic system, paving the way for a new era of autonomous robots that can enhance safety, efficiency, and productivity in various domains.

Keywords: Six Legs, Hexapod, Sensors, Navigation.

DESIGN OF RIPPED FRUIT-PLUCKING ROBOT

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ABSTRACT

Ripped Fruit Plucking Robot designed using the Arduino microcontroller platform. The RFPR is a sophisticated robotic system that combines computer vision and precise manipulation to autonomously detect and harvest ripe fruits from trees. The core components of the RFPR include an Arduino microcontroller, a robotic arm, and a camera module. The Arduino serves as the brain of the system, facilitating real-time data processing and decision-making algorithms. The camera module is responsible for capturing high-resolution images of the fruit-laden branches. These images are then processed using computer vision techniques to identify and analyse the ripeness of each fruit based on colour, size, and texture characteristics. By leveraging machine learning algorithms, the RFPR continuously improves its fruit recognition accuracy over time. Once the ripe fruits are identified, the robotic arm, actuated by servo motors, moves with precision and delicacy to pluck the fruits from the tree. The design of the robotic arm incorporates soft grippers to minimize any potential damage to the plant or surrounding fruits during the plucking process. RFPR is equipped with safety features to prevent collisions with obstacles and ensure the safety of nearby workers.

Keywords: Fruit Plucking Robot, Agriculture, Automation, Machine Learning.

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DEVELOPMENT OF PLASTIC PAVEMENT BLOCKS

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ABSTRACT

The development of plastic pavement blocks is a significant stride towards sustainable infrastructure. By utilizing recycled plastic waste and innovative additives, these blocks offer a durable and eco-friendly alternative to conventional concrete. Extensive testing demonstrates comparable strength and reduced carbon footprint, addressing plastic waste pollution. The application of plastic pavement blocks in road construction, landscaping, and urban development showcases their versatility. With ongoing research, this eco-friendly solution has the potential to revolutionize construction practices and contribute to a greener future. The abstract encapsulates the key advantages and potential impact of adopting plastic pavement blocks in sustainable construction projects.

Keywords: Plastic Pavement blocks, Green buildings, Recycled Plastic.

DESIGN OF BIPED WALKING ROBOT

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ABSTRACT

This presents developmental design of a simple bipedal walking robot. The robot replicates the walking style of a human particularly walking upright, these robots are engineered to perform tasks and navigate environments in a manner like humans. The robot is built with light-weight Aluminum sheets which act as the structural members and housing the servos. An Arduino controller produces intelligent commands to the servos for walking. The Arduino board serves as the brain of the robot, controlling the movements of the servo motors through carefully crafted algorithms. Bipedal working robots find applications in various fields, including research and development, human-robot interaction, medical rehabilitation, search and rescue missions, and entertainment, ushering in a new era of robotics that aims to coexist harmoniously with humans and enhance our daily lives.

Keywords: Bipedal Walking Robot, Arduino, Algorithms.

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DESIGN OF AUTONOMOUS QUADCOPTER

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ABSTRACT

This study explores innovative solutions for limited access to healthcare centers by designing and promoting at-home testing through user-friendly sample collection kits. Concurrently, the utilization of CATIA software facilitates the optimization of flight parameters to improve delivery efficiency under diverse whether conditions. The integration of ANSYS enables model error reduction, refining the testing process. Moreover, the design considerations of Autonomous Quadcopter, to enhance the efficiency and safety delivery process. Mitigates the threat of aerial vehicle collisions. Integrating desired velocities further enhances healthcare testing and aerial operations, culminating in a comprehensive and highly efficient approach.

Keywords: Quadcopter, CATIA, Aerial Operations.

DESIGN OF AUTOMATIC WALL PAINTING ROBOT

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ABSTRACT

The primary aim of the project is to design of Automatic Wall Painting Robot which helps to achieve low-cost painting process and equipment. Despite the advanced techniques in robotics and it Is wide spreading application in wall painting has shared little in research activities. The system performs the painting process by the use of sensors information. The ultrasonic sensor mounted are on the mobile robot in a way so that the first sensor is positioned to give vertical coordinates and the second sensor gives the horizontal coordinates. The painting chemicals can cause hazards to the human painters such as eye and respiratory system problems, Also the nature of painting procedure that requires repeated work and hand rising makes it boring, time and effort consuming. When construction workers and robots are properly integrated in building tasks, the whole construction process can be better managed and savings in human labor, timing and cost are obtained as a consequence. In addition, It offer to reduce human exposure to difficult and hazardous environments, which would solve the most of the problem related to safety when many activities accurate the same time. All these factors motivate the development of an automatically painting robot.

Keywords: Automation, Wall Painting Robot, Ultrasonic Sensor.

INCREMENTAL FORMING OF Al1064 AND TESTING SURFACE CHARACTERISTICS BY TALYSURF

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ABSTRACT

Incremental forming is a manufacturing process used to shape sheet metal into desired shape using a series of small, localized deformations. This process is employed where the small, detailed, high accurate results are need to be achived. ro In this process, a tool is moved on the workpiece along a programed path, while pressing against the sheet metal gradually formed into the desired shape. Here we perform this action on Al1064.The sheet with 1064Al often is used to fabricate aluminium parts at room temperate in the incremental forming process due to the fact that the metal has a high ductility in the normal temperature. Howeverr, the material can cause the large quantity of spring back for parts formed to influence dimensional accuracy. The aluminum alloys are used in industries for a large scale due to their favorable properties and different mechanical, thermal, and chemical characteristics. They can be tailored for specific applications by adjusting the alloying elements and processing parameters. Here in this process, we perform the incremental forming on Al1064. By using the talysurf, the surface roughness of the component is measured, Where this talysurf device consists of the stylus, which slides on the surface of the material and records the observation. This method can measure the surface roughness, contour and waviness over the flat surfaces. In this paper, the use of the SPIF can effectively improve the dimensional accuracy of parts compared to single stage forming and double stage forming at room temperature. The effect of main process parameters, such as tool diameter, feed rate, step size and current, on temperature is studied in detail using the SPIF. Some target values namely, the max temperature , the average temperature, and the max temperature difference, are measured with a cone using 1064 Al. Moreover, the response surface methodology has been employed to analyze results in detail and to establish respectively corresponding models to predict the target values.

Keywords: Incremental Sheet Metal Forming, Talysurf, Al1064.

FABRICATION OF WALL CLIMBING ROBOT

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ABSTRACT

The purpose of wall climbing robots is climbing mainly on the vertical surfaces like that of walls. The robots are required to have high, maneuverability and robust & efficient attachment and detachment. The robot can automate tasks which are done manually with an extra degreed of human safety in a Cost-Effective manner. The robot can move in all the four directions forward, backward, left and right. The other locomotion capabilities include linear movement, turning movement, lateral movement, rotating and rolling movement. Apart from the reliable attachment principal the robot should have low selfweight and high payload capacity. The design and control of robot should be such that it can be operated from any place. A wireless communication link issued for high performance robotic system. Regarding the adhesion to the surface the robots should be able to produce secure griping force. Robots should adopt to different surface environments from steel, glass, ceramic, wood, concrete etc. with low energy consumption and cost.

Keywords: Wall Climbing Robot, Maneuverability, High Payload Capacity.

DEVELOPMENT OF MINI DRONE WITH PROXIMITY ALERT

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ABSTRACT

Drones are widely used in a number of fields. The major issue associated with drones is cost and there is a huge risk of damage while flying. The typical solution for this issue is the Mini drones with proximity sensor. This sensor is used for obstacle detection features using LIDAR (Light Detection And Ranging).This drone makes use of a Arduino pro mini to sense the proximity using LIDAR and operate the LED and buzzer accordingly. So, we get a low cost and lightweight micro drone, LED and Buzzer indications as per obstacle distance. That can take off from anywhere, fly indoors and gardens and it is less risky to fit in dense forest of tricky places and it senses the obstacles using LIDAR proximity sensor.

Keywords: Drone frame, Arduino pro mini, LIDAR Module, Buzzer, Led, Drone Motors.

DEVELOPMENT OF NAMSTE GREETING ROBOT

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ABSTRACT

This paper introduces a service robot that performs the repetitive task of welcoming people graciously both by a sweet, recorded message and hand gesture representing "Namaste" – an Indian traditional method wishing of people. Most commonly we observe people dressed in imitation costumes of Mickey Mouse, Donald duck, Teddy bear etc., near schools, colleges, offices, in parties and marriages. Here the people wear only costumes and perform the task of wishing unfamiliar people mechanically which is a mind-numbing task. In this paper, we designed a service robot that acts as a host in receiving people and performs the same task for hours without getting weary. This is a low-cost flexible robot that can be designed and constructed without difficulty. The "Namaste Greeting Robot" is an innovative humanoid robotic system designed to bridge the gap between modern technology and cultural traditions by offering a personalized and culturally- appropriate greeting experience. Inspired by the traditional Indian greeting "Namaste," the robot combines advanced robotics, artificial intelligence, and machine learning techniques to create a socially interactive and respectful greeting process. This study highlights the technological advancements and cultural sensitivity incorporated into the Namaste Greeting Robot. As society moves toward greater integration of artificial intelligence and robotics, this project serves as a pioneering example of how technology can respect and celebrate diverse cultural practices, fostering a deeper sense of inclusion and harmony among human-robot interactions.

Keywords: Robot, CNN, UML.

IOT BASED MONITORING AND CONTROLING SYSTEM FOR FARMING

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ABSTRACT

As we can see in today's world only some devices like PC's and mobiles are connected to internet. Now-a-days world is fully overtaken by the internet and internet of things. Internet is use for basic need of all human beings. The Internet of Things (IOT) is the network of physical objects. It simply means to monitor a physical device or machine or it is inter-networking of physical devices which are embedded with electronics, sensors and software and network connectivity to enable it to achieve greater value and services by exchanging data with the manufacturer IOT permits objects to be sensed or controlled remotely across the network infrastructure. The result improves accuracy, economic benefits, efficiency and reduces intervention of human. In this paper we are going to deal with basic and important concepts of IOT and its scope in upcoming future. This paper studies the need of IOT in day-to-day life for different applications and gives brief information about IOT. IOT contributes significantly toward revolutionary farming methods. So we are trying to demonstrate IOT in Automatic watering system. Automatic watering system monitors and maintains the approximate moisture content in soil. ESP8266 WIFI MODULE is used as microcontroller to implement the control unit. The setup uses a temperature sensor, moisture sensor and humidity sensor which measure the approximate temperature, moisture and humidity in the soil. This value enables the system to use appropriate quantity of water which avoids over/under irrigation.

Keywords: IOT, Farming, Sensors.

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DEVELOPMENT OF WELCOME ROBOT

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ABSTRACT

This project is aimed at developing a robot that welcomes people. The entire project is developed by using Arduino. The speaker welcomes the people in a systematic way. When a person enters the room, the ultrasonic sensor, which is placed in the robot, activates the Arduino and it turns into an output that controls the motor placed near the hand structure. The communication with the robot by Arduino is done by the code, Embedded C, using open-source Arduino software (IDE). The microcontroller is connected to the Arduino UNO to control the movement of the robot. A specific application, Arduino micro-controller, handles this by the user, and the user can control the robot by altering the command. A motor drive is connected to the motor, which feeds electricity into it in varying amounts, thereby indirectly controlling the motor speed.

Keywords: Arduino, Robot, Welcoming System, Ultrasonic Sensor, Motor Control, Sensors.

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ROBOT ARM CONTROLLER USING FPGA

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ABSTRACT

A robotic arm is a type normally programmable mechanical arm, which can be used to pick and place various objects in the industries from one place to another place. It may be the sum total of the mechanism or may be part of a more complex robot. The parts of these manipulators or arms are interconnected through articulated joints that allow both rotational movement. The FPGA based project is implement and Robotic ARM kit. The entire a system is made up of the Controller System and the drive circuits, one for each motor on the robotic arm. These driving circuits are required since the Control System does not provide enough power to directly operate the motors. The controller System is written in VHDL and implemented on the Spartan -II FPGA chip. The Spartan -II FPGA can run at considerably faster speeds, but a sluggish clock is required to provide relatively long delays for the output signals. This article focuses on the work of our project, which is centered on motion control with a stepper motor.

Keywords: Industrial Automation, Robotic Arm, Manipulators, FPGA Implementation.

DEVELOPMENT OF VOICE ROBOT

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ABSTRACT

The development of a voice controlled talking robot based on Arduino Uno microcontroller. The control system of the robot movement will be employed by the voice and the robot will respond to the commanding persons by generating sounds of human voice with each verbal instruction. The proposed system will be designed based on microcontroller which is connected to Wi-Fi module for receiving voice command. The voice command is converted to text by an ESP32 Module and sends necessary data to the microcontroller. A Storage module which will consist some pre-recorded human voice as audio file will be used by the robot for the development of the robot's talking system. After getting each command the robot will act according to the instruction and will be able to speak different sentence. The ultimate goal is to create a voice robot that can interact with humans in a way that is seamless and that can be used in a wide range of applications, from customer service to personal assistants.

Keywords: Humanoid Robot, Artificial Intelligence (AI), Natural Language Processing (NLP).

TOUCH SCREEN CONTROLLED MULTIPURPOSE SPY BOT

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ABSTRACT

The touchscreen-controlled multipurpose spy bot is a revolutionary device that has transformed the field of surveillance and exploration. This compact device is designed to be operated by a user-friendly touchscreen interface, making it easy to control and maneuver. Equipped with advanced features such as high-definition cameras and audio recording, the spy bot can perform a variety of tasks ranging from security and surveillance to exploration and research. With endless possibilities, the spy bot is capable of collecting and transmitting data, such as images, videos, and location information, to a remote location for analysis and monitoring. This paper provides an overview of the touchscreen-controlled multipurpose spy bot, its features, and its applications. The spy bot's compact size, versatility, and user-friendly interface make it a valuable tool for a wide range of applications in various industries.

Keywords: Live Streaming Spy Bot, Multipurpose Spybot, Wi-Fi Module.

DEVELOPMENT OF RASPBERRY PI HUMANOID ROBOT

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ABSTRACT

The Raspberry pi humanoid robot project aims to design, built, and program a fully functional humanoid robot using a Raspberry pi microcontroller. The project encompasses a comprehensive study of robotics, electronics, and programming techniques to create a versatile and interactive robotic platform. The humanoid robot will be equipped with various sensors, actuators, and vision systems to perceive its environment, move with agility, and interact with users. The development process includes hardware design, software development, and integration of cutting-edge AI algorithms, decision making and human robot interaction. The project will culminate in a demonstration of the robots capabilities, showcasing its ability to navigate, perform tasks, and respond to user commands, thus exemplifying the potential of affordable and accessible robotics solutions powered by the Raspberry pi platform.

Keywords: Raspberry Pi, Humanoid Robot, Artificial Intelligence, Voice commands.

DEVELOPMENT OF SMART ROBOT FOR FACE RECOGNITION

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ABSTRACT

This work introduces a smart robot designed for robust and efficient face recognition, utilizing accessible components such as a Raspberry Pi and a standard webcam. The system employs machine learning algorithms, specifically OpenCV, for face detection and recognition within real-time video captured by the webcam. Users interact with the robot through a user-friendly interface, enabling command input and real-time feedback on recognized faces. The potential applications for this smart robot encompass security systems, access control, attendance management, and human-computer interaction. Performance evaluation emphasizes accuracy, speed, and reliability, with the Raspberry Pi ensuring both portability and affordability. Furthermore, the system's scalability allows for future enhancements through additional sensors and AI capabilities, including emotion recognition and gesture control. In conclusion, this cost-effective and efficient solution serves various purposes, making it a valuable asset in the fields of security and human-computer interaction. Simultaneously, DC motors and wheels provide mobility to the robot, allowing it to move in response to detected faces or user commands.

Keywords: Facial Detection, Raspberry Pi, Gesture Control, Robot.

DESIGN OF HUMANIOD ROBOT

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ABSTRACT

The design of humanoid robots has been a topic of significant interest and research in the field of robotics and artificial intelligence. This abstract provides a concise overview of the key aspects of humanoid robot design. Humanoid robots are characterized by their ability to mimic human-like physical features and movements, making them valuable in various applications, including healthcare, service industries, and entertainment. This design process involves considerations of mechanical structure, sensor integration, control systems, and human-robot interaction. Engineers and researchers strive to create robots that can navigate complex environments, manipulate objects, and interact with humans in a natural and intuitive manner. Achieving a successful humanoid robot design involves a multidisciplinary approach, combining knowledge from mechanics, electronics, computer science, and artificial intelligence. This abstract serves as a starting point for a deeper exploration of the intricacies of humanoid robot design. The design of humanoid robots represents a multidisciplinary effort to bridge the gap between humans and machines. Their creation involves a fusion of mechanical, electrical, and materials engineering, as well as computer science and artificial intelligence. As technology continues to advance, humanoid robots are expected to play an increasingly important role in fields ranging from healthcare and disaster response to entertainment and companionship, thereby enriching the human-robot interaction landscape. However, addressing the challenges in design and ensuring safety and ethical considerations remain essential for the successful integration of humanoid robots in our society.

IMPLEMENTATION OF TREE CLIMBING ROBOT ON COCONUT TREE

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ABSTRACT

Tree-Climbing Robot that is capable of climbing from a tree trunk to a branch. The robot employs several design principles adapted from arboreal animals, including claw gripping and inchworm locomotion, with a certain artificial optimization to achieve high maneuverability on irregular-shaped trees. Tree is composed of a climbing pair of tree grippers that permits robot to attach to a wide variety of trees with a wide range of gripping curvature, and a novel continuum maneuvering structure that provides robot. Most of these tree climbing robots have some characteristics, such as the wheeled tree-climbing robot is adapted to the trunk without branches which cannot flexibly adapt to the actual working conditions, and the bionic tree-climbing robot has more advantages in vertical or upside-down climbing, while quadruped tree climbing robots, especially bionic robots, have not been investigated intensively.

Keywords: Robot, Agriculture, Tree climbing , Dc Motor.

DESIGN OF INTELLIGENT ROBOTIC DOG

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ABSTRACT

The design and implementation of an advanced robotic dog, integrating cutting-edge artificial intelligence and robotics technologies. The robotic dog is engineered to exhibit lifelike behaviors, providing companionship and assistance to users. Leveraging deep learning algorithms, it can learn from interactions, adapting to users' preferences, and intelligently respond to various commands and environmental stimuli. The system includes sophisticated sensors for perception, allowing the dog to navigate complex terrains autonomously and interact with the surroundings. Additionally, the robotic dog features emotional recognition capabilities, enabling it to recognize and respond to human emotions appropriately. The successful realization of this intelligent robotic dog holds promising applications in healthcare, therapy, and smart home environments, enhancing human-robot interaction and improving the overall quality of life.

Keywords: Advanced Robotics, Artificial Intelligence, Robotic Dog, Deep Learning Algorithm.

Organized by the Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India.

DEVELOPMENT OF DANCING ROBOT

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ABSTRACT

The Dancing Robot is a cutting-edge robotic system designed to showcase dynamic and captivating dance performances. The Dancing Robot is a cutting-edge robotic system designed to showcase dynamic and captivating dance performances. Through a combination of pre-programmed choreographies and real-time motion analysis, the robot can perform a diverse range of dance styles, from traditional to contemporary. Its ability to synchronize movements with music and adapt to various rhythms adds a human-like touch to the performances, enhancing audience engagement and entertainment. This research demonstrates the successful implementation of a dancing robot with potential applications in entertainment, art, education. Dancing Robot stands as an exciting advancement in the field of robotics and human-robot interactions.

Keywords: Humanoid Robot, Motors and Micro Controllers, Power Supply, Sensors, LED Lights, Bluetooth or Wi-Fi Module, Programmable Tools.

ADVANCED 3D PRINTER

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ABSTRACT

3D involves a meticulous layer-by-layer buildup, resulting in objects of unparalleled intricacy and surface smoothness. The foremost hallmark of resin 3D printing is its exceptional precision. This technology excels in producing intricate prototypes, jewelry designs, dental models, and medical devices that demand meticulous attention to detail. The ability to create complex geometries with fine features has unlocked new possibilities in industries ranging from aerospace to healthcare. resin printing, also known as stereolithography (SLA) or digital light processing (DLP) printing, stands as a groundbreaking approach in additive manufacturing. It operates by utilizing liquid photopolymer resin that solidifies with pinpoint precision when exposed to UV light.

Keywords: 3D Printing, Resin, Stereolithography, Digital Light Processing.

ROBOTIC ARM CONTROL THROUGH ARTIFICIAL INTELLIGENCE

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ABSTRACT

Robotic arm control through Artificial Intelligence (AI) represents a cutting-edge advancement in the field of robotics. By leveraging AI algorithms, these robotic arms can perform complex tasks with increased efficiency and adaptability. However, with AI, the robotic arm can learn from data, recognize patterns, and make real-time decisions. 4 Degree of Freedom (DOF) robotic arm has been developed. It is controlled by an Arduino UNOmicro controller which accepts input signals from a user by means of a set of potentiometers. This AI-powered robotic arm technology finds applications in various industries, including manufacturing, healthcare, and space exploration, where it can undertake delicate tasks, respond to unforeseen challenges, and work collaboratively with humans, ultimately revolutionizing the future of automation.

UGC AUTONOMOUS

DESIGN OF PROGRAMMABLE GRASS SHEDDING ROBOT

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ABSTRACT

The design of a programmable grass shedding robot using CATIA software. The robot is engineered to efficiently shed grass in diverse terrains and conditions autonomously. Leveraging CATIA's advanced 3D modeling capabilities, the robot's architecture incorporates versatile cutting mechanisms, intelligent sensors, and a user-friendly programmable interface. Through systematic simulation and prototyping, the robot exhibits enhanced performance, adaptability, and precision in grass shedding operations. This innovative design opens new avenues for automated landscaping solutions, promising to revolutionize the maintenance of green spaces with increased efficiency and reduced human intervention. The innovative robotic system is designed to autonomously and efficiently trim and maintain grass in various outdoor environments. Leveraging advanced programming and cutting-edge technology, the robot offers precise control and adaptability to different terrains, making it a sustainable solution for lawn care. This project showcases the integration of robotics and automation in enhancing the efficiency and convenience of outdoor maintenance tasks while reducing the environmental impact associated with traditional lawn mowing methods. It involves new adaptive methods by which we can see good efficiency in the robot.

Keywords: Programmable Grass Shedding Robot, Advanced Programming, Machine Learning.

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IOT BASED WATER QUALITY MONITORING SYSTEM USING ARDUINO

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ABSTRACT

Water quality monitoring is crucial for ensuring the safety and sustainability of our water resources. With the rapid advancement of Internet of Things (IoT) technology, there is an opportunity to develop efficient and cost-effective water quality monitoring systems. This paper presents an IoT- based water quality monitoring system utilizing Arduino microcontroller to continuously assess water quality parameters while the water flow occurs continuously. The proposed system integratesvarious sensors to measure essential water quality parameters such as pH, turbidity, temperature, and conductivity. Arduino boards act as the central processing units, acquiring data from the sensorsand transmitting it to a cloud- based server via Wi-Fi protocols. The cloud-based server processes and stores the data, allowing real-time monitoring and analysis. The collected data is compared with standard water quality guidelines to assess the system's accuracy and reliability. The results demonstrate that the IoT-based water quality monitoring system offers a cost-effective, scalable, and reliable solution for real-time water quality monitoring system.

Keywords: IOT, Water Quality Management, Wi-Fi, Cloud-based System.

ROBOTIC SNAKE WITH SURVEILLANCE CAMERA

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ABSTRACT

A robotic snake equipped with a surveillance camera is an innovative and versatile solution for discreet surveillance and exploration in various environments. Mimicking the locomotion of real snakes, this bio-inspired robot can slither through tight spaces, rough terrains, and confined areas with ease, making it ideal for applications in search and rescue operations, industrial inspections, and military reconnaissance. The integration of a high-resolution surveillance camera allows the robotic snake to capture real-time video footage, providing valuable visual information to operators or researchers. With advancements in AI and machine learning, the robotic snake can also be programmed to autonomously navigate its environment, avoiding obstacles and adapting to changes in terrain. This promising technology holds immense potential for revolutionizing surveillance and reconnaissance missions while minimizing risks to human operators and increasing overall efficiency.

Keywords: Robot Snake, Surveillance, AI, Machine Learning.

DEVELOPMENT OF HOLLOW BRICKS USING WASTE PLASTIC

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ABSTRACT

Modern world is facing a serious situation of waste management, especially plastic waste. There has been a considerable imbalance between the availability of conventional building materials and their demand in the recent past. On the other hand, various type of sands such as foundry sand are abundantly available and the disposal of waste plastics (Polyethylene Terephthalate, Poly Propylene etc.) is a biggest challenge, as repeated recycling of PET bottles poses a potential danger of being transformed to a carcinogenic material and only a small proportion of PET bottles are being recycled. In the present study, the effectiveness of PET bottles on manufacturing of bricks is analyzed and properties of plastic-soil bricks are assessed. PET bottles are melted and into this molten plastic mix, sand is added in various proportions. Plastic-soil bricks using sand and as well as foundry sand are manufactured. Various standard tests on bricks are conducted such as compressive strength test, water absorption test, efflorescence test, hardness test, soundness test, impact test, thermal resistance test, prism Test. Through the results obtained from the standard tests, the optimum percentage of plastic is estimated. It is studied that plastic-soil bricks show excellent behavior when compared to conventional burnt clay bricks.

Keywords: Plastic Hollow blocks, Green buildings, Recycled Plastic.

ARTIFICIAL INTELLIGENCE BASED CHATBOT ROBOT FOR APPLIANCE CONTROL

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ABSTRACT

AI based Chatbot can be described as software that can chat with people using artificial intelligence using a smartphone, which is used to perform tasks such as quickly responding to users and providing better service to customers. Anyone from anywhere can have connectivity to the electrical appliances connected to the Chatbot based on AI. This project presents an artificial intelligence based chatbot for controlling electrical appliances using Node MCU and Telegram Messenger platform. The platform used for creating chatbot is Chatfuel. Node MCU development board with Wi-Fi Soc, Relay module, and bulb are used. The user interface will be easy to understand even by common man.

Keywords: AI, Chatbot, Chatfuel, Electrical Appliances.

DEVELOPMENT OF 360° SURVELLIANCE MILITARY ROBOT

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ABSTRACT

Surveillance plays an important role in border areas to keep an eye on enemies. In such situations it is difficult to allow the duty of surveillance to a soldier, which may cause danger to the life of one. Rather we can use a robot to keep an eye on border areas. So, in such cases these kinds of robots are very useful. They are small in size and provided with many abilities so they can perform the duty of surveillance and spying perfectly. In case if they are found by the combatant, they have no identity to whom they belong. Military on border area are facing many problems so this kind of technology help them too aware about the opponent activities ,so they can take further decisions.

Keywords: Surveillance, Robot, Defense.

DESIGN OF ELECTRIC THREE WHEEL DRIVE WHEELBARROW

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ABSTRACT

The electric wheelbarrow's mechanical design prioritizes strength and durability with a lightweight frame made of steel or aluminium. User-friendly handles and suitable wheels enhance user control and stability on various terrains. The spacious load tub ensures a low center of gravity and injury prevention during loading. The well-positioned motor and easily accessible battery offer efficient propulsion and straightforward maintenance. An easy-to-use control system and dependable braking ensure user safety. Waterproofing safeguards electrical components against moisture, while standardized fasteners allow for simple assembly and maintenance. Thorough testing and documentation guarantee a sturdy, user-friendly, and reliable electric wheelbarrow.

Keywords: Electric wheelbarrow, Strength, User-friendly, Durability, Efficiency.

FABRICATION OF INVIGILATION ROBOT

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ABSTRACT

The Invigilation Robot is an innovative application of IOT technology in the field of examination monitoring. This robotic system leverages Bluetooth and Arduino connectivity and smart sensors to remotely supervise examination halls, ensuring a fair and secure environment. Through real-time video and audio feeds, the robot can detect suspicious activities, such as cheating, and alert human invigilators. Its autonomous navigation capabilities enable it to move seamlessly throughout the exam venue, providing a cost-effective and efficient solution for maintaining academic integrity during assessments. Equipped with high-resolution cameras, Its autonomous navigation capability allows it to patrol exam rooms, providing real-time video feeds to human proctors, who can intervene when necessary. The invigilation robot represents a promising solution to enhance the integrity and credibility of academic evaluations. Equipped with a network of high-resolution cameras and microphones, it possesses an acute sensory perception that extends far beyond the capabilities of human proctors. These sensors allow the robot to monitor every corner of the examination room simultaneously, capturing any unusual behavior or unauthorized activity. The robot's mobility is another key feature, as it navigates autonomously within the examination space. This mobility ensures comprehensive coverage, making it virtually impossible for any misconduct to go unnoticed. contributing to the continued evolution of academic assessment processes. This innovative technology not only protects the integrity of exams but also offers a glimpse into the future of automation in education.

Keywords: Invigilation Robot, IOT, Machine Learning, AI, Patrol Exam Rooms.

DESIGN OF MATERIAL HANDLING ROBOTIC TRAIN

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ABSTRACT

The material handling robotic train is an innovative solution for efficient and automated logistics operations. This cutting-edge technology integrates robotics and transportation systems, enhancing the movement of goods in various industrial settings. The robotic train utilizes a network of smart sensors and advanced algorithms to navigate through complex environments, efficiently picking up and delivering materials within factories, warehouses, and distribution centers. By reducing manual intervention and streamlining material flow, this technology contributes to increased productivity, improved safety, and reduced operational costs. This abstract explores the key features and benefits of the material handling robotic train, highlighting its potential to revolutionize the logistics landscape and create a more agile and sustainable supply chain.

Keywords: Robot, Material Handling, Efficient.

DEVELOPMENT OF HEXBUG ROBOT

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ABSTRACT

The development of Hexbug robots involves creating miniature robotic devices that simulate the behaviors of insects. These robots are designed to move autonomously, exhibiting life like movements through the use of vibration motors. The development process encompasses mechanical engineering, electronics, and software programming. By studying the locomotion of insects, engineers create mechanisms that enable the robots to navigate their environment, react to obstacles, and exhibit emergent behavior. This abstract approach combines engineering and biomimicry to produce engaging and entertaining robotic toys that captivate users with their unpredictable and insect-like movements. This project introduces an innovative application of the Hexbug micro-robot platform for autonomous environmental monitoring and exploration. The Hexbug robot, typically known for its simple locomotion capabilities, has been augmented with state-of-the-art sensors and control systems to enable it to navigate environments. The robot employs a combination of computer vision, and ultrasonic, sensors to perceive its surroundings, allowing it to adapt to various terrains and obstacles. The project focuses on the development of a robust navigation algorithm that combines sensor data with machine learning techniques for real-time decision-making.

Keywords: Hex bug Robot, Machine Learning, AI.

DESIGN OF HEXAPOD USING ARDUINO

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ABSTRACT

Hexapod robots, with their six-legged locomotion, offer advantages in terms of stability and adaptability to rough terrains. The primary objective of this project was to design and construct a hexapod robot capable of basic locomotion and remote control through Arduino programming. This process involved designing and 3D printing the robot's body and legs, incorporating servos for joint movement, and assembling the mechanical components. The Arduino Uno was utilized to control the servo motors, enabling precise leg movements and coordination. Programming the hexapod's locomotion patterns, such as walking and turning, was a crucial aspect of the project. The Arduino code was developed to implement various gait sequences and to enable wireless control using Bluetooth or RF modules. The project's outcome is a functional hexapod robot capable of moving forward, backward, turning, and performing other basic maneuvers under Arduino control. The hexapod's adaptability and programmability make it suitable for various applications, including surveillance, exploration, and educational purposes. This abstract summarizes the fabrication process and the key components involved in creating a hexapod robot controlled by an Arduino microcontroller, highlighting its potential for versatile applications in robotics.

Keywords: Arduino, Hexapod, Robot, 3D Printed Components.

RECENT ADVANCES IN SINGLE POINT INCREMENTAL SHEET FORMING

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ABSTRACT

This paper presents a comprehensive overview of the recent advances in Single Point Incremental Sheet Forming (SPISF), a flexible and cost-effective manufacturing process that has gained significant attention in the field of sheet metal forming. The method involves the use of a single-point tool to deform sheet metal incrementally, allowing for the production of complex shapes without the need for elaborate dies. The review covers advancements in toolpath optimization, material utilization, and process monitoring techniques, highlighting improvements in accuracy, efficiency, and sustainability. Additionally, the paper discusses emerging technologies, such as the integration of robotics and artificial intelligence, which further enhance the capabilities and applicability of SPISF. Through the exploration of these developments, the paper aims to contribute to the understanding of the current state of SPISF and inspire future research directions in the realm of incremental sheet forming.

Keywords: Single Point Incremental Sheet Forming (SPISF), Emerging Technologies, Toolpath Optimization, Sustainable Manufacturing.

FABRICATION, TESTING AND ANALYSIS OF ALUMINUM 2024 METAL MATRIX COMPOSITE

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ABSTRACT

In the field of material science and engineering, there has been a great impact ever since the invention of composites materials. High strength and lightweight remain the winning combination that propels composite materials into new areas. The composite materials replace conventional materials like steel, cast iron and aluminum alloys by its superficial properties. As literature was collected, it could be found that metal matrix composites are under serious consideration as potential candidate materials to replace conventional materials in aerospace and automotive applications. In this project, composite material based on aluminum alloy (Al 2024) reinforced with 10% volume fraction of Silicon Carbide Particulates (Si C) and 5 % volume fraction of Graphite particles is produced by stir casting method. The fabricated composite is tested in order to find tensile strength, hardness, microstructure and analysis is to study on cracking behavior.

Keywords: Composites materials, Conventional materials, Metal matrix composites, Reinforcement, Fabricated Composite.

PERFORMANCE EVALUATION MICROCHANNEL HEAT SINK

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ABSTRACT

This paper presents the performance investigation of single-phase microchannel heat sink. In this study, three parameters are considered for the analysis: depth of the channel, heat flux and coolant flow rate. The effect of these parameters on microchannel heat sink performance based on their individual and mutual interactions is studied. The Numerical model implementation and simulation results are validated with the published experimental results. The effect of depth, heat flux and coolant flow on the performance of microchannel heat sink is investigated. The performance parameters considered are, pressure drop in the channel, and average temperature at the base of the heatsink.

Keywords: Microchannel, Heat sink, Conjugate heat transfer, Electronic chip cooling, Design of experiments, Analysis of means, Analysis of variance

INTEND AND INVESTIGATION OF NORMAL CONVECTIVE HEAT RELOCATE FROM TWO ADJACENT NARROW PLATES

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ABSTRACT

Natural Convection flow in a vertical channel with internal objects is encountered in several technological applications of particular interest of heat dissipation from electronic circuits, refrigerators, heat exchangers, nuclear reactors fuel elements, dry cooling towers, and home ventilation etc. In this paper the air flow through vertical narrow plates is modeled using CREO design software. We will focus on thermal and CFD analysis with different Reynolds numbers (2×106 & 4×106) and different angles (00,300,450) of the vertical narrow plates. Thermal analysis was done for the vertical narrow plates by steel, aluminum & copper at different heat transfer coefficient values. Finally, we observed which material is best for heat transfer coefficient and which angle is best for heat transfer.

Keywords: Laminar Flow, Reynolds Number, Heat Flux, Temperature.

EXPERIMENTAL INVESTIGATION OF AN ALTERNATE REFRIGERANT FOR R22 IN WINDOW AIR CONDITIONING SYSTEM

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ABSTRACT

This paper is concerned with the future phase-out of Hydro Chloro Fluoro Carbons (HCFCs) used in the air conditioning systems. The air conditioning industry is currently evaluating alternative refrigerants for R-22. A window-type air conditioning system is selected for the tests conducted with three different types of refrigerants. These air conditioning units are spread widely in their applications and are circulating R-22 as a refrigerant. Finding an alternative refrigerant for replacing R- 22 is becoming a practical problem because general use of hydro chlorofluorocarbons (HCFCs) including R-22 is promised to be banned by 2020 as per the Montreal Protocol. It is intended to replace R-22 refrigerant by other refrigerants which are considered to be environmental friendly. In this project, two zoetrope blend refrigerants were selected to be tested as alternative refrigerants for R-22 in the window type air conditioner system viz., R-407C (mixture of R-32/125/134a), R-407A (mixture of R-32/125/134a) to their better thermal properties and acceptable pressure and temperature ranges. The alternate refrigerants to be used in the project have very less ozone depletion potential (ODP) and global warming potential (GWP). The performance of each refrigerant has been found individually and the results were used to evaluate and compare the following performance criteria: cooling capacity, Energy Efficiency Ratio and the coefficient of performance (COP).

Keyword- Alternative Refrigerant, HCFCs, Zoetrope Blend ODP, GWP.

DESIGN AND DEVELOPMENT OF SELF DRIVING CAR USING AI

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ABSTRACT

A self-driving car, also known as an autonomous vehicle (AV or auto), driverless car, or robotic car (robot-car) is a vehicle that is capable of sensing its environment and moving safely with little or no human input. Self-driving car combine a variety of sensors to perceive their surroundings, such as camera, ultrasonic sensor, thermal sensors and inertial measurement units. It analyzes the given navigation map and surroundings uses its sensor to alert the passenger with an automatic voice update. Advanced control systems with help of AI interpret sensory information to identify appropriate navigation paths, as well as obstacles and relevant signs to safely navigate in the real world.

Keywords: Navigation, Environment perception, Vehicle control, and path planning.

DESIGN OF HYDROGEN FUEL-CELL DRONE

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ABSTRACT

The long endurance unmanned aerial vehicle (UAV) has significant value as a low-cost, autonomous and remote sensing platform for research, commercial and military missions. The hydrogen fuel-cell drones are most common now-a-days and there are different types of drones, it's quite common to imagine Zeppelins, weather balloons and similar uses of hydrogen in lighter-than-aircraft to lift stuff of the ground. But with smaller and more efficient fuel cells, hydrogen is gaining its place in the drone field. Drones are definitely getting more diverse and innovative as they play a more relevant role in our everyday life. The most significant problem with drones today is that they have a remarkably limited range. Most commercially available options can only fly for 25 minutes or less due to issues with battery capacity. Fuel cells provide greater energy density, so they can give drones longer ranges. Fuel cells require hydrogen to produce power, and the air provides a ready supply of the latter. As a result, fuel cell-powered vehicles only need to carry half of their fuel, reducing weight and extending their range. Hydrogen is also less dense than air, so fuel cell-powered drones could be far lighter than battery- powered alternatives. With less weight to carry, these drones could travel farther with less energy.

Keywords: unmanned aerial vehicle (UAV), fuel cells, fuel cell-powered drones, PEM fuel-cells.

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DESIGN OF POWER GENERATION USING E-BIKE

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ABSTRACT

Now day's bike or vehicle is very important our fast life for travelling and this is also play very important role in growth of economy. Self-power generating electrical bike is nothing but e-bike that generates its own power supply by using some arrangement of equipment and drive the bike without any external energy. This type of bike no need to any external energy just like fuel or charging of battery by externally. This is charged internally without any effect on operation of self-power generating electrical bike. an electric bike is attracting more people's attention around the world because it is one of the environmentally friendly vehicles as well as zero emissions from the vehicle. Main components of this bicycle are Dynamometer, Battery. The main use of Dynamometer is to absorb the power generated. Regenerative dynamometers, in which the prime mover drives a DC motor as a generator to create load, make excess DC power. When the bicycle starts running then the energy through chain and sprocket given to dynamometer and then to the battery which stores the energy. This stored energy is used to drive the bicycle which reduces human efforts & increases the comfort level of humans.

Keywords: Hub Motor, Braking System, Dc Power Generator, Twist Throttle, Controller, Dynamometer

DESIGN AND DEVELOPMENT OF SELF DRIVING CAR USING AI

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ABSTRACT

A self-driving car, also known as an autonomous vehicle (AV or auto), driverless car, or robotic car (robot-car) is a vehicle that is capable of sensing its environment and moving safely with little or no human input. Self-driving car combine a variety of sensors to perceive their surroundings, such as camera, ultrasonic sensor, thermal sensors and inertial measurement units. It analyzes the given navigation map and surroundings uses its sensor to alert the passenger with an automatic voice updates. Advanced control systems with help of AI interpret sensory information to identify appropriate navigation paths, as well as obstacles and relevant signs to safely navigate in real world.

Keywords: Ultrasonic Sensor, DC Motors, Raspberry PI 4, L239D Motor Driver, NEO-6M GPS Chip

DEVELOPMENT OF SMART ROBOT FOR FACE RECOGNITION

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ABSTRACT

The smart robot is designed for robust and efficient face recognition, utilizing accessible components such as a Raspberry Pi and a standard webcam. The system employs machine learning algorithms, specifically OpenCV, for face detection and recognition within real-time video captured by the webcam. Users interact with the robot through a user-friendly interface, enabling command input and real-time feedback on recognized faces. The potential applications for this smart robot encompass security systems, access control, attendance management, and human-computer interaction. Performance evaluation emphasizes accuracy, speed, and reliability, with the Raspberry Pi ensuring both portability and affordability. Furthermore, the system's scalability allows for future enhancement through additional sensors and AI capabilities, including emotion recognition and gesture control. This cost-effective and efficient solution serves various purposes, making it a valuable asset in the fields of security and human-computer interaction. Simultaneously, DC motors and wheels provide mobility to the robot, allowing it to move in response to detected faces or user commands.

Keywords: Ultrasonic Sensor, DC Motors, Raspberry PI 4, L239D Motor Driver, NEO-6M GPS Chip.

Organized by the Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India.

DESIGN OF AUTOMATIC SOLAR GRASS CUTTER

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ABSTRACT

The project aims at fabricating a grass cutting machine system which makes the grass cutter motor running through solar energy. The "Solar Powered Grass Cutting Machine" is a robotic vehicle powered by solar energy that also avoids obstacles and is capable of automated grass cutting. The system uses 12V battery to power the vehicle movement motors as well as the grass cutter motor. A solar panel is used to charge the battery so that there is no need to charge it externally. The grass cutter and vehicle motors are interfaced topic microcontroller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for obstacle detection. The microcontroller moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection the ultrasonic sensor monitors it and the microcontroller thus stops the grass cuter motor to avoid any damage to the object/human/animal whatever itis and it also provides an alarm. Microcontroller then turns the vehicle as long as it gets clear of the object and then moves the grass cutter in forward direction again otherwise it changes the direction.

Keywords: Solar Panel, Relay, DC motor, Blades, Ultra sonic sensor, Micro controller.

DESIGN OF SPRINGLESS CAR SUSPENSION USING BEVEL GEARS

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ABSTRACT

The main aim of our project is to design a spring less car suspension using bevel gears. We are replacing the spring suspension with bevel gears. This spring less Suspension System Combines a differential mechanism and an oscillating system. The oscillating property makes sure that the vehicle is moving forward even in rough terrain. A differential is a gear train with three drive shafts that has a property such that the rotational speed of one shaft is the average speeds of the others, or a fixed multiple of that average and Oscillation is the repetitive or periodic variation of an object. A motor is connected to a gear in the differential mechanism, thereby making it the driving gear.

Keywords: Dc motor, Supporting strips, Pivot joints, CATIA.

OPTIMIZATION OF MULTI PARAMETERS OF WEDM USING ANN BASED ON PRINCIPAL COMPONENT ANALYSIS FOR AA6063/B4C METAL MATRIX COMPOSITES

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ABSTRACT

Improved mechanical characteristics for composites using a linear low-density propylene (PP) matrix and a carbon fibre (CF) filler were the focus of this study. The material was fabricated by a hand layup process in an oven. Oxygen plasma treatment of the PP matrix enhanced adherence. Before being filtered and dried for manufacture, CF and PP were first combined with standard stirring, ultrasonication and mechanical stirring. The highest tensile strength was achieved in plasma-treated propylene (PPP) with 10 wt% CF, with overall property performance increasing by 13.46% comparison to non-PP with the same CF addition. Tensile strength was reduced from 19.4 Mpa to 18.3 Mpa when carbon fibers were added at 14 and 16% wt. As a result of CF aggregation with plasma- treated and untreated PP, tensile strength (TS) was reduced. Better tensile qualities were seen in a factory setting with temperatures of 1800 C for 20 min. After plasma treatment, the PP/8% CF blend had a flexural strength (FS) of 26.19 Mpa, which was higher than that of untreated PP by a significant margin.

Keywords: Carbon Fiber, Optimization, Composites, WEDM.

DEVELOPMENT OF SOLOR DC INDUCTION STOVE

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ABSTRACT

To develop the DC solor based induction stove to make the dynamic and mild change to evolve the cost cutting, pollution free, and easy and safety awareness. General Solar energy is a good and clean source of energy, which can help the world in experiencing the dirty and short of non-renewable resources, such as coal, etc. The department of energy (DoE) has developed a strategy in which the renewable energy sector can operate to grow and contribute positively to the country's economy together with global environment. The trending advantage includes high efficiency that is almost two times the existing technologies. The efficiency comes with low power consumption i.e. all power that is generated is transferred at least 80 % of the generated. solar induction cooking system including induction stove is completely dependent into electricity generated by Eskom. Reduce electricity bills, The high harmonic semi-sine wave generated during induction process. The general objective of this research is to simulate and build a solar powered induction cooking system using auto selection method for any available power source, taking solar panel power as a priority for encouraging savings from using the grid power. Solar powered induction cooking system should be designed as a complete standalone product that is also portable and it can be used everywhere with the advantage of battery storage that is charged either by the panel or the mains itself if it happens the sun is not available for days. The aim also covers the reducing of electricity bills as the electric stove uses more power while half it is wasted as heat energy in the kitchen.

Keywords: DC Solar, Solar Induction Cooking System, Renewable Energy Sector, Electric Stove.

DESIGN AND ANALYSIS OF ROBOT PEDESTAL

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ABSTRACT

Today's automation scenario robot is very essential part. There are many standard robot manufacturers which manufacture the standard sizes of robots. According to industrial application to achieve desired position of the work robot required its customized height of the robot arm.to achieve desired height robot requires its own pedestal.so initially we design the cross-section beam for the robot pedestal with considering different parameters of the loads and developing the CAD model for the according to the requirement. For modeling and analysis, we use the ANSYS 15.0 software. We apply boundary condition on that model and doing FEA of that pedestal according to analysis result we change the body structure. We find the total deformation and equivalent stress to safe that model.

Keywords: Robot Pedestal, CAD Model, ANSYS 15, FEA Analysis.

Organized by the Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India.

A CRITICAL REVIEW ON THE SURFACE TEXTURING OF TITANIUM AND MAGNESIUM ALLOYS FOR BIOMEDICAL APPLICATIONS

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ABSTRACT

Biomaterials are designed to interact with living cells in order to provide diagnostic and therapeutic benefits. Over the past ten years, there has been a significant increase in the need for highly precise, tiny biomedical implants made of several biomaterials, including biodegradable magnesium (Mg) alloys and non-biodegradable titanium (Ti) alloys. To create micro-components with high dimensional accuracy, one of the potential techniques is micro-electric discharge machining (micro EDM). The micro EDM method and the characteristics of titanium and magnesium alloys that are necessary for their biocompatibility are reviewed in this research. This article also discusses the qualities of these biomedical materials and the elements that enhance their compatibility with surrounding tissues in relation to the influence of micro EDM procedures. In order to fulfil the stringent requirements for biomedical materials and their uses in the production of bioimplants, this review concludes by examining potential future research topics and micro EDM process.

Keywords: Titanium Alloy, Magnesium Alloy, Micro EDM, Surface Texturing.

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REVOLUTIONIZING URBAN MOBILITY: A 360-DEGREE ACKERMAN STEERING SYSTEM FOR ZERO TURNING RADIUS IN FOUR-WHEEL ELECTRIC VEHICLES

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ABSTRACT

The indigenously developed system consists of Ackerman steering and various mechanisms with arrangement of the various kinematic links. In this system at first the vehicle is stopped, and wheels are then rotated to the required position with the help of the steering system. This system can be useful in better parking, traffic jams, back turning on narrow roads. This paper explains a steering mechanism that turns the vehicle through 360 degrees angle about its geometric center in standing position. That is the vehicle can be turned in any direction with zero turning radius. This steering mechanism is suitable for four-wheel electric vehicles.

Keywords: Ackerman Steering System, Zero Turning Radius, Urban Mobility.

DEVELOPMENT OF CFRP COMPOSITES USING CARBON AND BASALT

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ABSTRACT

In recent times, an increase in the use of eco-friendly, natural fibers as reinforcement for the fabrication of lightweight, low-cost polymer composites can be seen globally. One such material of interest currently being extensively used is Basalt fiber, which is cost-effective and offers exceptional properties .The prominent advantages of these composites include high specific mechanical, physical and chemical properties, biodegradability, and non-abrasive qualities. Carbon fiber has the properties of high strength, high modulus, high temperature resistance, corrosion resistance, fatigue and creep resistance, electrical conductivity, and thermal conductivity. It is mainly used for the preparation of composite materials. CFRP Means Carbon fiber reinforced polymer (CFRP) is one of the composite materials which is used in both repairing and strengthening of reinforced concrete structures. In this project ,we would like to prepare a carbon basalt composite to understand the mechanical, thermal and chemical resistant properties achieved for applications in medical, aerospace and automotive industries.

Keywords: CFRP, Composites, Aerospace. Automobile.

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DESIGN AND FABRICATION OF FOLDABLE BICYCLE

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ABSTRACT

We are going to develop a portable/foldable cycle which can be easily packed in travelling bag. The project idea was generated through portable bike ride in foreign countries. So research is begun with list of all necessity we required during designing, Planning, Analysis, and Manufacturing. When we are researching on it we also got idea to fold the wheel of bicycle so that bicycle compact more when it is in folded position. This report will give a brief idea of work we are trying to do and had completed work. Report includes basic idea of how we are designing, how we are going to analysis it.

Keywords: Wheel Rim, Seat And Seat Post, Chain Sprocket And Chain Construction.

Organized by the Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India.

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LAYERED INNOVATION: A COMPREHENSIVE EXPLORATION OF 3D PRINTING TECHNOLOGIES AND APPLICATIONS

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ABSTRACT

This research paper delves into the multifaceted realm of 3D printing, offering a comprehensive examination of its evolving technologies and diverse applications. The abstract provides a succinct overview of the key themes explored in the paper, emphasizing the transformative impact of 3D printing on industries, manufacturing processes, and the creative landscape. The document navigates through the fundamental principles of 3D printing, elucidating various printing techniques such as fused deposition modeling (FDM), stereo lithography (SLA), and selective laser sintering (SLS). It explores recent advancements in materials science, showcasing the expanding range of printable materials, including polymers, metals, ceramics, and biomaterials. Special attention is given to the wide-ranging applications of 3D printing across industries, from rapid prototyping and customized manufacturing to medical applications, aerospace, and architecture. The abstract also discusses the potential societal implications, such as decentralized manufacturing and the democratization of design. Furthermore, the document addresses challenges and future prospects in the 3D printing landscape, highlighting ongoing research directions and emerging trends. It concludes with reflections on the transformative potential of 3D printing as a catalyst for innovation, creativity, and sustainable manufacturing practices. This exploration serves as a valuable resource for researchers, industry professionals, and enthusiasts seeking a holistic understanding of the current state and future possibilities of 3D printing technologies. Through a synthesis of current knowledge and forward-looking insights, this research aims to inspire continued exploration and advancement in the field of additive manufacturing.

Keywords: 3D printing, stereo lithography, metals, selective laser sintering.

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PERFORMANCE OF DOMESTIC REFRIGERATOR WHEN THE HOT GAS REFRIGERANT INJECTED TO SUCTION LINE

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ABSTRACT

In this research work, it is proposed to reduce the compressor work by decreasing the pressure ratio. To achieve this, one of the possibilities is to bleed a fraction of high-pressure refrigerant gas from the outlet of the compressor to inject into the inlet of the compressor (i.e., suction line). In general, the refrigerant gas in the suction line of the compressor is at low pressure. When the high-pressure refrigerant gas from the delivery line is bled and mixed with the low-pressure refrigerant gas in the suction line, the resultant suction pressure will be higher than the normal and hence the pressure ratio can be reduced, saving compressor work. To study the effect on the "Coefficient of Performance" (COP) of the system, experiments conducted for different mass fractions of refrigerant bypassed from the delivery line to the suction line. The optimum bypass factor of the refrigerant will be established through these studies.

Keywords: Rotameter, Bypass valve, check valve, R-134a refrigerant.

GREEN POWER FOR A BRIGHTER FUTURE: SCREW HYDROTURBINE DESIGN FOR RURAL ELECTRIFICATION IN INDIA

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ABSTRACT

The abundant low-head water streams in the Western Himalayan region create massive micro-hydro power generation capability potential. The Archimedes screw turbine is being explored worldwide as one of the best candidates for efficient electricity generation at low-head and low-flow rate sites. But there is a lack of research in identifying the best screw configuration for achieving maximum output power and efficiency at such low head and low flow rate sites. This research is mainly on the design, simulation, and flow characterization within the screw turbine. Our experimental analysis reveals that the screw angle ranges from 20° to 25° with a flow rate below 1.5 L/s increased the efficiency of the Archimedes Screw Turbine to around 90%. It is further observed that with the increase in pitch, output power and efficiency increase because the output power is directly proportional to the tilt angle of the screw runner, head, pitch, and load on the runner. The experimental analysis showed that Archimedes Screw Turbine can produce a humungous amount of power and efficiently support the adverse power requirement of the country cost-effectively.

Keywords: Sustainable Development; Screw Hydroturbine; Small/Micro/Pico Hydropower Plant; Run of River Powerplant; Fish Friendly Turbine; Low Head Hydropower.

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