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Department of *Mechanical Engineering* Presents

4th Online/Offline Mega International Conference on "Recent Advances in Mechanical Engineering" on 17th & 18th December 2024



(ICRAME-24) **PROCEEDINGS**

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Department of Mechanical Engineering

4th International Conference on "Recent Advances in Mechanical Engineering" (ICRAME-24)

ISBN No: 978-93-94246-64-5

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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 4th International Conference on “Recent Advances in Mechanical Engineering” (ICRAME-24) on 17th and 18th of December 2024. 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

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 4th International Conference on “Recent Advances in Mechanical Engineering” (ICRAME-24) on 17th and 18th of December 2024. 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 4th International Conference on “**Recent Advances in Mechanical Engineering**” (ICRAME-24) organized by the Department of Mechanical Engineering on 17th and 18th of December 2024. 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-24) on 17th and 18th of December 2024 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 4th International Conference on “**Recent Advances in Mechanical Engineering**”(ICRAME-24) 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-2024). 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.

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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 “4th 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

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Dr. Sanjay Kumar Suman

Dean R&D



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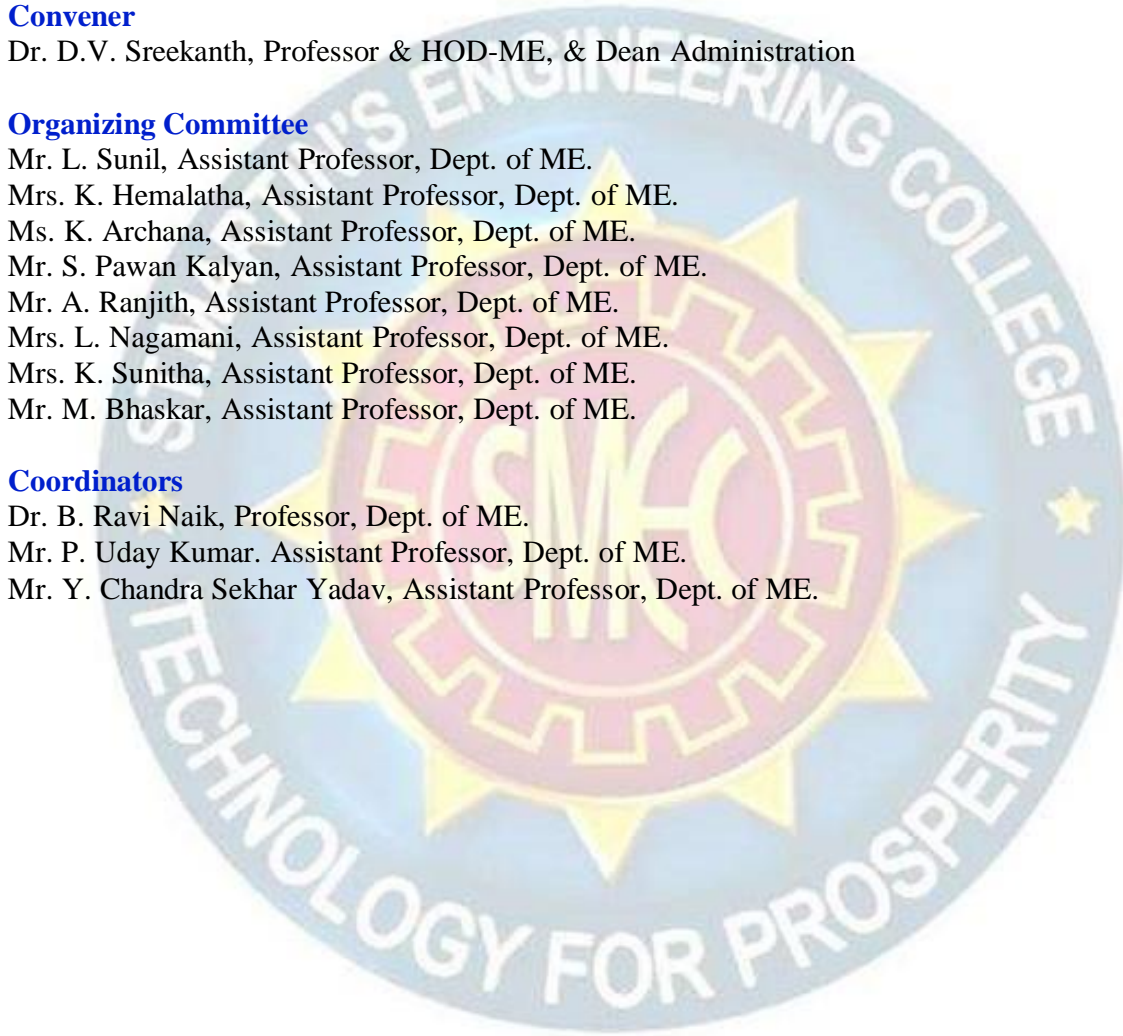


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SANITARY VENDING MACHINE INTEGRATED WITH UPI VENDING SYSTEM

Deepak Kumar Sharma^{1*}, Desai Sai Nikhil², Nithin Sharma³, Dr. D.V. Sreekanth⁴
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ABSTRACT

Sanitary vending machines have emerged as a vital innovation to improve public health and accessibility to hygiene products. Strategically placed in public spaces like schools, workplaces, and transit stations, these machines offer automated, reliable, and discreet distribution of items such as menstrual supplies, hand sanitizers, and contraceptives. The integration of smart technology enables real-time monitoring of inventory, usage patterns, and maintenance, ensuring consistent availability and operational efficiency. The design, functionality, and societal impact of these machines, focusing on technical aspects like user interface design, payment systems, and inventory management. Case studies of implemented systems reveal significant benefits, including enhanced access to hygiene products in underserved areas and reduced stigma associated with their procurement. Future research directions include expanding product offerings and developing sustainable vending solutions. Overall, sanitary vending machines significantly contribute to public health by promoting hygiene and accessibility.

Keywords: Analog to Digital Conversion, Arduino Programming Board, Arduino Board.

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DEVELOPMENT OF BIO-BASED ADHESIVE FOR CONSTRUCTION APPLICATION

D.KasiVishwanatha Reddy^{1*}, Rajababu Yadav², R Shiva Reddy³, Dr. B. Ravi Naik⁴

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ABSTRACT

The construction industry is shifting towards sustainable and environmentally friendly practices, driving the demand for bio-based adhesives. This innovative adhesive replaces traditional cement-based binders, offering a eco-friendly solution for joining bricks and other construction materials. Our bio-based adhesive is formulated from renewable biomass sources, such as corn starch, sugarcane, and potato starch, combined with natural polymers like cellulose, chitin, and lignin. This proprietary blend provides exceptional bonding strength, durability, and water resistance, making it suitable for various construction applications.

Keywords: Cornstarch, Glycerol, Borax, Epoxy, Lignin.

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DEVELOPMENT OF MEMS SENSOR CONTROL HAPTIC 4-FINGER ROBOT

Janga Pranay Kumar^{1*}, B Naga Praveen², B Chandra Shekar³, Dr. D.V. Sreekanth

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ABSTRACT

This project presents the MEMS sensor-based haptic robotic aid aimed at assisting physically challenged individuals. MEMS sensors, which integrate electrical and mechanical elements on a small chip, are placed on the user's fingers to detect finger movements. These movement signals are transmitted wirelessly via RF to a microcontroller, which then directs the robot to move in the desired direction. This enables users to intuitively control the robot using natural finger motions. Experimental results demonstrate the effectiveness of this finger-controlled, direction-based robotic system, providing an accessible and efficient aid for users with physical challenges.

Keywords: Arduino UNO Microcontroller, Arduino NANO, Flex Sensor, Zigbee Transmitter, 4-Servo Motor

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DEVELOPMENT OF SWARM INTELLIGENT ROBOT

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ABSTRACT

This work gives an overview of the broad field of computational swarm intelligence and its applications in swarm robotics. Computational swarm intelligence is modelled on the social behavior of animals and its principal application is as an optimization technique. Swarm robotics is a relatively new and rapidly developing field which draws inspiration from swarm intelligence. It is an interesting alternative to classical approaches to robotics because of some properties of problem-solving present in social insects, which is flexible, robust, decentralized and self-organized. This work highlights the possibilities for further research.

Key words: Arduino UNO Board, UNO Micro controller, Grade motors, Jumper Wires, Zigbee Module, sensors.

UGC AUTONOMOUS

DEVELOPMENT OF HUMAN SAFETY NIGHT SURVEILLANCE ROBOT USING RASPBERRY-PI

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ABSTRACT

The development of a Human Safety Night Surveillance Robot utilizing Raspberry Pi technology. The primary objective is to enhance night-time security through automated surveillance. The robot is equipped with infrared cameras, sensors, and a GPS system to detect, monitor, and track human activity in low-light conditions. By leveraging the processing power of the Raspberry Pi, the system can analyze real-time data and send it to cloud for streaming, recognize potential threats, and alert security personnel. This cost-effective and efficient solution aims to improve safety in residential, commercial, and public areas by providing continuous, reliable surveillance throughout the night.

Keywords: Bipedal Walking Robot, Arduino, Algorithms.

UGC AUTONOMOUS

DEVELOPMENT OF VIRTUAL TELEPRESENCE ROBOT USING RASPBERRY-PI

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ABSTRACT

A telepresence robot utilizing a Raspberry Pi for exploring unseen locations such as mining sites and adventurous terrains operates by integrating a Raspberry Pi, a versatile and affordable microcomputer, with various sensors and cameras. The Raspberry Pi serves as the brain of the robot, controlling its movements and data processing capabilities. The robot is designed to navigate through challenging environments remotely, allowing users to explore hazardous or hard-to-reach areas from a safe distance. By streaming live video and sends data back to the user, the robot provides real-time insights into the surroundings, enabling exploration and analysis without physical presence. This technology opens possibilities for applications in mining operations, exploration of remote areas, and adventure tourism, enhancing safety and efficiency in exploring unseen places.

Keywords: Raspberry Pi, Node_MCU ESP8266, ESP32-CAM, Motor Driver(L293D) Pin.

UGC AUTONOMOUS

AI BASED GPS TRACKING SYSTEM FOR TRANSPORT VEHICLES

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ABSTRACT

A simple AI-based GPS tracking system for transport vehicles, providing real-time location information directly to mobile phones via SMS. Utilizing a GPS module to monitor vehicle location and an Arduino microcontroller for data processing, the system integrates a GSM module to send the GPS coordinates as SMS messages to designated mobile phones. This ensures fleet managers or vehicle owners receive timely updates without needing complex infrastructure or internet connectivity. The project aims to offer a reliable, cost-effective solution for real-time vehicle tracking, showcasing the potential of integrating GPS and GSM technologies with the Arduino platform for efficient transport management.

Keywords: Arduino UNO R3, Arduino UNO Architecture, GSM Module, Accident sensors.

UGC AUTONOMOUS

DEVELOPMENT OF HIGH -MOTION CONTROL WHEEL CHAIR FOR DIFFERENT ENABLE PEOPLE

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ABSTRACT

Quadriplegia, or Tetraplegia, is a form of paralysis that results in the loss of sensory and motor functions in all four limbs. One of the significant hurdles that people with quadriplegia encounter is the lack of independent mobility. Since they lose control of their arms, it becomes impossible for them to operate traditional wheelchairs or even electric ones. To tackle this issue, a prototype wheelchair controlled by head movements and with joystick and with Bluetooth can be developed to enhance the independence of those who rely on wheelchairs. This design would include components such as a MEMS sensor, Joystick, DC geared motors, control electronics based on a microcontroller, a mechanical structure, and power supply modules. This setup allows users to steer the wheelchair simply by operating the joy stick with hand in the desired direction. Additionally, the speed can be adjusted. The system is designed with a cap that has built-in sensors, enabling the wearer to turn their head to navigate. This makes the wheel chair intuitive and easy to use.

Keywords: 315/434 MHz transmitter, 315/434 MHz transmitter STT-433, ADXL 335, ATmega328.

UGC AUTONOMOUS

DEVELOPMENT OF AI BASED SMART DOOR BELL SYSTEM

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ABSTRACT

The development of an AI-based smart doorbell system integrates advanced hardware and software to enhance home security and convenience. The system features a high-resolution camera, microphone, speaker, motion sensor, and network module, all managed by a powerful processor capable of running AI algorithms for real-time person detection. This doorbell leverages edge computing to minimize latency and bandwidth usage while providing image capturing and live video streaming and two-way communication through a dedicated mobile application. Users receive instant notifications of visitors, with image, video footage securely. The integration of AI enhances the accuracy of detection and alerts, making the smart doorbell a reliable and efficient solution for modern home security.

Keywords: Raspberry PI -PICO, ESP-32 Camera, Magnetic Lock, Buzzer.

UGC AUTONOMOUS

DEVELOPMENT OF COCKROACH INSPIRED ROBOT WITH ARTIFICIAL MUSCLES

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ABSTRACT

We present the design and prototype of a six-legged walking robot inspired by cockroach which uses Bluetooth connectivity and motors to perform locomotion. The six legged walking robot uses an Arduino nano micro controller as its control unit and two servo motors and an L293 board for locomotion. The power is derived from three four volts battery that are connected in series connection this gives us combined 12volts 1.2 amps for battery power . The robot is controlled via an Bluetooth connectivity module and is controlled via mobile application. The commands are stored in the application that help in locomotion of the robot. Two iron strips in different phases are used for actuating each tripod so that only one tripod may touch the ground. Such robots can be used in war torn areas , places where natural disaster such as earthquakes have taken place to check for the life expectancy below the rubble of the disaster via help of camera.

Keywords: iron strips, Arduino pro mini,, servo motors, L293 board ,

UGC AUTONOMOUS

DEVELOPMENT OF AN ASSISTIVE ROBOT FOR SAFE ROAD CROSSING

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ABSTRACT

This project describes the design, implementation, and testing of an intelligent robotic system for safe road crossing assistance. Integrating Raspberry Pi Zero 2 W, PIC microcontroller, ultrasonic sensors, and signal lights, the robot monitors traffic conditions, detects vehicles, and provides intelligent signal control. The system employs autonomous navigation and real-time feedback to ensure pedestrian safety. Technical specifications, methodology, and potential impacts are discussed. By reducing accidents and promoting responsible crossing practices, this system has the potential to transform urban mobility and save lives.

Keywords: Step-Down Transformer, Bridge rectified, DB107, L293D IC

UGC AUTONOMOUS

DEVELOPMENT OF HIGH-TECH CAR WASHING SYSTEM

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ABSTRACT

In the modern world, technology has linked each town, city and country with the other through means of transportation. This has ultimately led to a massive increase in the number of vehicles. To deal these vehicles there is a need of a proper washing system. The most common problem often encountered while cleaning these vehicles is time consumption and cost. So this project is developed to save time, cost, water, electricity and cleaning vehicle effectively. In this car washing system we can do multitasking and can be portable. In this we use different components like induction motor to pump, pressure guage to adjust pressure, pipes to inlet and outlet the water, nozzle is connected to end of the pipe for that we can change various components like water sprayer, foam, sprayer, cleaner cloth and purifier to clean the car.

Keywords: Water Reservoir, Nozzle/Spray Wand, induction motor

UGC AUTONOMOUS

IOT & PASSWORD BASED LOCKING SYSTEM FOR VEHICLES

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ABSTRACT

The vehicle locking system that integrates Internet of Things (IoT) technology with electronic password authentication to provide enhanced security and convenience for vehicle owners. The system consists of a microcontroller-based locking mechanism, A password-protected keypad, and a mobile application connected through IoT. The user should enter a valid password on the keypad or mobile app. If the password is correct. The microcontroller sends a signal to the locking mechanism to grant access. The system also features real-time notifications by GSM, GPS tracking, and remote locking/unlocking capabilities through the mobile app. This electronic password-based locking system offers improved security, ease of use, and flexibility, making it an attractive solution for vehicle owners seeking advanced protection against theft and unauthorized access.

Keywords: Relay Module, Arduino UNO, Microcontroller, GPS Module, GSM Module.

UGC AUTONOMOUS

DEVELOPMENT OF LIDER BASED SELF-DRIVING CAR

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ABSTRACT

This Lidar-based self-driving car is designed to sense its surroundings, navigate autonomously, and provide transportation capabilities without any human input. Utilizing Lidar technology, the vehicle continuously monitors its environment, detecting obstacles and maneuvering around them to ensure safe navigation. The advantages of autonomous cars include fewer traffic collisions, increased reliability, enhanced roadway capacity, and reduced traffic congestion. We believe that the widespread adoption of autonomous vehicles is on the horizon and will become a necessity in our lives. By addressing current challenges, these vehicles can ensure safety, efficiency, cost-effectiveness, and comfort in transportation

Keywords: Lidar sensor, perception module, localization and mapping, path planning and control, human machine interface

UGC AUTONOMOUS

DEVELOPMENT OF SEMI-AUTOMATIC RUBBER TRACKING ROBOT

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ABSTRACT

A semi-automatic rubber-tracking robot efficiently navigates diverse terrains, leveraging specialized tracks for enhanced mobility and traction. Combining user commands with autonomous capabilities, it ensures precise control in exploration, surveillance, and maintenance tasks. This innovative design boasts adaptability, stability, and reduced environmental impact. Its semi-autonomous functionality allows for real time data collection, obstacle avoidance, and customizable routing. Ideal applications include search and rescue, environmental monitoring, industrial inspection, and infrastructure maintenance. With its versatility, precision, and reliability, this robot redefines robotics capabilities, expanding operational possibilities in challenging environments. Enhanced safety, increased productivity, and cost-effectiveness further underscore its value, making it an invaluable asset for various industries. Its advanced technology seamlessly integrates into existing workflows, optimizing task execution and efficiency. Overall, this robot represents a significant leap forward in robotics, fostering innovation and efficiency. The semi-automatic rubber-tracking robot seamlessly navigates diverse terrains, integrating enhanced mobility, traction and stability. Autonomous capabilities and real time data collection enable efficient exploration, surveillance and maintenance. Ideal for search/rescue, environmental monitoring and industrial inspection, this innovative design prioritizes safety, productivity and cost-effectiveness, revolutionizing robotics capabilities.

Keywords: Semi - automatic Rubber-tracking, Efficient movement, Diverse terrains, Mobility, Traction, Navigation.

UGC AUTONOMOUS

DEVELOPMENT OF AGRICULTURE BASED SOLAR POWERED AUTOMATED MULTIPURPOSE ROBOT

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ABSTRACT

The agricultural sector is facing numerous challenges including labor shortages, increasing production costs, and the need for sustainable practices. Our project presents Solar-powered automated multipurpose agriculture robots are an innovative solution to improve agricultural efficiency while reducing the need for human labor. In India nearly about 70 percentages of people are depending on agriculture. Numerous operations are performed in the agricultural field like seed sowing, water spraying, Birds control Buzzer, Plougher and pesticide spraying etc. The equipment's used for above actions are expensive and inconvenient to handle. So, the agricultural system in India should be encouraged by developing a system which will reduce the man power and time. Solar-powered automated multitasking agriculture robots are a cost-effective and sustainable solution for farmers, providing them with a way to improve their productivity and reduce their environmental footprint.

Keywords: Ploughing, Pesticide Spraying, Water Spraying, Birds Control Buzzer, Seed Sowing, Battery, Solar plane.

UGC AUTONOMOUS

DEVELOPMENT OF DELIVERY ROBOT

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ABSTRACT

The autonomous delivery robot is meant to be a substitute for a delivery person. The delivery robot is capable of navigating through a GPS from a home location to a destination point while avoiding obstacles in the process. It uses an ultrasonic Sensor to detect if anything has been placed in middle of way. And the design, implementation, and evaluation of a delivery bot is to improve and enhancing user convenience. The proposed robot integrates advanced technologies including Internet of Things (IOT) devices, various sensors such as ultrasonic, GPS, microcontroller, digital compass and motor drivers to enable navigation, obstacle avoidance, and precise delivery capabilities. This delivery bot offers a sustainable and cost-effective solution for businesses and consumers alike, transforming the future of logistics and delivery services.

Keywords: Arduino uno, ESP 32 cam, Relay 5V, Motor driver, GPS module

UGC AUTONOMOUS

SOLAR TRICYCLE FOR DIFFERENTLY ABLED PEOPLE

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ABSTRACT

The proposed project involves the design and development of a solar-powered tricycle tailored for individuals with varying physical abilities. This innovative transportation solution aims to enhance mobility and independence for persons with disabilities while promoting sustainable energy use. The tricycle will incorporate a solar panel system to harness renewable energy, ensuring eco-friendly operation and reducing reliance on conventional fuels. Key features of the solar tricycle include an ergonomic design to accommodate different physical needs, a robust yet lightweight frame, and an efficient electric motor powered by solar energy. The vehicle will also feature customizable controls and seating arrangements to provide maximum comfort and accessibility. Additionally, safety measures such as anti-tip mechanisms, reliable braking systems, and user-friendly interfaces will be integrated.

Keywords: Solar pannel, Dc gear motor, Lead Acid Battery, Rectifier, Chain Sprocket.

UGC AUTONOMOUS

DEVELOPMENT OF CRICKET FILMING DRONE

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ABSTRACT

The design and development of a cricket filming robot aimed at enhancing sports broadcasting and coaching. The robot employs advanced motion tracking and camera technologies to autonomously follow cricket players and the ball during matches and practice sessions. Key features include real-time video streaming capabilities, precise manoeuvrability on uneven terrain, and integration with artificial intelligence for intelligent framing and analysis. The development process involves mechanical design, sensor integration, and software programming to achieve robust performance in dynamic cricket environments. The robot represents a significant advancement in sports technology, promising to revolutionize cricket filming and analysis for both professionals and enthusiasts alike.

Keywords: Motion tracking, Camera technologies, Artificial intelligence, Sports technology, Dynamic environments, Real-time video streaming, Sports broadcasting.

UGC AUTONOMOUS

DEVELOPMENT OF 3D PRINTED AND EV SCOOTERS

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ABSTRACT

A foldable helmet is a type of protective headgear designed to offer the same level of safety as traditional helmets while being more convenient to carry and store. These helmets are typically made from innovative materials and engineered to collapse or fold into a more compact form, making them ideal for commuters, cyclists, and anyone who needs to carry a helmet around when it's not in use. Foldable helmets are becoming increasingly popular due to their convenience and practicality. Foldable helmets represent a significant innovation in personal safety gear, combining practicality with protection. As technology advances, we can expect even more refined designs and features to emerge.

Keywords: 3d Printed Part, Nylon Straps, Buckle, Carbon Fiber, Nylon Head Gear.

UGC AUTONOMOUS

PRESSURE DROP CHARACTERISTICS OF NANOFLUIDS

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ABSTRACT

Pressure drop (Δp) in pipes of basic importance in several applications in which fluid flows through pipe passages for heat removal. This investigation studies the effects of variations in nanofluid properties due to convective heat transfer on basic laminar flow parameters: wall shear stress, pressure drop and velocity. These effects are classified as direct and indirect. The direct effects are due to the variations in fluid flow parameters, fluid density (ρ) and dynamic viscosity (μ), which determine the axial velocity field, wall shear stress, and pressure drop. The indirect effects are due to the variations in fluid thermal parameters, specific heat at constant pressure, and thermal conductivity, which affect the temperature field; consequently, ρ and μ are affected. The examination with nanofluids showed that the different nanofluid properties have little effect on the refrigerator performance. Thus, nanofluids can be used in domestic refrigerators to considerably reduce energy consumption.

Keywords: Laminar And Turbulent Flow, Reynolds Number, Propylene Chemical Structure, XY – Plane,

UGC AUTONOMOUS

FATIGUE ANALYSIS AND DESIGN OPTIMIZATION OF EXCAVATOR BUCKET

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ABSTRACT

As we see there's a climb within the earth moving machine industries because the construction work is rapidly growing is understood through the high performance of construction machines. An excavator may be a typical hydraulic heavy-duty human operated machine utilized in general versatile construction operations, like digging, ground levelling, carrying loads, dumping loads. Normally backhoe excavators are working under worst working conditions. Due to severe working conditions, excavator parts are subjected to high loads and must work reliably in the unpredictable working conditions. Thus, it's necessary for the engineers to provide an equipment of maximum reliability. In this project we focused on reducing the weight of one such excavator bucket keeping in mind the stresses developed in the bucket during operation. A 3d model of an excavator bucket is modelled and structural analysis is performed to determine its initial parameters. Then the weight of same model is reduced using topology optimization and then reanalyzed to make sure the stresses in the bucket are not increased. Then both the models are compared and the best one is defined.

Keywords: Digging excavator bucket, Rock excavator bucket, Hoe, Hydraulic excavator Operation

UGC AUTONOMOUS

EFFECT OF BORON AND CARBON ADDITION ON MICROSTRUCTURE AND TRIBOLOGICAL PROPERTIES OF METASTABLE BETA TITANIUM ALLOY, TI-10V-2FE-3AL

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ABSTRACT

Wear properties of a metastable beta titanium alloy, Ti-10V-2Fe-3Al, with and without boron and carbon were examined in two different heat treatment conditions. The analysis of wear tracks and debris clearly indicated that the underlying wear mechanism was one of delamination. At a constant load, the wear rate as a function of sliding speed exhibited a maximum at an intermediate speed of 1 m/s. Wear rate increased with increasing load at a constant sliding speed. These trends were explained in terms of coefficient of friction and maximum temperature attained. For the same heat treatment, boron plus carbon containing alloy exhibited higher wear rate as compared to the base alloy. This was attributed to lesser ductility of the bulk alloys that influenced the formation and characteristics of the mechanically mixed layers.

Keywords: Beta-Ti alloy, Heat-treatment conditions, Wear properties, Microstructures study, Additions boron plus carbon.

UGC AUTONOMOUS

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FABRICATION OF GUIDANCE ROBOT FOR BLIND

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ABSTRACT

The robot has the capability to follow a path that is provided on the floor and also detect any obstacle that is blocking the path. Apart from that, the robot can sense the motion of the user. The robot can also detect when the user wants the robot to increase or decrease its speed. Another great advantage of the robot is that the cane that is attached on the robot can be easily detached from the robot body. In addition, the hardware design for the robot is small and lightweight. Thus, visually impaired people can comfortably receive the help from the robot in assisting their movement. Most of the previous guidance robots for the visually impaired ignored the human response behavior and comfort, treating the human as an appendage dragged by the robot, which can lead to imprecise guidance of the human and sudden changes in the traction force experienced by the human. In this paper, we propose a novel quadruped guidance robot system with a comfort-based concept. We design a controllable traction device that can adjust the length and force between human and robot to ensure comfort.

Keywords: obstacle, robot body, Obstacle Avoidance System (OAS), Ultrasonic sensors, Buzzer

UGC AUTONOMOUS

FABRICATION OF SOLAR SAND SCREENING MACHINE

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ABSTRACT

Sand is a fundamental material in construction of solar sand screening machine can efficiently filter out impurities like stones and large particles, ensuring that only clean sand is used for building purpose. In the production of bricks and ceramics, clean sand is essential to achieve high-quality products. The machine can help in separating fine sand from larger particles, which is crucial for these industries. In agriculture, sand is used for various purposes, including soil conditioning and as a component in certain fertilizers. The machine can ensure that the sand used is free from contaminants, improving soil quality and crop yield. The mining industry often requires sand for various processes, including as a medium for separating minerals. The solar sand screening machine can help in obtaining clean sand, which is essential for efficient mineral extraction. By using solar energy to power the machine, it reduces the reliance on fossil fuels and minimizes the carbon footprint, contributing to environmental sustainability. Since the machine is solar-powered, it reduces operational costs by eliminating the need for conventional electricity, making it a cost-effective solution for small and medium enterprises.

Keywords: filters, fertilizers, solar energy, fossil fuels

UGC AUTONOMOUS

FABRICATION OF REGENERATIVE BRAKING

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ABSTRACT

In recent years, increased concerns over the impact of the conventional car (ICE –Internal Combustion Engine) on the environment have led to renewed interest and advancement in the Electric Vehicle (EV). While the advancements in the EV technology have been able to overcome many of its initial limitations, the need to improve overall efficiency of the vehicle has led to the design of the regenerative braking system (RBS). The RBS will be used to convert the car's mechanical energy and also the heat that would have been lost during braking into electrical energy. Therefore by varying the resistor value, the braking intensity can also be varied. The motor to be used in this system will primarily be a DC Motor. We intend to switch to an induction motor later on as this is currently the norm in the BEV (Battery Electric Vehicle) industry. In other term to maximize the efficiency of the RBS, it is important that we store some of the energy that may have otherwise been wasted. To achieve this, we implement the use of large capacitors connected in parallel to store the energy. This energy could then be used to recharge the batteries of the Electric vehicle (EV).

Keywords: regenerative braking system, Electric Vehicle, induction motor

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ADVANCES OF COMPOSITE MATERIALS IN AUTOMOBILE APPLICATIONS

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ABSTRACT

There is a rising need to create high performance, lightweight and strong yet tough materials for use in various industries including aerospace (civil, military aircraft), automotive (sports, utility, emergency vehicles) and others (civil engineering etc.). The use of composite materials to meet this need is now commonplace for several reasons. These include significant weight savings over traditional materials and design flexibility (load bearing only where required/reduced number of parts). In this project we modelled such multiple composite sheets and experimented with their mechanical properties by changing materials and defined which material composite is safe to use in automobile and aerospace industry.

Keywords: Solid works, ANSYS. Mesh Design, applying TI-6AL-4V

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CNC FABRICATION OF HIGH-TOLERANCE BOLTS AND NUTS FOR CRITICAL APPLICATIONS

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ABSTRACT

The demand for high-tolerance bolts and nuts is critical in industries such as aerospace, automotive, and heavy machinery, where precision and reliability are paramount. This project focuses on the fabrication of these fasteners using advanced CNC machining techniques. High-performance materials such as stainless steel, titanium, and Inconel are selected to meet the mechanical and environmental requirements. The project involves designing bolts and nuts with tight tolerances, optimizing thread profiles, and achieving superior surface finishes. CNC lathes are programmed for precise turning, threading, and finishing operations, ensuring consistent quality across batches. Quality control measures, including coordinate measuring machines (CMM), thread gauges, and tensile testing, validate dimensional accuracy and mechanical integrity. The outcome demonstrates the capability of CNC machining to produce fasteners with exceptional precision, strength, and durability for critical applications, setting a benchmark for modern manufacturing practices.

Keywords— Bolts and nuts, Threading processes, Precision engineering, Critical applications, Aerospace fasteners, Automotive components, Dimensional accuracy, surface finish optima

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DESIGN AND ANALYSIS BLADELESS WIND TURBINE

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ABSTRACT

The efficiency of renewable energy sources has increased dramatically in recent years, and wind power has been one of the biggest responsibilities. The growing demand for electricity hassled several countries to turn to renewable energy sources, and wind power is one of the related energy sources, and the demand for wind turbines that produce energy efficiently has started to increase. It would be very useful to develop new wind turbines if they could mimic the properties that make photovoltaics' one of the most important energy sources in the distributed energy sector. In terms of large-scale wind power, offshore technology (turbines installed at sea) is very promising. The aggressive nature of the marine environment, particularly the corrosion of moving mechanical plant parts, is one of the many problems encountered in marine areas. If there is a device that can harvest wind energy without major maintenance, mechanical parts such as gears, bearings, etc. become an important advantage. The oscillations or vibrations produced by the wind are used to generate electric current. How Vortex Induced Vibration (VIV) works. Therefore, electricity is generated using permanent magnets and copper coils.

Keywords: Renewable resources, Bladeless Wind Turbine, Vortex Induced Vibration.

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ELECTRICAL DISCHARGE MACHINING OF TI-4AL-6V

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ABSTRACT

Electric discharge machining (EDM) of Ti-4Al-6V alloy and optimization of the cutting parameters by using Taguchi methodology. Four observed values, MRR, EWR, REWR, and SR, are used as machining responses and four parameters like peak current, pulse on time, pulse off time and rotational speed of disk electrode are taken as machining parameters. Further, the surface topography study will be done using scanning electron microscope and X-ray diffraction analysis.

Keywords: Ti-4Al-6V, signal-to-noise, Material removal rate

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AUTOMATIC SIDE STAND RETRIEVING SYSTEM FOR TWO WHEELERS

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ABSTRACT

In modern developing world, automobile plays important role especially two- wheeler i.e (motorcycles& bikes) plays a major role. Even though they are helpful there are some sad events like accidents due to careless of rider. Major accidents occur due to forgetting of lifting side stand. To rectify this problem many advance measures have taken, but they are useless. so, by considering that it should be implemented practically in all type's bikes. The new system "Automatic Side-Stand Retrieve System" is to be designed based on the working principle of bikes. Since all bikes transmit power from engine to rear wheel by means of chain drive. Since the design setup is to be kept in between chain drive, then setup (Sprocket) rotates and side stand get retrieves automatically.

Keywords: Two- wheeler, chain drive , Sprocket

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AUTOMATIC DRUM SEEDER

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ABSTRACT

Direct seeding and transplanting are the two methods of planting rice. The traditional method followed by many years in lot of farming lands is transplanting of seeding raised in nursery. Transplanting method involves seedbed preparation, nursery growing, care of seeding in nursery, uprooting of seeding, hauling and transplanting operations. The preparation of seedbed and sowing are done 30 days before planting. The rice farmers practicing transplanting are facing problems like shortage of labour during peak time, hike in labour charges, small and fragmented land holdings etc. Direct seeding is becoming increasingly popular now days in India. Since, preparation of seedbed, raising of seedling and transplanting are labour and time intensive operations. Research reports show that labour involvement in these operations consume nearly one third of the total cost of production in INDIA. In addition, transplanting is not a healthy method as the farmers as it takes huge toll to their body. Direct sowing by drum seeder in 8 rows facilitated to take up organic fertilizer application, plant protection measures and weed control in an efficient manner. Further the crop duration is reduced around one week in direct sown rice as compared to normal transplanted which facilitated to raise another crop. The farmers in OFTs had realized that direct sowing by drum seeder is only a viable option to reduce cost of cultivation of rice and increase net return due to less seed rate, less labour requirements at the time of sowing and no need of nursery raising etc.

Keywords: Automatic drum seeder, Ground wheel, Electric motor, Nuts and bolts.

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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:** Peltier Effect, Heat sink, Thermoelectric module, Refrigeration.

Keywords: Robot, Material Handling, Efficient.

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MULTI NOZZLE PESTICIDE SPRINKLING MACHINE

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ABSTRACT

Spraying is not a continuous operation round the year. So, the same PV system available in solar sprayers can be utilized for energizing other farm operations such as pumping, farm lighting etc. One of the factors which affect the use of conventional electricity or fuel is increasing prices and its non-availability at peak time in rural area. The available solar sprayers used by the farmers are having low field coverage capacities, creating health hazards due to direct inhaling of spray drift and thus, polluting the environment with engine operated sprayers. Therefore, the emphasis should be given on design and developing independent renewable power source which can give uninterrupted energy and fulfill energy demand of remotely located farmers for operating various farm equipment's. Keywords: Solar Power, Agricultural, Sprayers. This circuit is designed to control the RPM of the motor by controlling the amount of resistance between the motor and the battery while simultaneously providing a charging supply for the battery. DC motor/pump lifts the pesticide from tank and delivers to nozzles with desired high pressure. Energy is supplied to DC motor/pump by the solar power unit for its running/operation.

Keywords: Solar Power, Agricultural, Sprayers

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SMART BOT WITH AUTOMATIC GARBAGE COLLECTING SYSTEM

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ABSTRACT

To make this monotonous job effortless, a new concept of Smart Garbage Collection System has been taken into consideration for Smart buildings, hospitals, schools and railway stations. The Smart garbage collector idea is an advancement of conventional garbage collector by upgrading it to become smart by instilling sensors and forms of logic. This smart garbage collector is a pioneering idea of application of line following garbage car and pole fixed garbage part on premeditated locomotive path. The fixed bin makes use of ultrasonic sensors for garbage level indication and updates the volume level of the bin to the garbage car, using RF Module. Hence, this device is fully automated system, making compact contribution towards the concern of Clean India Green India. Hence to overcome this major problem of waste collection, BinBot (Automatic Garbage Collecting robot) is developed. It facilitates the smarter way for garbage collection automatically from houses in the Residential areas and intimates the municipality about the BinBot status to collect the garbage when it is filled.

Keywords: Garbage Collecting Robot, IR Sensor, Ultrasonic Sensor, Arduino, RF Module.

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The International Conference on Recent Advances in Mechanical Engineering (ICRAME) aims to be one of the leading international conferences for presenting novel advances in the fields of recent innovations in Mechanical Engineering. ICRAME hopes to bring together researchers, scientists, and scholar students to exchange and share their experiences, new ideas, and results about all aspects and discuss the practical challenges encountered and the solutions adopted. Expert talks are planned for the exchange of ideas and sharing of expertise. The conference serves as a better platform to enrich research activities.



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