



PAAVAI ENGINEERING COLLEGE

(An Autonomous Institutions)

Accredited by NBA & Accredited by NAAC (UGC) with "A" Grade
Paavai Nagar, Namakkal - 637 018



Proceedings of National e-Conference on Recent Advancement in Engineering and Technology

Organized by Departments of Aeronautical Engineering, Mechanical Engineering and
Mechatronics.

(NCRAET'22)

Proceedings of National Level Conference on Recent Advancement in
Engineering and Technology– NCRAET'22

Copy Right: This proceedings book should not be reproduced in any form
without the written permission of the Editors and Publisher

ISBN: 978-93-94412-10-1



1st Edition-Volume-1-November 2022

Editors:NCRAET'22

Dr. M.Premkumar, Principal / Paavai Engineering College (Autonomous)

Dr. A. P. Sivasubramaniam, HoD / Mechanical Engineering / Paavai
Engineering College (Autonomous)

Dr. D.R.P. Rajarathnam, HOD/Mechatronics / Paavai Engineering College
(Autonomous)

Dr. R. Arravind, HOD/Aeronautical Engineering / Paavai Engineering College
(Autonomous)

Published by

AIRWALK PUBLICATIONS,
80-KARANEESHWARA KOIL STREET,
MYLAPORE, CHENNAI -600 004

Printer:

Classik Printers,
No.12, Oil Monger street,
Triplicane,
Chennai-600005

PAAVAI ENGINEERING COLLEGE
(Autonomous)
NATIONAL CONFERENCE ON RECENT ADVANCEMENT IN ENGINEERING AND TECHNOLOGY (NCRAET'22)

INDEX
AERONAUTICAL ENGINEERING

S.NO	TITLE	PAGE NO
1	Automatic Speed Control of Drone Based on Environment	1
2	Lane Detection of ADAS System	2
3	Implementation of GIS & Remote Sensing to Create a Updated Maps	3
4	Design and Analysis of Drone	4
5	Design and Development of Hexacopter Drone for Health Care	5
6	A Real Time Collision Free Path Planning for UAV Using Evolutionary Algorithm	6
7	Aerodynamic Analysis of Quadcopter Blades	7
8	Obstacle Avoidance Technology for UAV Operations	8
9	Strategic Optimization of Boeing 787 Dream lifter from 787 Dreamliner	9
10	Designing of Typical Slithering Platform for Helicopter Using Composite Materials	10
11	Bio Inspired Landing Gear System for Drone	11
12	Sustainable Development – The Key for Green Aviation	12

MECHANICAL ENGINEERING

S.NO	TITLE	PAGE NO
13	Experimental Investigation on the Delamination Behavior of Kevlar Fiber Composites During Drilling Process	13
14	A New Artificial Immune Algorithm for Solving Gear Design Problem	14
15	Study on A Counter - Flow Heat Exchanger for Energy Storage	15
16	Combustion and Emission Characteristics of An Ultra Lean Burn Spark Ignition (SI) Engine with Liquefied Natural Gas (LNG)	16
17	Experimental Results of Co-Gasification of Municipal Solid Waste and Coconut Shell in A Fluidized Bed Gasifier	17
18	Experimental Study about Flash and Fire Point Comparison on Three Combinations of Waste Tyre Oil with Diesel for Alternate Fuel Properties Identification	18
19	Nano Cellulose Fabrils: Production and Applications – A Review	19
20	Performance Analysis and Characteristics of a Domestic Refrigeration System Using Nano-Lubricant Zirconium Oxide (ZrO ₂) as an Additive	20
21	Review of Phase Change Materials in Heat Transfer Applications	21
22	Design and Study on the Engine with Pneumatic System	22
23	A Review Study on Electrochemical Machining Parameters	23
24	Review of the Properties of Aluminum Metal Matrix Composite	24
25	A Review Study of Friction Stir Processing of Aluminum Alloys	25
26	Welding Process for Stainless Steel and Mild Steel - Review	26
27	Experimental Investigation of Thrust Force and Torque in Chemically Treated Kevlar Fiber Composites During Drilling Process	27
28	A Study of The Modelling and Optimization of The Laser Beam Machining Method	28
29	A Variability Study of Machinability on Electrochemical Machining	29
30	Investigation of Mechanical Properties on Graphite Reinforced Aluminum Matrix Composite Through Stir Casting Technique	30
31	Analyzing the Mechanical and Electrical Characteristics of Epoxy Composites with Carbon Filler	31
32	Investigation and Analysis of Mobile Hydro Power System	32

MECHATRONICS

S.NO	TITLE	PAGE NO
33	Sentimental Analysis Using Machine Learning	33
34	Care Taker Robot Using Firebird V	34
35	PLC Based Object Handling Using RFID	35
36	Generation of Braille Code from Speech and Image to Text	36
37	Defection Identification Using Machine Learning and Robotics in Vannamei Prawn Cultivation	37
38	PLC Based Pick and Place Station Using Modular Production System	38
39	Speech Recognition System Using CNN	39
40	AI Technology for Sustainability	40
41	A Multitasking Agriculture Robot Using IOT	41
42	Wireless Gripper Robot in Hospital Management	42
43	A Smart Robotic Car with Automatic Controls for Safe Driving	43
44	Food Preservation Insulated Box by Phase Change Material Erythritol	44
45	Swarm Drone Technology - The Future of Robotics	45
46	Vision Based Navigation System in The Prime Factor of Underwater Navigation	46
47	Compliant Mechanisms in Robotics	47
48	A Review on Image Processing	48

AERONAUTICAL ENGINEERING

AUTOMATIC SPEED CONTROL OF DRONE BASED ON ENVIRONMENT

Mrs Karthiga M¹, Jaswant K², Divyaprakash J³, Dhineshbabu S⁴

^{1, 2, 3, 4} UG Scholar, Department of Electronics and Communication Engineering, Bannari Amman Institute of Technology, Erode, India
Dhineshbabu.ec19@bitsathy.ac.in

ABSTARACT

Here the sensors measure the environmental changes and commands the UAV which in turn results in that the propellers will create lift and total lift for the UAV will be the sum of four propeller's lift. It pushes the air down which also comes under Newton's third law of motion. (Every action has an equal and opposite reaction) When the sensors like (accelerometer, gyro sensor) IMU, TOF sensor, PID controller measure the abnormal environmental changes (where the drone cannot sustain), the UAV will land immediately. So, the crash can be avoided.

Key words – UAV, IMU, TOF, PID Propellers, Environmental changes.

LANE DETECTION OF ADAS SYSTEM

Mr.Stephen Sagayaraj A¹, Asan Mohamed J², Abisheak Hemarengan P³, Eswaramoorthy K⁴

¹ Professor, Department of Electronics and Communication, Bannari Amman Institute of Technology, Erode, India.

^{2,3,4} UG Scholar, Department of Electronics and Communication, Bannari Amman Institute of Technology, Erode, India.

asanmohamed.ec19@bitsathy.ac.in

ABSTARACT

The road or lane perception is a crucial problem for advanced driver assistance systems. As such, it has been an active field of research for the past two decades with considerable progress made in the past few years. The lane detection problem, at least in its basic setting, does not look like a hard one. In this basic setting, one has to detect only the host lane, and only for a short distance ahead. By doing this we can make them go in the appropriate lane. Traffic accidents occur for various reasons. The majority of traffic accidents are caused by an improper speed on the road turning or unexpected lane changes while avoiding an obstacle. The system acquires the front view using a camera mounted on the vehicle then applying few processes in order to detect the lanes. The extreme conditions that are avoided as low level features like mistaking a landmark as a lane, lane blurred extreme lighting or a car almost occupying a lane. These approaches were tested and the experimental results show that the proposed scheme was robust and fast enough for real time requirements. Eventually, a critical overview of the methods was discussed, their potential for future deployment were assist.

Key words – Advance driver assistance system, Lane detection, extreme conditions.

IMPLEMENTATION OF GIS & REMOTE SENSING TO CREATE A UPDATED MAPS

Pushparaj Muthukrishnan¹, Dr. Malathi Raman²

¹ Research Scholar, Department of Electronics and Instrumentation Engineering, Annamalai University, Chidambaram,
608 002.

² Professor, Department of Electronics and Instrumentation Engineering, Annamalai University, Chidambaram
pushparajasi@gmail.com

ABSTARACT

Geospatial data collection typically uses aerial or satellite pictures. Unmanned aerial vehicles (UAVs) are, nevertheless, becoming a viable technology for offering data with extremely high spatial and temporal resolution at a reasonable price. The purpose of this article is to demonstrate the possibilities of using UAVs for mapping and map updating by using GIS (Geographical Information System) & Remote Sensing (RS). The study's goal is to use GIS and RS methodologies to determine the updated maps. A GIS is a framework for collecting, analyzing, and displaying geographically referenced data and information associated with specific locations. RS is a compilation of data collected from the surface of the planet; RS is carried out with the help of a drone. Using a case study in Auroville where 1350 photos were gathered with a DJI Phantom quadcopter, the paper introduces the entire methodology. In order to extract features with centimeter accuracy, a 0.099 km² orthophoto with a spatial resolution of 5 cm was created. The UAV data products underwent quantitative and qualitative assessment, demonstrating that the accuracy obtained complies with international standards.

Key words – UAV, GIS, RS and Drone mapping.

DESIGN AND ANALYSIS OF DRONE

Karikalan L¹, Balasubramanian S², Somasundaram B³, Unni Krishnan S J⁴

^{1,2,3,4} UG Scholar, Department of Automobile Engineering, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai.

karikalanl.se@velsuniv.ac.in

ABSTRACT

This century is notable for contemporary warfare, in which technology has improved to the point that we have more powerful defenses and weaponry. Knives or swords are thought to be the main weapons used by humans to engage in a war at first. Following that, the rifle was introduced, and weapons played a significant role in the victory of those who utilized them. Following the introduction of firearms, missiles were introduced in 1944, and the year 1944 was known as The Dawn of Missile. These missiles had a significant impact on wars and are still in use today. However, when we look at all of the conflicts that have occurred on our globe, we can see the enormous loss of life and riches. Wealth cannot be protected in a conflict, but lives can. We are now in the twenty-first century. Nevertheless, if we continue to act foolishly, the human species will perish. War must be avoided at all costs, but in the event of an emergency, we will require new technology to protect and attack. The UAV is used for the following reasons. The term unmanned aerial vehicle refers to a vehicle that can be used for both warfare and surveillance. UAV's use cutting-edge technology to attack with pinpoint accuracy in combat, avoiding unnecessary casualties.

Keywords – UAV, technology, Aerial vehicle, Military.

DESIGN AND DEVELOPMENT OF HEXACOPTER DRONE FOR HEALTH CARE

Dr.D.Jagadeesh¹ , Sriharan M², Sridev R³, Tharun P⁴,Sudharsan K S⁵

¹ Professor

^{2,3,4,5} UG Scholar

^{1,2,3,4,5}Kongunadu College of Engineering and Technology

Namakkal –Trichy state Highway, Tholurpatti Post,Thottiam Taluk, Trichy District

ABSTRACT

In these flexible applications to facilitate human life, is currently used at great demand. They perform tasks repetitively at reasonable cost and quality levels. The main objective of this work is to design and develop healthcare delivery drone. The delivery drone has the potential to have the same effect on traditional transportation infrastructure. Due to poor transportation infrastructure, or roads blocked by severe weather, disasters or traffic congestion, the delivery of small items like medicines, blood and vaccines or other healthcare items that is needed in locations with difficult access becomes critical in healthcare. To overcome this problem, autonomous drone is design for the rapid delivery of medicines at places required. The delivery drone with an “PIXHAWK” is built through both manual and autopilot mode which drives the drone to position necessary. It can supply up to 750g of medicine with flight time of 20min at far of 2 kilo meters of an aerial distance. The objective of the project is to eliminate the difficulties and complications involved in existing time-consuming method for medicine transmission as well as to design and develop a drone for delivering medicine with short time span by perfect navigation system. Medicines such as pills, blood and vaccines are delivered on the roads in India. The level of traffic in major cities is very high at all times. The ambulance reaches destination with it is very difficult in the particular time and it is difficult to enter the ambulance in the rural places. Furthermore, lithium batteries are rapidly improving so drones can fly further on a charge. Drone technology can monitor and navigate using cell phone or tablet devices.

Keywords – Autonomous vehicle, Healthcare drone, Path planning, Global positioning system, Electrical speed controller.

A REAL TIME COLLISION FREE PATH PLANNING FOR UAV USING EVOLUTIONARY ALGORITHM

Kumarasan T¹, Saranya S², Jeya Surya P³, Cathrine Arockiya Mary J⁴

^{1,2}Assistant professor of Aeronautical Engineering,

^{3,4}Final year UG Scholar of Aeronautical Engineering, J. J College of Engineering and Technology, Trichy

ABSTRACT

Recently unmanned aerial vehicles (UAVs) have a wide civilian application due to its mobility and accessibility. Obstacle avoidance is a major task in online path planning. The present work describes a real-time three-dimensional path planning of a multirotor in a static environment along with dynamic obstacle. This situation is characterized by means of high-level geometric primitives. A collision-free optimal path is established through A* discrete search algorithm. It consequently provides feasible shortened and cost-effective path. The proposed path planning solution has been simulated in V-REP (Virtual Robot Experimentation Platform) simulator, obtained results reveals this method can be applicable for realistic environment.

Keywords - Path planning simulation, UAV path planning, obstacle avoidance, dynamic obstacle detection.

AERODYNAMIC ANALYSIS OF QUADCOPTER BLADES

Mathan A¹, Dakshinamurthy B², Soundarya B³.

^{1,2,3,4}UG Scholar, Department of Aeronautical Engineering, Bannariamman Institute of Technology, Erode.

soundarya.ae19@bitsathy.ac.in

ABSTRACT

Analyzing the propeller aerodynamic performance is of vital importance for research and improvement of unmanned aerial vehicles. The design specifications for rotorcraft propellers are presented in this study, along with a CFD analysis is carried out to determine the performance of the propeller model. The analysis and implementation of a blade element's aerodynamic force are based on the momentum theory of the blade element. The Eppler series of E62 airfoils performed better than the other airfoils when some of the most widely used airfoils were compared based on performance at different angles of attack. The diameter, pitch, number of blades, blade shape, and choice of airfoil have all been modified to create a highly efficient propeller. Based on the research, a quadcopter blade is modeled with Catia v5, preprocessing is carried out with ANSA, and computational fluid dynamic analysis is performed with Ansys Fluent for various blade shapes, comprising bi-blade, tri blade, and modified ducted blade. Utilizing comparison graphs for thrust force, coefficient of lift, coefficient of drag, and drag force, one may evaluate the propeller's efficiency. In comparison to other blade types, the modified ducted blade is more efficient and produces maximum efficiency. The purpose of the analysis is to reduce the cost of the physical prototype. The research is necessary for choosing more effective propellers for unmanned aerial vehicles and for enhancing the dynamic system of these aircraft's performance.

Keywords – Aerodynamic force, Quadcopter blade, Airfoils.

OBSTACLE AVOIDANCE TECHNOLOGY FOR UAV OPERATIONS

Dhanesh Raam S¹, Dhushyanth D², Midhun S³

^{1,2,3} UG Scholar, Department of Aeronautical Engineering, Bannari Amman Institute of Technology, Erode,
India

dhushyanth.ae19@bitsathy.ac.in

ABSTARCT

A low-cost obstacle avoidance technology is being developed for pricey multi- rotor pesticide spraying equipment in order to avoid obstructions in the UAV's pre-planned path. Obstacles can be any size or shape, yet sensors are unable to account for these details. It might be able to find out all the details about obstructions in its flight path thanks to its vision-improving abilities. Impediments are only detected and mapped in 3D using LiDAR and vision- based systems; ultrasonic and infrared sensors are only utilized to identify 2D obstacles. Numerous journals claim that the dynamic avoidance solution can use the real-time obstacle avoidance approach. Most obstacle avoidance technologies let the drone determine how far obstacles are and make an effort to avoid them. The drone can use our recommended method to judge the distance to the obstacle and man oeuvre around it without deviating from the mission's original objective.

Keywords – Multi rotor, LiDAR, Mapping.

STRATEGIC OPTIMIZATION OF BOEING 787 DREAMLIFTER FROM 787 DREAMLINER

Vishnuraj R¹, Praveen kumar B², Srikrishna R³, Dr.R. Ramaswamy⁴

^{1,2,3} UG Scholar, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology

⁴ Professor, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology

arrvishnuraj2002@gmail.com

ABSTARCT

The passenger to the freighter conversion process of the Boeing 747 jumbo jet is rebuilt with the Boeing 787 Dream liner and are model led dream lifter is proposed for design. The crucial advantages of the Boeing 747 jumbo jet like susceptibility to air turbulence, unwanted bulk weight, loss of flexibility at high load conditions, the poor fuel efficiency of engines and cost ineffectiveness are overcome in this design. Two Designs involved in the P2F conversions are prepare during the same difference percentage carried out in the Boeing 747 jumbo jet P2F conversion process and the proposed 787 dream lifter is compared with the 787dream liner with the help of aerodynamic flow analysis. Also, the loading conditions and the strength of the designed dream lifter are to be checked with the help of the structural analysis. Hence the Boeing 787 Dream liner is expected to be introduced on the manufacturing scale in a cargo approach as Boeing 787 Dream lifter in near future.

Keywords – Boeing 747 Jumbo jet, Boeing 787 Dream liner, 787 Dream lifter.

DESIGNING OF TYPICAL SLITHERING PLATFORM FOR HELICOPTER USING COMPOSITE MATERIALS

M. Balaji¹, M. Jananidurgadevi², A. Emil Jebastin³, Dr. R. Ramasamy⁴

^{1,2,3} UG Scholar, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology

⁴ Professor, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology

Ramasamy10@gmail.com

ABSTRACT

One of the important operations the defence services (especially army) have to carry out during a specific mission is to transport armed troops to remote places where there is no access by road in quickest possible time. Army aviation uses the helicopters for the said mission where in the Troops are carried in the helicopter to a predetermined destination and are made to slide down the helicopter with the helicopter in hovering condition at about 200 feet to 300 feet above the ground. This operation of sliding down from the helicopter is called as slithering. Slithering operation essentially needs a Slithering Boom firmly attached to the helicopter structure, an end fitting to attach the rope and a platform for the troops to stand before sliding. The aim of the project is to design a platform using composite materials approximating it on a simply supported beam to carry a load of 300 Kg i.e., two armed troops of 150 Kg each.

Keywords – Slithering, Composite materials, Helicopter platform.

BIO INSPIRED LANDING GEAR SYSTEM FOR DRONE

Kiruthik Adhithya V¹, Nagasurya T², Kavidharshini P S³, Kaviya A⁴

^{1,2,3,4} ³ UG Scholar, Aeronautical Engineering, Hindustan College of engineering and technology

kiruthik700@gmail.com

ABSTRACT

The application of drones (Unmanned Aerial Vehicle-UAV) in various fields such as surveillance, construction, defence, photography, delivery, agriculture, and rescue play a vital role in the current scenario. In the landing operation aspect, it remains a difficult task for drones to land on oblique surfaces. The proposed work came up with a solution for landing on the descent surfaces through the unique design of bio-inspired landing gear for multi-rotor UAVs. The design is inspired by the biological feature of spider legs (Appendages). The movement of spider legs is quite fascinating and a natural example of hydraulics. With the implementation of biomimic landing gear design, drones can perch on the surface while doing inspection and surveillance. It majorly helps to do an inspection on the dams, construction walls, pipelines, and towers. Perching will increase the inspection or surveillance duration with this landing gear system. Generally hovering the drone in a particular area limits the battery life. so that inspection for a longer duration will be complex. Additionally, drones can be made to avoid any collision by keeping Infra-Red (IR) Sensors and transmission of live data to the ground station by using a transmitter and a receiver. Also, the low battery indication will be sent to a transmitter by programming the flight controller and some more manoeuvrability techniques.

Keyword – Manoeuvrability, Hydraulics, Infra-Red (IR).

SUSTAINABLE DEVELOPMENT – THE KEY FOR GREEN AVIATION

P.Dharmadurai¹, K.Nilavarasu², R.Selvaganapathy³

¹Assistant Professor, Department of Aeronautical Engineering, Mahendra Engineering college, Thiruchengode, Namakkal.

^{2,3}UG Scholar, Department of Aeronautical Engineering, Mahendra Engineering college, Thiruchengode, Namakkal.
nilavarasu540@gmail.com

ABSTRACT

The aviation industry has always been seeking the technological progress that will optimize the economic, operational and environmental way of flying. In the first part of this study the author describes the impact of the CO₂ emissions on the climate change. Also, the author emphasizes the fact that once again the aviation environment is asking for new breakthroughs to face the challenge of the aviation's sustainable growth. Airbus and its approach with the least possible impact on environment are introduced in the last part of this paper. Additionally, the environmental way of greener aviation is illustrated by examples of fuel consumption and CO₂ emissions measurements made for several selected airlines.

Keywords – Sustainable development, Climate change, Fuel efficiency, Green aviation, CO₂ emissions.

MECHANICAL ENGINEERING

EXPERIMENTAL INVESTIGATION ON THE DELAMINATION BEHAVIOUR OF KEVLAR FIBRE COMPOSITES DURING DRILLING PROCESS

Dr.K.Periasamy¹, V.P.Vaishnav², S.Sukanth³, C.Suriya⁴, K.Sathish⁵

¹Associate Professor, Kongunadu College of Engineering and Technology, Thottiyam Tholurpatty, Trichy.

^{2, 3,4,5} UG Scholar, Kongunadu College of Engineering and Technology, Thottiyam Tholurpatty, Trichy.

vaishnavperiasamy@gmail.com

ABSTARACT

Among all machining operations. Delamination is mostly considered as the principal failure mode in drilling of composite materials. Delamination is a crucial concern in hole making industry, as it is necessary to prevent damage of cutting tools, machine tools and workpieces. Kevlar fiber reinforced composite (KFRC) are of great interest for the excellent technical properties which finds wide applications in the field of aerospace, armor vehicle, sports goods, naval etc. The present study aims in analyzing the extent of interaction between Kevlar fiber and various thermoset resins like polyester, epoxy and vinyl ester. Composite specimens composing Kevlar fiber and thermoset resins were prepared by hand layup method on compression moulding. Drilling has been carried out on the pure and Kevlar filled thermoset resins. The study implies low delamination for polyester-Kevlar composites due to high physical interaction between Kevlar and polyester. Microscopic images have recorded the delamination in the drilling holes which helps to find the optimum parameters of drilling such as feed rate and spindle speed by means of factors i.e., thrust force and torque.

Key words – Kevlar; Drilling; Thrust force; Delamination; Laminates.

A NEW ARTIFICIAL IMMUNE ALGORITHM FOR SOLVING GEAR DESIGN PROBLEM

T.Vinod Kumar¹, M.Chandrasekaran², S. Padmanabhan³, S.Baskar⁴

^{1,4} UG Scholar, Department of Mechanical Engineering, Vels Institute of Science Technology and Advanced Studies
(VISTAS), Chennai, India.

^{2,3} UG Scholar, School of Mechanical and Construction, Vel Tech Dr. Rangarajan Dr.Sagunthala R&D Institute of
Science and Technology, Avadi, Chennai, India.

vinod.se@velsuniv.ac.in

ABSTARACT

The design of gears is critical for smooth running of any mechanism, automobile and machinery. Gear drive design starts with the need of optimizing the gear thickness, module, number of teeth etc., this creates huge challenges to a designer. Optimization algorithms are more flexible and gaining importance in engineering design problems, because of the accessibility and affordability of today's mechanical field. A population based heuristic algorithm offers well-organized ways of creating and comparing a novel design solution in order to complete an optimal design. In this paper, a new artificial immune system-based algorithm proposed as Modified Artificial Immune System (MAIS) algorithm is used to optimize a gear design problem. The results are compared with an existing design.

Key words – Artificial Immune System, Gear Materials, Gear design, Spur Gear drive and Multi-objective Optimization.

STUDY ON A COUNTER - FLOW HEAT EXCHANGER FOR ENERGY STORAGE

M.Chandrasekaran¹, S.Baskar², S. Padmanabhan³, T.Vinod Kumar⁴

^{1,4} UG Scholar, Department of Mechanical Engineering, Vels Institute of Science Technology and Advanced Studies (VISTAS), Chennai.

² UG Scholar, Department of Automobile Engineering, Vels Institute of Science Technology and Advanced Studies (VISTAS), Chennai.

³ UG Scholar, School of Mechanical and Construction, Vel Tech Dr.Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Avadi, Chennai.

baskar133.se@velsuniv.ac.in

ABSTARACT

The experimental assessment of a phase change material-based thermal energy storage device is presented in this work (PCM). It is a part of a thermal storage system that generates hot water, heats and cools buildings, and uses solar collectors and strong heaters. It consists of a PCM tank and a heat exchanger with staggered fins (HE). Experimental findings demonstrate the tank's ability to both increase system output and satisfy the demand for a DHW fitting. The density of the stored energy and the rate of heat transfer are designed into the tank.

Key words – SH, LH, Energy storage, PCM, HX.

COMBUSTION AND EMISSION CHARACTERISTICS OF AN ULTRA LEAN BURN SPARK IGNITION (SI) ENGINE WITH LIQUEFIED NATURAL GAS (LNG)

D. Damodara Reddy¹, Srikar Potnuru²

^{1,2} UG Scholar, Department of Mechanical Engineering, Malla Reddy College of Engineering & Technology,
Hyderabad, India.

damureddi@gmail.com

ABSTARACT

Understanding the process of lean combustion to LNG engines and the factors that affect it is crucial for developing gas engines that will fulfill the increased need for greater efficiency and little emissions. Optical experiments using a single-cylinder SI engine, the studies in this report concentrate on ignition as well as premature flame propagation phase because both phases have a substantial effect on the succeeding main combustion. Comparisons are made between un scavenged pre-chamber and direct ignition of spark plugs and recovered pre-chambers along with various operating circumstances and an outspread and tangential nozzle alignment. Apart from the ignition's phenomenology the motion of the main chamber interacts with the igniting mechanism. As a result, the study focuses on various valve timings, such as standard timings and the Miller cycle, and setups with low and high turbulence. He findings demonstrate that powerful turbulent jets originating within the nozzles boost the initial stage of flame propagation when employing a scavenged pre chamber. Additionally, it is seen that the boundary conditions and the geometry of the nozzle have an influence on how the early flame propagates. It is demonstrated that such a scavenged pre chamber makes up for the main chamber's lack of turbulence. Because of the generated turbulence. bigger surfaces at the flame front in the main chamber produced by entreating flame torches, the scavenged pre chamber hence boosts the flame propagation.

Key words – Lean burn; Spark Ignition Engine; Liquefied Natural Gas; Turbulence.

EXPERIMENTAL RESULTS OF CO-GASIFICATION OF MUNICIPAL SOLID WASTE AND COCONUT SHELL IN A FLUIDIZED BED GASIFIER

Thendral Tamilmani¹, Pranesh Ganesan²

¹ Full Time Research Scholar, Department of Mechanical Engineering, M.I.E.T. Engineering College, Tiruchirappalli
620007, Tamilnadu, India.

² Assistant Professor (SG), Department of Mechanical Engineering, M.I.E.T. Engineering College, Tiruchirappalli
620007, Tamilnadu, India.

dharinisakthikumaran@gmail.com

ABSTARACT

In many industrial processes, including those in the petrochemical, pharmaceutical, and mining sectors, fluidized beds play a significant role. In the current study, air is used as a gasification agent in a fluidized bed gasifier to co-gasify municipal solid waste and coconut shell. The mixture of coconut shell and municipal solid waste is co-fed at various ratios, including 80:20, 60:40, 40:60, and 20:80, using silica sand as a main catalyst. The effects of E.R., temperature, and blending ratio on the composition, gas output, tar concentration, CGE, and HHV of syngas are all being studied. The blending ratio of CS: MSW 20:80 is higher HHV value than the blending ratio of CS: MSW 80:20. For various CS: MSW blending ratios, the CO, CH₄, tar content, cold gas efficiency, and higher heating value all increased.

Key words – Fluidized bed, municipal solid waste, coconut shell and blending ratio.

**EXPERIMENTAL STUDY ABOUT FLASH AND FIRE POINT
COMPARISON ON THREE COMBINATIONS OF WASTE TYRE OIL
WITH DIESEL FOR ALTERNATE FUEL PROPERTIES IDENTIFICATION**

Bala subramanian D¹, Arun C², Charles Peromio A³, Gurusamy U⁴

^{1,2,3,4}Assistant professor, Mookambigai College of Engineering, Pudukkottai

bala.subramanian979@gmail.com

ABSTRACT

The current study investigates about flash and fire point comparison of three different combinations of waste tyre oil with diesel for alternate fuel prosperities identification in compression ignition engines. Waste tyre oil is gained through esterification process. 500 ml of diesel and tyre oil with three combinations taken for the experiment. These samples tested before and after esterification process. Then the corresponding flash and fire point values noted for this investigation.

Key words – Esterification, Ignition, Waste tyre oil.

NANO CELLULOSE FABRILS: PRODUCTION AND APPLICATIONS – A REVIEW

Dr.A.kumaravel¹, B.Vishvak², K.Rajamanikam³, M.Pavani Shankar⁴

¹ Professor, Department of Mechanical engineering, K.S.Rangasamy college of technology is an autonomous engineering college, affiliated to Anna University, Chennai, Tamilnadu, India.

^{2,3,4} UG Scholar, Department of mechanical engineering, K.S.Rangasamy college of technology is an autonomous engineering college, affiliated to Anna University, Chennai, Tamilnadu, India.

vishvakguna@gmail.com

ABSTARACT

Various applications polymer matrix composites are being widely used in areas like aerospace, construction, shipbuilding, automobile industry etc. the application area of nanocellulose is increasing day by day due to its excellent mechanical properties and rich hydroxyl group used in surface modification. Nanocellulose can be extracted from agricultural waste such as sugarcane bagasse, cotton linter, rice husks, and used in reinforcing material for composites which gives very high Specific stiffness and strength. In this paper extraction technique of nanocellulose and fabrication of polymer matrix composites has been explained, Elastic modulus of composites can be obtained and verified by rule of mixture. Due to its low toxicity, renewable nature, nanoscale dimension and good biocompatibility the future scope of nanocellulose is very wide. Nanocellulose have rich hydroxyl groups which is used for surface treatment of materials, mechanical properties of nanocellulose such as high stiffness and strength are attractive to use it as a filler for composites which gives better mechanical and thermal properties. It can be concluded that the mechanical behavior of the nanocellulose composites are more adaptive to be used in various applications such as in biomedical for tissue repair, drug delivery and implants of some body parts, in paper and packaging industry, in electronic industry such as time- temperature integrator, gas and leak detector etc.

Key words – Nanocellulose, hydroxyl group.

PERFORMANCE ANALYSIS AND CHARACTERISTICS OF A DOMESTIC REFRIGERATION SYSTEM USING NANO-LUBRICANT ZIRCONIUM OXIDE (ZRO₂) AS AN ADDITIVE

M. Ruban¹, S. Baskar², P. Balachandran P³, R. Deepanchakaravarthi⁴

^{1,2,3,4} UG Scholar Department of Automobile Engineering, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai,

Indiaruban.se@velsuniv.ac.in

ABSTRACT

This study suggests ZrO₂ nano-oil as a suitable lubricant to improve the efficiency of a refrigerator compressor that uses vapor compression. Experimental research is done to determine the stability of SiO₂ microparticles in the oil. It was proven that the nanoparticles remained steady and steadily suspended in the mineral oil for a considerable amount of time. The compressor oil was supplemented with nano-oil at precise concentrations of 0.1%, 0.2%, and 0.3% (by a mass fraction). The results reveal that using nano-oil instead of pure oil increased the system's coefficient of performance by 7.61%, 14.05%, and 11.90%, respectively.

Keywords – Energy, Performance, Power, Refrigeration, Nanoparticles.

REVIEW OF PHASE CHANGE MATERIALS IN HEAT TRANSFER APPLICATIONS

Baskar¹, M. Ruban², D. Rajesh Kumar³, R. Rakesh Kumar⁴

^{1,2,3,4} UG scholar Department of Automobile Engineering, Vels Institute of Science Technology and Advanced Studies
(VISTAS), Chennai

baskar133.se@velsuniv.ac.in

ABSTRACT

Phase change materials (PCMs) are used in latent heat thermal energy storage, which is a practical solution to the imbalance between energy supply and demand. However, it has a leakage issue and poor thermal conductivity. The recent experimental and numerical studies on phase change heat transfer are reviewed in this study. It turns out that the most popular PCM and porous support in the present experiments are metal foam and paraffin. The development of numbers is examined from the perspective of several simulation techniques. In addition, research on phase change heat transfer and material preparation is lacking. This analysis concludes by outlining potential future research areas for phase change heat transfer in porous ss-PCMs.

Keywords – Phase change materials, Thermal conductivity, Heat transfer.

DESIGN AND STUDY ON THE ENGINE WITH PNEUMATIC SYSTEM

S. Ramasubramanian¹, V.S. Shaisundaram², M. Vignesh³, M. F. Abu hanifa⁴

^{1,2,3,4} UG Scholar Department of Automobile Engineering, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, India
rsmaniam.se@velsuniv.ac.in

ABSTRACT

In this study, a compressed-air engine is used as a pneumatic actuator to change one type of energy into another. The environmentally friendly Air Driven Engine uses compressed air to run. The pistons of this engine are propelled by the expansion of compressed air. A pneumatic actuator known as an air-driven engine uses compressed air to expand and do useful work. Since there is no combustion, there is no mixing of the fuel with the air. Compressed Air Technology is used by an Air Driven Engine to operate. The technology of compressed air is rather straightforward. The air would contain some energy if it were compressed into a cylinder. There are productive uses for this energy. The energy is released to perform work when this compressed air expands. For the construction of a safe, light, and affordable compressed air vehicle in the near future, it is necessary to master the control of compressed air parameters such as temperature, energy density, input power demand, energy release, and emission control.

Keywords – IC engine, pneumatic system, actuator, regulator, compressed air.

A REVIEW STUDY ON ELECTROCHEMICAL MACHINING PARAMETERS

Pugalmozhi R¹, Hari Prasath K², Naveenkumar M C³, Sivapragasam A⁴

^{1,2,3} PG Scholar, Engineering Design, Sona College of Technology, Salem.

⁴Assistant Professor, Department of Mechanical Engineering, Sona College of Technology, Salem.

pugalmozhi.21meed@sonatech.ac.in

ABSTRACT

Jet electrochemical machining is a non-traditional machining process which is developed by W.Gussef as far back as 1929. This process commercially developed in 1959 by Anocut Engineering Company. B.R. and J.I. Lazarenko was credited with proposing the use of electrolysis for metal removal. In 1960 and 1970s much research was done, particularly in the gas turbine industry. The rise of EDM in the same period slowed ECM research in the west, although work continued behind the Iron Curtain. The original problems of poor dimensional accuracy and environmentally polluting waste have largely been overcome, although the process remains a niche technique. In this process material is removed by electrochemical process which is used for mass production and for hard material or materials that are difficult to machine using conventional methods. Its use is limited to electrically conductive materials. This paper critically reviews the development of physical experimental work in Jet- ECM and corresponding hybrid technologies and their applications, e.g. laser- and air assisted Jet- ECM. In addition to discussing the merits of the physical experimental research challenges in the future of Jet-ECM development.

Keywords – Micro Machining, Electrolyte, Jet- ECM.

REVIEW OF THE PROPERTIES OF ALUMINUM METAL MATRIX COMPOSITE

Gokul Raj S¹, Gokuldass P², Ramapraba J R³, Saravanan K G⁴

^{1,2,3} PG Scholar, Engineering Design, Sona College of Technology, Salem.

⁴ Associate Professor, Department of Mechanical Engineering, Sona College of Technology, Salem.

Gokuldass.21meed@sonatech.ac.in

ABSTRACT

Aluminum metal matrix composites are gaining widespread acceptance for automobile, aerospace, agriculture farm machinery and many other industrial applications because of their essential properties such as high strength, low density, good wear resistance compared to any other metal. The present study deals with the addition of reinforcements such as graphite, fly ash, silicon carbide, red mud, organic material etc. to the Aluminum matrix in various proportions. Each reinforced material has an individual property which when added improves the properties of the base alloy. An effort has been made to review the different combinations of the composites and how they affect the properties of the different alloys of aluminum. A comprehensive knowledge of the properties is provided in order to have an overall study of the composites and the best results can be employed for the further development of the aluminum reinforced composed. The investigation shows that Al metal matrix composites can be replaced with other conventional metals for better performance and longer life.

Key Words – Aluminum, Reinforcement, Stir Casting, Silicon Carbide, Graphite, Fly Ash.

A REVIEW STUDY OF FRICTION STIR PROCESSING OF ALUMINUM ALLOYS

Abishek J¹, Abubakkar Siddiq A², Ajay A³, Fahad khan S⁴

^{1,2,3,4} UG Scholar, Department of Mechanical Engineering, Ramakrishnan College of Technology, Samayapuram, Trichy.

ajayarockiyaraja2001@gmail.com

ABSTRACT

Friction stir processing is a Nobel technique established for its capacity to alter the microstructures and properties of a metal to its enhanced one with the assistance of extreme and confined plastic distortion. On the off chance that in tests, with effectively cooled magnesium-amalgam work pieces the micro hardness gets tripled in the region of the rubbing mix handled crease i.e. 120-130 Vickers hardness. In FSP process a more homogenous and refined microstructure of material is obtained. Repaired regions from FSP process are prevalent in quality and furthermore have better formability looked at than parent material. E.g. aluminum castings can be prepared to tie voids, or expulsions can likewise be enhanced in much focused-on zones. FSP in blend with superplastic framing gives the possibility to shape complicated-molded parts at high strain rates and in segment thicknesses which isn't conceivable utilizing customary superplastic handling. In this article of survey, current phase of FSP and improvement jumped out at comprehend it is tended to.

Keywords – Al Alloys, FSP Variables, Tool Pin Profiles, Transverse Speed.

WELDING PROCESS FOR STAINLESS STEEL AND MILD STEEL - REVIEW

Dhiwahaer S¹, Hariharan M², Hariprasana R³, Hari Venkatesha Rai D H⁴

^{1,2,3,4} UG scholar, Department of Mechanical Engineering, K Ramakrishnan College of Technology, Samayapuram,
Trichy-621 112.

hari032000@gmail.com

ABSTRACT

In the paper, we are going to study about the welding process in the stainless steel and mild steel. These stainless steel and mild steel becoming progressively striking for producing industrial applications. The main application is the airport structure, especially in boiler. The purpose of this project is to study the welding parameter such as laser power, gas flow and welding speed to investigate the tensile properties, microstructure, micro hardness and strength. This paper is used to find the optimum parameter. To identify the hardness of the welding element in the Laser Welding (LW) stainless steel and mild steel based on the experimental approach.

Keywords – Laser welding stainless steel and mild steel, Process parameter.

EXPERIMENTAL INVESTIGATION OF THRUST FORCE AND TORQUE IN CHEMICALLY TREATED KEVLAR FIBER COMPOSITES DURING DRILLING PROCESS

Mr.S. Chandra Kumar¹, R. Vigneshwaran², V. Vinothkumar³, R. Tamilselvan⁴, S. Vetrivel⁵

¹Assistant Professor, Department of Mechanical Engineering, Kongunadu College of Engineering and Technology,
Thottiyam, Tholurpatty, Trichy.

^{2,3,4,5} UG scholar, Department of Mechanical Engineering, Kongunadu College of Engineering and Technology,
Thottiyam, Tholurpatty, Trichy.

ABSTRACT

Now a days Kevlar composite has been widely used because of its sound mechanical properties in various field like aeronautical, ballistic application, marine etc. Drilling is most important machining process in making assembly of components within a specified tolerance. Drilling in Kevlar composites is very difficult due its superior mechanical properties like high toughness and hardness. Thrust force and torque are the major causes of delamination during various machining of reinforcement polymer composites. More number of research works on machining operations has been carried out in order to reduce defects like delamination and fiber pull outs. It is found from literature studies surface modification has been enhancing bonding strength between reinforced polymer laminates. This paper deals influence of process parameters on thrust force and torque during drilling of Kevlar laminates with and without chemical treatment. The composite material is prepared for the investigation of 60/40 Kevlar-polyester resin on weight basis. Dichloromethane, methanol and distilled water used for surface treatment with specified intervals. Twisted drill bits and core drill bits were used for making holes. Results has highlighted that twist drill with chemically treated having minimum thrust force. Our main objective is to find minimum cutting force and torque through conducting experiments.

Keywords – Kevlar, Drilling, Thrust force, Delamination, Torque,

A STUDY OF THE MODELLING AND OPTIMIZATION OF THE LASER BEAM MACHINING METHOD

Poovarasan K¹, Manikandan M², Prince Victor P³, Mohan R⁴

^{1,2,3} PG Scholar, Engineering Design, Sona College of Technology, Salem.

⁴ Professor, Department of Mechanical Engineering, Sona College of Technology, Salem.

poovarasan.21meed@sonatech.ac.in

ABSTRACT

Machining of advanced materials by conventional methods consequences in increased high cutting temperature, high cutting force magnitudes, tool wear, lesser tool life and meagre machined surface. Machining of these materials by conventional methods are originate to be uneconomic. Researches are attracted towards laser beam machining (LBM) between the various nonconventional machining methods. This paper focuses the probable usage of LBM for various materials machining, current progress, benefits and challenges in machining, process parameters and performance characteristics, modeling and optimization. There is need to agreeably designed process parameters which is appropriate to LBM. It is resolute that investigational based modeling and optimization methods are essential to generate model that gives very good fitting with experiments, while determining the effects of several process parameters.

Keywords – Optimization, Cutting temperature, Laser beam.

A VARIABILITY STUDY OF MACHINABILITY ON ELECTROCHEMICAL MACHINING

Sakthi Kumar V¹, Mohan Raj V², Ramani Krishnan R³, Naveen Sabarinathan M⁴

^{1,2,3,4} PG Scholar, Engineering Design, Department of Mechanical Engineering, Sona College of Technology, Salem.

sakthikumar.21meed@sonatech.ac.in

ABSTRACT

Electrochemical machining processes provide a viable alternative for drilling macro- and micro-holes with exceptionally smooth surface and reasonably acceptable taper in numerous industrial applications particularly in aerospace, electronics, computer and micro - mechanics industries. Electrochemical Machining (ECM) offer a better alternative or sometimes the only alternative in generating accurate 3-D complex shaped macro, micro and nano features and components of difficult- to-machine materials. Technological advances reported in electrochemical machining processes, which reflect the state of the art in academic and industrial research and applications, are briefly reviewed in this paper.

Keywords – ECM, Macro and Micro-holes.

INVESTIGATION OF MECHANICAL PROPERTIES ON GRAPHITE REINFORCED ALUMINIUM MATRIX COMPOSITE THROUGH STIR CASTING TECHNIQUE

S. Kumaradevan¹, Dr.U. Natarajan², Dr.A. Kumaravadivel³, Dr.G. Pranesh⁴

^{1,4}M.I.E.T. Engineering College, Trichy

²A.C.Govt. College of Engineering and Technology, Karaikudi

³Sir Issac Newton College of Engineering and Technology, Nagapattinam

kumaradevan.sk@gmail.com

ABSTRACT

Aluminium alloys are widely used in aerospace and automobile industries due to their low density and good mechanical properties, better corrosion resistance and wear, low thermal coefficient of expansion as compared to conventional metals and alloys. The excellent mechanical and physical properties of these materials and relatively low production cost make them a very attractive candidate for a variety of applications both from scientific and technological viewpoints. The aim involved in designing metal matrix composite materials is to combine the desirable attributes of metals and Ceramics. In this present work is focused on the study of behaviour of aluminium cast Alloy (AL7075) with graphite composite produced by the stir casting technique. 5%, 10% age of reinforcement is used. Hardness Test, tensile test, and impact test performed on the samples obtained by the stir casting process. Hardness test is employed to evaluate the interfacial bonding between the particles and the matrix by indenting the hardness with the constant load and constant time.

Keywords – Alloy (AL7075), Graphite composite.

ANALYZING THE MECHANICAL AND ELECTRICAL CHARACTERISTICS OF EPOXY COMPOSITES WITH CARBON FILLER

S. Sakthi¹, M. Vimalkumar², S. Mahendran³, S.T. Jayasuthakar⁴

^{1,2} Research Scholar, Department of Mechanical Engineering, University college of Engineering, Thirukuvalai campus.

^{3,4} Assistant Professor, Department of Mechanical Engineering, University college of Engineering, Thirukuvalai campus.

sakthi.mech1990sss@gmail.com

ABSTRACT

Filler materials of varying types are embedded within the components of polymer composites. When it comes to improving the required properties of composites, the choice of fillers that are used is very important. Filler materials are used in polymers to improve dimensional stability, increase heat resistance, increase mechanical properties, and modify electrical properties. Filler materials can also be used to modify electrical properties. The purpose of the research is to determine how best to choose a carbon-based filler material that can provide polymer composites with a harmonious combination of balanced mechanical and electrical output characteristics. Test methods such as scanning electron microscopy, tensile testing, and four-point probe testing were applied to the specimens in order to obtain a comprehensive understanding of the connection that exists between the mechanical properties and the electrical conductivity of filler-reinforced polymer composites. According to the findings of this study, there are discernible dependencies between the amount of carbon filler and the material's electrical conductivity and mechanical properties. The electrical conductivity of the epoxy matrix is improved by the addition of conductive fillers, from a value of 8×10^{-13} S/m to a value of 7×10^{-2} S/m. When reinforced with milled carbon fibre (MCF), the tensile strength of an epoxy matrix can be reduced by no more than 4.12 percent at 8 weight percent filler loading.

Keywords – Carbon fillers, Conductivity, Dispersion, Elongation, Epoxy.

INVESTIGATION AND ANALYSIS OF MOBILE HYDRO POWER SYSTEM

P. Jegan¹, J. Gowtham perumal², A. Harikrishnan³, R.V. VigneshKumar⁴

¹Assistant professor, Department of Mechanical Engineering, Roever Engineering College, Perambalur.

^{2,3,4}UG Scholar, Department of Mechanical Engineering, Roever Engineering College, Perambalur.

paramasivamjegan@gmail.com

ABSTRACT

This project aims to explain the design and construction of a movable hydropower system which will be convert the kinetic energy of water flowing in small creeks in electrical energy as a source off renewable energy for the D.C house. The DC house is a project to build a self-sustainable house for third world countries that utilizes only DC electricity. The system consists of two converts and a charge controller for a 12V lead-acid battery. The first converter converts the hydro generator voltage output to 15V for safe and proper charging of the lead acid battery by the charge controller. The second converter provides power output for DC house by converting the 12V lead – acid battery to 20 volts at a maximum of 24Watts. Charge controller contains a bi-directional connection to the 12V lead-acid battery that can store the energy generated by the hydro generator for future use during light loads or deliver additional power during heavy loads .since the system uses dc electricity, interfacing with the DC house eliminates costly and inefficient conversion from DC to AC and vice versa, normally implemented in conventional methods.

Key words – Hydro generator, Charge controller, Lead acid battery.

MECHATRONICS

SENTIMENTAL ANALYSIS USING MACHINE LEARNING

Janani B S¹, Nikitha M², Bawya V³, Kaviyalakshmi S S⁴

^{1,2,3,4} UG Scholar, Department of Information Science and Engineering, Bannari Amman Institute of Technology,

Erode, India

janani.se21@bitsathy.ac.in

ABSTARACT

At the useful resource of emotional threads. People use many gestures to express emotions such as joy, sadness, love, anger, etc. Sentiment evaluation is the division of emotions into advantageous and horrific classifications. Millions of human beings share their views and opinions on a variety of day-to-day existence troubles that either right now or in a roundabout way have an impact on them on social media platforms like Twitter, in the technological know-how of microblogging, which has grown to be a well-known instrument of communication. This classification fashion can similarly be used to classify and continue to tweet on any topic on Twitter. So, the dataset 'Sentiment140 dataset with 1.6 million tweets' is taken from Kaggle to detect the negative emotions of Twitter users such as frustration, sadness, and anger. The feature is "text," and the "target" is converted from stated statistics into numbers so that it can be used as a target. This can be completed through more than a few computing devices studying methods like Logistic regression, Bernoulli NB, Linear Support Vector Classifier, and Random Forest and Multinomial NB.

Key words – Twitter, Machine mastering applied sciences, Bernoulli NB, random forest.

CARE TAKER ROBOT USING FIREBIRD V

Prithisha S¹, Lakshmi T², Janani R³, Hemalatha T⁴

^{1,2,3,4} UG Scholar, Department of Artificial Intelligence and Data Science, IFET College of Engineering, Villupuram.

Prithishaads@gmail.com

ABSTARACT

Autonomous Intelligent Robots can perform desired tasks in any type of environment without the continuous guidance of human. A line follower programmed to follow a specific path. A line following robot carries the medicine to the patient whenever they need it based on the predefined path that can be either visible on a black line on a white surface or vice-versa. IR sensor remote is used by the nurse or technician, based on which the data is sent to the system or the robot. Based on the request the care taker robot will serve the patients accordingly. In this project Firebird V ATMEGA 2560. Microcontrollers are used to deliver the requested provisions by the patients in the hospital. It uses three levels of feedback for path alignment, rotation offset and for avoiding obstacles. Since the path of the wards remains same in the hospitals, so a fixed path is defined and is loaded to the Firebird V through codes.

Key words – Fluidized Firebird V, Embedded System, ATMEGA-2560.

PLC BASED OBJECT HANDLING USING RFID

Surandar V S¹, Dhiyanesh K², DhineshKumar M³

^{1,2,3} UG Scholar, Department of Mechatronics, Bannari Amman Institute of Technology, Erode, India

surandar.mc19@bitsathy.ac.in

ABSTARACT

In current time due to speeding, industries automate themselves. But they widely depend on sensors, which increases the cost and occupies more workspace. And have high possibilities of malfunction. So as an alternative we replace sensor with RFID. Our Project have two-parts software and hardware. The Software contains ladder logic programming used in plc which controls the total process systematically according to input data sequence. The hardware contains conveyer, RFID reader, RFID tags and other electronic components like interconnector, motor, drives, etc. using RFID the cost and workspace can be reduced by multiprocessing in a single section. This multi work process can be done easily and maintained constantly.

Key words – Automate, Sensor, RFID reader, RFID tag, PLC (programmable logic controller), Multiprocessing.

GENERATION OF BRAILLE CODE FROM SPEECH AND IMAGE TO TEXT

Dhinesh Kumar G¹, Gokul B², Gughana N P³

^{1,2,3} UG Scholar, Department of Electronics and Communication Engineering, Bannari Amman Institute of Technology,
Erode, Tamil Nadu.

gokul.ct19@bitsathy.ac.in

ABSTRACT

This initiative will produce Braille printers for the blind. These folks are unable to further their education because they are unable to use computers and other instructional software. Using their tactile sense and the Braille writing system, they can read any form of data. However, reading literature that is not written in the Braille alphabet presents substantial reading challenges. Here, we provide a prototype for writing Braille from spoken words. They are weaker than those who have a clear vision, which is bad for the economy. This technology enables the employment of braille-to-word, image, or audio converters that generate both the input word and the output word for a given input. As a system input, a Braille keypad with several configurations of six cells is used. Braille text in English has been decoded.

Keywords – Arduino Mega, visually impaired, Ramps 1.4 board, microphone, and USB port.

DEFECTION IDENTIFICATION USING MACHINE LEARNING AND ROBOTICS IN VANNAMEI PRAWN CULTIVATION

E. Jagadishwaran¹, A. Ganesh², N. Muralidharan³, A. Thamizharasan⁴

^{1,2,3,4} UG scholar, Department of Mechanical Engineering, IFET College of Engineering, Villupuram

jagadishwaran63@gmail.com

ABSTRACT

White leg shrimp also known as Pacific white shrimp or king prawn, is a variety of prawn of the eastern Pacific Ocean commonly caught or farmed for food. The infected prawn will automatically spoil the entire pond. The Robot capable of detecting the object in the random movement after detecting the object the robot senses by webcam and followed by image processing, after the segmentation process the robot classifies the prawn into healthy and infected prawn. The robot run with 60 rpm motor and the arm movement of the robot run with 10 rpm motor and the process is interface with serial port by interfacing device. By machine learning algorithmic techniques (Artificial Neural Networks) all image features in R, G, B color projection values are extracted and stored in database using specified programming methods.

Keywords – White leg shrimp, RGB color projection, Image processing.

PLC BASED PICK AND PLACE STATION USING MODULAR PRODUCTION SYSTEM

Rock Richard S¹, Vigneswaran V², Rishi D³

^{1,2,3} UG scholar, Department of Mechatronics, Bannari Amman Institute of Technology, Erode
vigneswaran.mc19@bitsathy.ac.in

ABSTRACT

Automation is the process of controlling & operating various machinery, networks, switches, etc. using microcontrollers and automatic control devices. A computerized system for handling materials is synchronizing the traveling on a robotic arm to pick up the object transporter belt. Various cutting-edge robots are utilized in industries, although controlling is still done by hand or with similar to Arduino and Microcontroller CPUs. But There are many drawbacks to microprocessors, so these PLC has the ability to overcome drawbacks. This project aims to design an automatic system which picks the products or objects from one location and places it to another. It also contains a Human Machine Interface (HMI) to monitor and control the activity of the entire process in a user-friendly manner. The entire design is operated using Programmable Logic controllers (PLC). Commonly this design is used in industries to do repetitive tasks, which reduces human effort and saves time. The basic mechanism includes gripping, lifting, moving, placing & releasing the objects to desired locations.

Keywords – PLC (Programmable Logic Controller), Automation, MPS (Modular Production System), DC motor.

SPEECH RECOGNITION SYSTEM USING CNN

Yokeeswran M¹, kavin Prashanna², Ashwin R³, Dr. Nirmaladevi J⁴

^{1,2,3} UG Scholar, Department of Information Science and Engineering, Bannari Amman Institute of Technology, Erode

⁴ Professor, Department of Information Science and Engineering, Bannari Amman Institute of Technology, Erode

ashwinmessi95@gmail.com

ABSTRACT

Transcribing vocal speech signals into text using transcripts is a process known as automatic speech recognition (ASR). The ASR plays a significant role in improving the user experience in a natural way while interacting with machines in the current era of the computer revolution. It prohibits the use of conventional devices like a keyboard and mouse, and the user is able to carry out an infinite number of operations like device control and customer service engagement. The application of a voice recognition model has grown significantly in significance. Speech recognition features were combined with deep convolutional neural-learning techniques to create a word-tracking model in our study. Speech control has grown in importance. There are six control words (start, stop, forward, backward, right, left). Words from a range of age groups. Our voice dataset, which is used to train and test suggested deep neural networks, is contributed in an equal split by men and women. Gather information at several locations, like the market, lab, park, and street. For thirty persons, the duration of each word varied from 1 to 1.30 seconds. In order to categorize each word from our pooled data set as a multi-class classification problem, Convolutional Neural Network (CNN) is used as an advanced deep neural network.

Keywords – CNN (Convolutional Neural Network), ASR (Automatic Speech Recognition).

AI TECHNOLOGY FOR SUSTAINABILITY

Logesh R¹, Dhanasekar R², Jeyabalan K³

^{1,2,3} UG Scholar, Department of Electronics and Instrumentation Engineering, Bannari Amman Institute of Technology, Erode, Tamil Nadu.
logesh.ei21@bitsathy.ac.in

ABSTARACT

Human-induced climate change and deterioration of our natural environment are critical problems. Advanced technologies, such as artificial intelligence (AI), offer potential for the development of solutions. Machines that learn by acquiring knowledge and perform humanlike tasks; can help humans reduce their intense use of natural resources and improve environmental governance for more sustainable living. This chapter provides evidence of AI's potential to create new opportunities to overcome major socio-environmental challenges, using two case studies. The first case study explains how machine intelligence can support the design and implementation of interventions for promoting pro- environmental behavior in societies. The next section discusses AI-powered strategies for efficient management of wildfires and renewable energy production. The conclusions offer insights into the ability of AI to influence larger trends in global sustainability and suggest data-driven interventions and leadership strategies to accelerate progress in combating climate change.

Keywords – Artificial Intelligence, climate change, Environmental changes, sustainability.

A MULTITASKING AGRICULTURE ROBOT USING IOT

B. Dinesh¹ B. Sathish², R. Muthukumar³, S. Sudursan⁴, Dr. P. Hemalatha⁵

^{1,2,3,4,5} UG Scholar, Department of AI&DS, IFET college of Engineering, Villupuram.

⁵ Professor, Department of AI&DS, IFET college of Engineering, Villupuram.

dhinesh9907@gmail.com

ABSTRACT

Agriculture is the backbone of our country. Robots are playing an important role in field of agriculture for farming process autonomously. The proposed system aims at making the agriculture smart by using automation and IoT technologies. Agri-robot is a robot designed for agricultural purposes to minimize labour and energy consumption. The highlighting features of this project includes Raspberry Pi based remote controlled robot to perform tasks like Seed Sowing and Automatic Irrigation. The efficient mechanism of the disperse seeds are led to fall into the soil through the seed dispenser and it includes smart irrigation with pump automation and intelligent decision making based on accurate real time field data. The farmers can able to control the robotic actions by switching onto the desired modes through dashboard from the mobile connected to Internet. These operations will be performed by interfacing sensors, motor, smart phone Wi-Fi and actuators with Raspberry Pi. It is designed to minimize the labour wages in addition to increasing the speed and accuracy of the work. Thus, the multitasking robot keeping the ideology that multiple small autonomous machines could be more efficient than traditional large tractors and human effort.

Keywords – Internet of Things, Raspberry Pi, Robot, Smartphone.

WIRELESS GRIPPER ROBOT IN HOSPITAL MANAGEMENT

SELVA PRASANNA M ¹

¹ Assistant Professor, Department of Mechatronics, Bannari Amman Institute of Technology, Erode
selvapasanna.mc19@bitsathy.ac.in

ABSTRACT

The World Health Organization predicts a shortfall of 18 million the health care workers by 2030. The population aging, a dwindling healthcare workforce, and a rise in chronic disease are major worries for many countries. Hospital Robots provide a reliable solution since they perform various tasks to relieve doctors, nurses, and surgeons of their everyday responsibilities with low or no value added. Robots have become a vital element of many hospitals' workforces, performing everything from surgeries to administrative labour. Robotic gripper is widely used for different tasks in various fields. A gripper is a device which enables the holding of an object to be manipulated. Dispensing medications is a task that encompasses many manual and repetitive processes suitable for robotics. A vision-based robot arm selects the correct medicine and delivers it.

Keywords – The health care, Robot gripper, Vision-based robot arm.

A SMART ROBOTIC CAR WITH AUTOMATIC CONTROLS FOR SAFE DRIVING

Sadhasivam A¹, Naidu Rahul Govindham², Gayam Sainath Reddy³

^{1, 2, 3} UG Scholar, Department of AI&DS, IFET College of Engineering, Villupuram.

rahulnaiduads@gmail.com

ABSTRACT

Car automation is an IOT technology by which we can control different things or can keep a track on a vehicle for the (i) Security, (ii) comfort and (iii) efficiency. The low-cost alcohol sensor is equipped in the car for alcohol detection to avoid accidents due to alcohol consumption controlling the speed of the car using sonic sensor while facing the obstacles. The seat belt consists of an inbuilt heart beat sensor to automate the ignition of the car during medical emergencies. Threshold limit is set according to the age of the drivers which are collected while registration itself. All controls are available in car owners' dash board available both in car and also in mobile application. The periodic data is sent via internet and stored in cloud for further analysis and decision making. The Dash board consists of ON/OFF switch so that the ignition is controlled remotely during thefts and break failures.

Keyword – Heart Beat Sensor, Alcohol Sensor, Ultrasonic sensor.

FOOD PRESERVATION INSULATED BOX BY PHASE CHANGE MATERIAL ERYTHRITOL

Dr. Karthik A¹, Nithesh G², Ruthra Moorthi J³

¹Assistant Professor, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology,
Coimbatore.

^{2,3} UG Scholar, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology, Coimbatore.
akarthick@acetcbe.edu.in

ABSTARACT

It is observed that currently the eating habits of Indians has oriented towards the fast food especially European and American foods such as Italian pizza, burgers, hot dogs etc. So, in most of the urban cities and towns the fast food centers such as dominos, KFC, Mc Donald's, Marry Brown, Pizza Hut etc. have been established. The setup is an insulated box. The inner surface is made up of copper and followed by PCM, stainless steel, glass wool and galvanized steel. Phase change material namely ERYTHRITOL melting point is 118°C. The copper sheets are insulated by a layer of glass wool 5mm thick. The glass wool is further surrounded by stainless steel then followed by galvanized steel. The bottom of the box is also provided with PCM.

Key words – ERYTHRITOL, PCM, Food centers.

SWARM DRONE TECHNOLOGY - THE FUTURE OF ROBOTICS

Rajasekar C¹, Sharansundar S², Suraj R³, Sabarivasan J⁴

¹Assistant Professor, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology,
Coimbatore.

^{2,3,4}UG Scholar, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology,
Coimbatore.

crajasekar@acetcbe.edu.in

ABSTARACT

Swarm drone technology is a method of controlling a bunch of drones as a unit. Each drone within the swarm is controlled by a separate computer, but all of them work together to realize a typical goal. Swarm drones is used for a range of tasks, including search and rescue, surveillance, and cargo delivery. The rapid development of Space-Air-Ground integrated network, IoT, and swarm-based robotic systems has led to the transformation of traditional single drone toward drone swarm. Compared to the normal single drone, drone swarm can collaboratively complete complex tasks with higher efficiency and lower cost, especially in harsh environments. Swarm drone technology continues to be in its early developmental stages, and there are variety of challenges that require to be addressed before it is widely adopted. This paper focuses on the basic idea of what swarm drone is, its advantages and disadvantages, main applications and future scope.

Key words – Swarm drone, Robotic system, IoT.

VISION BASED NAVIGATION SYSTEM IN THE PRIME FACTOR OF UNDERWATER NAVIGATION

Vinoth S¹, Mohammed Shakeer S², Aravinthan M³, Mellbill Biju⁴

¹Assistant Professor, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology,
Coimbatore.

^{2,3,4}UG Scholar, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology,
Coimbatore.

nmsvinoth@gmail.com

ABSTRACT:

Vision based navigation systems are usually composed of three main components: a camera, an Inertial Measurement Unit (IMU), and a computer. The camera captures images from the environment around the AUV, which are then processed by the computer to create a map of the environment. The IMU provides information about how fast and in what direction the AUV is moving, which can be used to correct errors in position estimation caused by drift or other factors. The navigation part of the AUV can be bit complicated. But it can be achieved through many methodologies like Visual Serving, Heuristic Reasoning, Robotics Vision etc. so that it helps to navigate the AUV in a better manner Vision based navigation systems are used for many different purposes, such as mapping the ocean floor, monitoring marine life, and exploring shipwrecks. They are also used for search and rescue operations.

Key words – IMU, AUV, Robotic Vision.

COMPLIANT MECHANISMS IN ROBOTICS

Suresh N¹, Immanuel Jiji², Santhiya R³, Murugan S⁴

¹Assistant Professor, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology, Coimbatore.

^{2,3,4}UG Scholar, Department of Mechatronics Engineering, Akshaya College of Engineering & Technology, Coimbatore.

nsuresh@acetcbe.edu.in

ABSTRACT

This paper discusses about the advantage of Compliant - Mechanism over traditional links and mechanisms for mobility. Thereby its use in robotics as a reliable mechanism for accurate movement and its characteristics in terms of maintenance, ease of manufacture and versatility of application.

Key words – Compliant-Mechanism, Mobility, Robotic system.

A REVIEW ON IMAGE PROCESSING

Abhishek S¹, Aageneye S², Ashkar Rabeem³, Karthik B⁴

^{1,2,3} UG Scholar, Department of Computer Science Engineering, College of Engineering Pathanapuram, Kerala.

⁴ UG Scholar, Department of Electrical and Electronics Engineering, St Thomos College of Engineering and Technology, Kerala.

saabhishek2003@gmail.com

ABSTARACT

Image Processing includes changing the nature of an image in order to improve its pictorial information for human interpretation, for autonomous machine perception. Digital image processing is a subset of the electronic domain wherein the image is converted to an array of small integers, called pixels, representing a physical quantity such as scene radiance, stored in a digital memory, and processed by computer or other digital hardware. Interest in digital image processing methods stems from two principle applications areas: improvement of pictorial information for human interpretation; and processing of image data for storage, transmission, and representation for autonomous machine perception. Edges characterize boundaries and edge detection is one of the most difficult tasks in image processing hence it is a problem of fundamental importance in image processing. In this paper investigates different steps of digital image processing. Like, a high-speed non-linear Adaptive median filter implementation is presented. Then Adaptive Median Filter solves the dual purpose of removing the impulse noise from the image and reducing distortion in the image. The Image Processing Toolbox software is a collection of functions that extend the capability of the MATLAB numeric computing environment. The toolbox supports a wide range of image processing operations on the given image.

Keywords – Image Enhancement, Feature Extraction, MATLAB.