SAPTHAGIRI
College of Engineering
Creating Tomorrow

Tech Grantha

2019-20

DEPARTMENT OF MECHANICAL ENGINEERING

Index

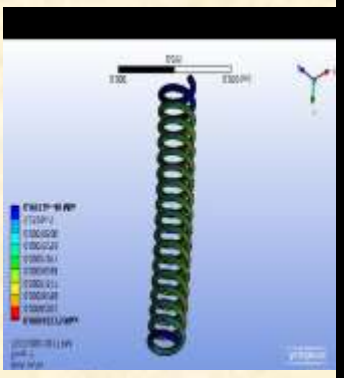
“ARTIFICIAL LEG MECHANISM FOR ABOVE KNEE AMPUTEES”

Mr. PRAJWAL NAIK (1SG16ME112)
Mr. LOKESH M (1SG17ME413)
Mr. SATHISHA U T (1SG17ME427)
Mr. PRAVEEN M (1SG17ME422)

Guide
Dr.P.Mahadevaswamy
Prof. & Head

People who have lost a leg have a diminished capacity to complete daily tasks. While prosthetic limbs are not a new field, adjustability of such limbs is proposed to increase the life span of the prosthesis. The increased life span of a prosthetic limb will greatly decrease the cost an amputee has to spend over the years on prosthetics; the need for a replacement will be less.

The main objective for the research was to design a low cost, adjustable upper-limb prosthetic leg. The adjustability of the leg allows the user to keep the same prosthesis for a longer period of time as the prosthetic leg is able to adjust to match the growth of the body. The design of the leg allowed for an electric knee, should the user wish to upgrade to one. The leg was designed to focus on strength, natural gait mimicry and promote adjustability of both leg and foot length. The design of the foot and ankle was aimed at simplicity and affordability.

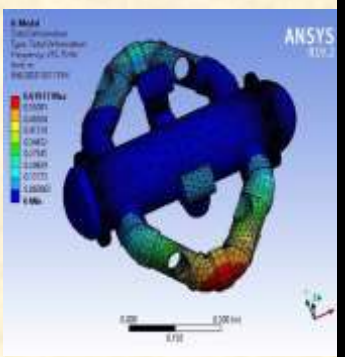


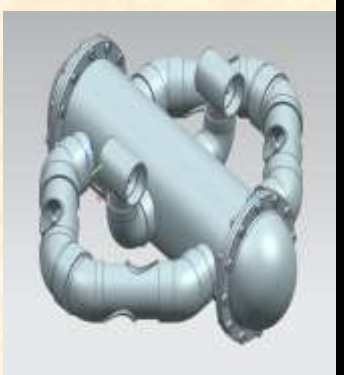
“REMOTELY OPERATED UNDERWATER VEHICLE”

Mr. NAVEEN KUMAR (1SG16ME056)
Mr. PRAJWAL (1SG16ME066)
Mr. RAHUL YELLAPPA (1SG16ME073)
Mr. RAJAT JANARDHAN (1SG16ME074)

Guide
Dr.P.Mahadevaswamy
Prof. & Head

The present project aims to explore and implement the methods which are effective. Such as semi-wired communication between the ROV and human controlling it i.e. using both radio and cable connection to transmit control signals and video data to and fro from the person controlling it. This provides the operator to operate the ROV form greater distance. This project uses PVC pipes to build the outer frame of the product since it is of low cost which provides needed strength and flexibility to fabricate the ROV as required. Since radio communication is not possible use of cables for communication is used. And a design is developed such that it achieves 6DOF’s motion. The developed product in this project will be cost effective and can be afforded by the public.



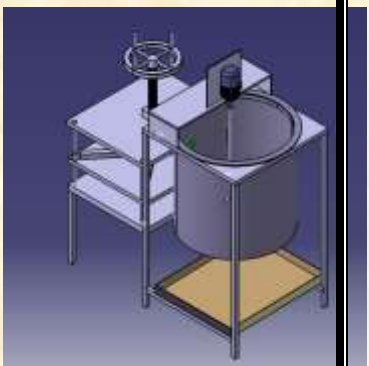


Design and Fabrication of Manual Operated Waste paper Recycling Machine

RISHABH B SHETTY	**(1SG16ME080)**
SANJAY N	**(1SG16ME087)**
SHARANABASAVA S	**(1SG16ME090)**
C MUKESH	**(1SG17ME405)**

Guide
Dr.Tulsidas D
Associate Professor

Use of paper as a means of communication is an effective mode compared to any other modes Instead of disposing off the waste papers into trash, they can be recycled. Recycling offers many benefits like saving trees, energy consumption, water, chemicals, and the most important being the prevention of environment pollution by disposing,. The present project work is based on recycling paper and producing paper on a small scale capacity. The benefits of solar energy have been utilized in the present project work. A small sized capacity machine has been designed and fabricated for recycling paper and producing new paper from it. The machine is powered with the use of solar power technique, and however can also be operated manually during the unavailability of solar power.

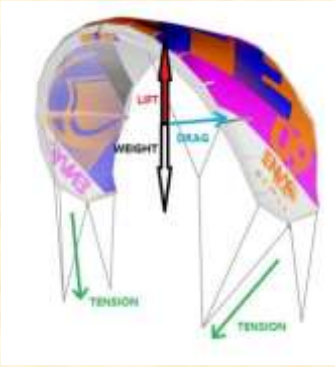


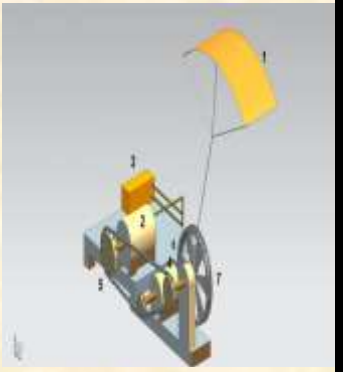
“FABRICATION OF KITE POWER GENERATOR”

Mr. KARTIKEYA (1SG1**6ME043)**
Mr. MANOJ T R (1SG1**6ME052)**
Mr. NARASIMHAN S R (1SG1**6ME055)**
Mr. CHETHAN K S (1SG1**7ME407)**

Guide
Dr.R.G.Deshpande
Associate Professor

This project deals with the fabrication of kite power generator which is a promising innovative technology for converting wind energy into electricity at a higher capacity factor and for many applications at a lower cost than conventional wind turbines. The key idea of kite power generator is to harvest high altitude wind energy with minimal effort in terms of generator structure, cost and land occupation. The rotor and the tower of the present wind technology are replaced in kite power generator by kite and its ropes. The system composed by the electric drives, the drums, the on-board micro-controller and all the hardware needed to control a single kite is the core of the “Kite power generator” The power transformation system transforms the mechanical energy generated by the kite into electrical energy that can be stored in the battery or can be utilized for domestic usage.



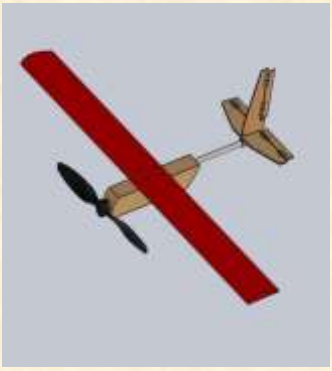


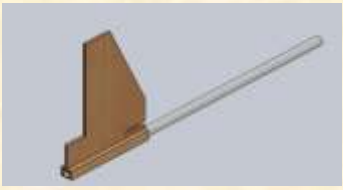
“SOLAR ENDURANCE GLIDER”

Mr. PRAVEEN S **(1SG16ME068)**
Ms. RAMYASHREE M **(1SG16ME078)**
Mr. VARUN M **(1SG16ME105)**
Mr. VARUN V **(1SG16ME106)**

Guide
Dr.R.G.Deshpande
Associate Professor

The general domain aircrafts use conventional source of fuels. These conventional fuels are derived from non-renewable source, have high costs and are pollutants. So, there is a great urge for effective utilization of Renewable source of energy like solar energy. Solar aircraft is one of the ways to utilize solar energy. This experiment aims to stimulate research on renewable energy sources in the field of aviation. A simulated model UAV solar gilder is capable of flying at various altitudes for multiple hours and day cycles at medium and high altitudes during summer. It should be noted that the glider fabricated is a prototype only. Camera mounted on UAV can also offer low altitude sensing application such as to create image map of a disaster area, forest fire, floods and Military patrolling. We present the design methodology to implement for perpetual flight of solar-powered UAV “Solar Endurance Glider”.



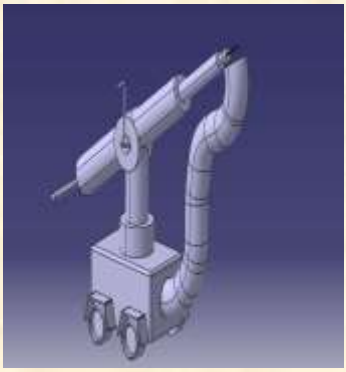


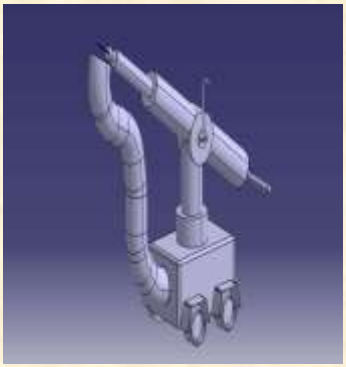
"PORTABLE PLUCKING MECHANISM FOR AGRICULTURE PURPOSE"

AJAY MAHAJAN 1SG16ME004
AKSHAY PS 1SG16ME007
KAILASH KUMAR 1SG16ME040
MUKUL YADAV 1SG16ME053

Guide
Dr.Basavaraj S
Associate Professor

This project proposes the development of a fruit/flower harvesting system by combining a low-cost jimmy jib type crane and a plucking arm. The jimmy jib type crane is used to reach the fruit level, distance, and position of the fruit, whereas the plucking arm is used to mechanically pluck the fruits. The harvesting is based on a prototype. Combining the harvesting machine and moving platform demonstrates the potential for harvesting in fields. The harvesting mechanism has adjustable crane shape that approaches the target fruit from the one end. This mechanism helps in reducing manual effort and provides better design modification. As a future work, this system will be designed with material selection, fabrication and tested in conventional outdoor farming conditions. A camera system to detect the fruits or flower conditions can be adopted for better purpose.



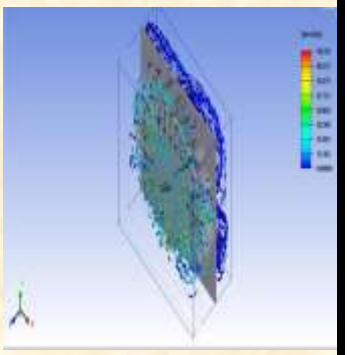


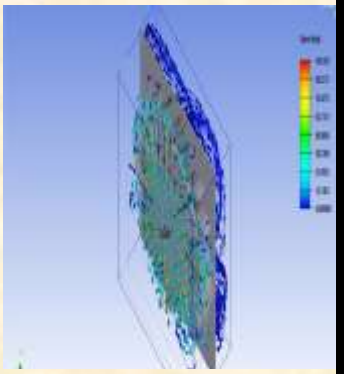
“DESIGN AND ANALYSIS OF ROTATING FINS”

Mr. GANESH NISCHAY S **1SG16ME030**
Mr. HEMANTH KUMAR G **1SG16ME034**
Ms. AKSHATHA J **1SG16ME005**
Mr. AMOGH G **1SG16ME009**

Guide
Dr.Basavaraj Ganiger
Associate Professor

The thermal performances of the heat sink with fins converging along the length design and tapered fins slightly inclined to base plate design were investigated experimentally and numerically. Slightly unconventional geometries are considered, but manufacturing cost can be reduced by adopting other fabrication processes and also under bulk production. In this study, the effects of fin orientation with respect to base plate and also velocity of fluid on thermal performance of heat sinks with converging fins along the length are experimentally studied. Experimental results show that among many design parameters such as fin orientation, fin inclination, velocity of fluid, optimization of all the above-mentioned parameters has a more significant influence on the thermal performance of heat sinks. It is also found that there is potential for optimizing the tapered fin heat sinks with base plates of different conducting materials, also different fin inclinations, alongside different tapering angles.





"BLADELESS WIND TURBINE

Mr.ABHISHEK M KAJAGAR (1SG17ME401)
Mr. PRAVEEN KUMAR A N (1SG16ME067)
Mr.SATHISHA YADAV (1SG16ME088)
Mr.VINAY KUMAR S (1SG16ME109)

Guide
Mr.Hemanth Kumar H.R
Assistant Professor

Bladeless Wind Power Generation uses a radically new approach to capturing wind energy. The device captures the energy of vortices, an aerodynamic effect that has plagued structural engineers and architects for ages (vortex shedding effect). As the wind bypasses a fixed structure, its flow changes and generates a cyclical pattern of vortices. Once these forces are strong enough, the fixed structure starts oscillating. Instead of avoiding these aerodynamic instabilities our design maximizes the resulting oscillation and captures that energy. Naturally, the design of such device is completely different from a traditional turbine. Instead of the usual tower, nacelle and blades, the device has a fixed mast, a power generator and a hollow, lightweight and semirigid fiberglass cylinder on top. This puts the technology at the very low range of capital intensity for such project, it also makes it highly competitive not only against generations of alternative or renewable energy, but even compared to conventional technologies

“FABRICATION OF HYDRAULIC RAM PUMP”

SANATH K.S **(1SG16ME436)**
SAKSHAM KANTHAK **(1SG15ME082)**

Guide
Mr.Hemanth Kumar H.R
Assistant Professor

As an alternate for the manual wheel chair, electric powered wheel chairs were produced. These wheelchairs have proved to be very effective as it involved less work to transport in them. However, these wheelchairs are priced very high and making it unaffordable to the public.

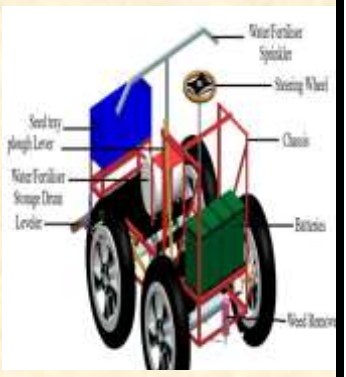
The present project aims to explore and implement the methods which are effective. This triggers the need for an automated solar wheel chair that will help the disabled person to transport easily with comfort. In project we focus on fabricating an electric wheelchair that runs autonomously using auto guided vehicle concept. The wheelchair runs on solar energy whilst keeping the fabrication and manufacturing cost of the wheelchair low so as to make it affordable and economical.

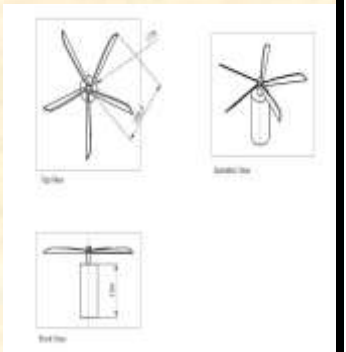
ELECTRICAL MULTIPURPOSE AGRICULTURAL VEHICLE

AMBAPRASAD G HEGDE (1SG16ME008)
K AKASH HEBBAR (1SG16ME039)
KESHAV A (1SG16ME044)
M AMRITHA NAIR (1SG16ME048)

Guide
Mr.Mahesh S
Assistant Professor

The main objective of our project was to combine all the individual tools and develop a modular design that provides farmers with equipment loaded vehicle that can be used for multiple purposes. The secondary objective of the design includes a vehicle which is small, compact in size and is easily accessible and controlled by an individual. The design of the vehicle is created in such a way that it is suitable for all the required activities such as ploughing, sowing the seeds, levelling the soil, sprinkling water. Thus, the project provides a machine design which can make cultivation much simpler, affordable and accessible. The vehicle is built to suit the middle-class farmers both men and women. The various systems of the vehicle are controlled by a toggle switches. In recent years the development of the autonomous vehicles in the agriculture has experienced increased interest.

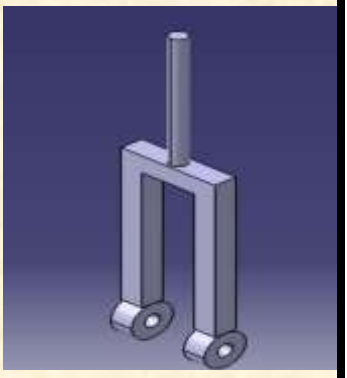


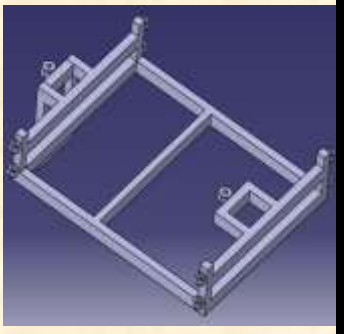


CAR PARKING WITH 90° ROTATION

SABARISH.B (1SG16ME083)
RAVI KUMAR (1SG16ME079)
ROSHAN.H (1SG16ME082)
VINAYAKA.M (1SG16ME108)

Guide
Mr.Mahesh S
Assistant Professor





Four-wheel steering is a serious effort on the part of automotive design engineers to provide near-neutral steering. Also, in situations like low speed cornering, vehicle parking and driving in city conditions with heavy traffic in tight spaces, driving would be very difficult due to vehicle's larger wheelbase and track width. Hence there is a requirement of a mechanism which result in less turning radius and it can be achieved by implementing four-wheel steering mechanism. In this project we are fabricate the four-wheel drive with 90-degree rotation. This is a new innovative concept. Here we are doing the equipment by the following arrangements with motor, chain drive, keypad, vehicle model, battery, and control unit. This concept is very useful to reduce the parking time in shopping complex, hotels, etc.

"Design and Fabrication of Cocoa Pod Splitting and Bean Extraction Machine"

MR. AKSHAY CHANNAPPA	**1SG16ME006**
MR. CHARAN S	**1SG16ME017**
MR. LOKESH KUMAR C	**1SG16ME047**
MS. DHANALAKSHMI H M	**1SG17ME410**

Guide
Mohan A.E
Assistant Professor

India is an agriculture based country and agriculture employs more than 50% of our country's population, hence agriculture is one of the main sources of income for our country. The main objective of this project is to help the small scale farmers exclusively working in the field of cocoa cultivation. As the farmers lack the advanced machines to process their cultivated cocoa fruit. Our project "design and fabrication of portable Cocoa bean separating machine" can greatly enhance the processing capabilities of cocoa fruits and promises the safety of farmers rather than outdated methods used for processing. This machine is simple in construction and compact, it can be manufactured from the parts which are effortlessly available. This machine is cost effective as the labor cost is almost reduced. This machine is highly productive and specifically designed to reduce the time taken for separation of cocoa beans as compared to traditional Method. This machine can be owned by a group of cocoa farmers who can bear the low maintenance cost of this machine.

“HYBRID SOLAR ELECTRIC BICYCLE”

ABHISHEK K M	**(1SG17ME400)**
RAKESH GOWDA J	**(1SG17ME424)**
V M RAKESH	**(1SG17ME432)**
VENU A V	**(1SG17ME433)**

Guide
Mr. Siva Murali Mohan Reddy
Assistant Professor

There are so many vehicles that came to influence in the existing world, their Operating systems are based on usual fossil fuel system. At the present sense the fossil fuel can exceed only for a certain period after that we have to go for a change to other methods. Thus we have made an attempt to design and fabricate a SOLAR powered System for a two-wheeler (Bicycle). This works on electric power distributed by the DC electric motor receiving the current from a battery. The motor and the various parts are such as sprocket, chain assembly, and bicycle and with easily available materials to serve and fulfill the purpose of the project which would produce cheaper & effective result than the existing system. This will be very useful to the future needs of the world.

“DESIGN AND FABRICATION OF CATTLE SHED CLEANING AND COLLECTING MACHINE”

Mr.VISHWAS GOWDA D	**1SG14ME127**
Mr.CHANDRASHEKAR M	**1SG17ME406**
Mr.NANDAN TD	**1SG17ME417**
Mr.NUTHAN C	**1SG17ME420**

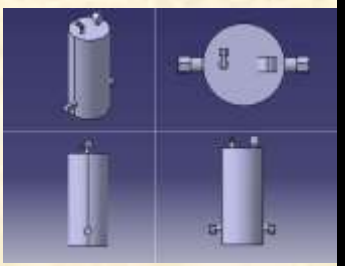
Guide
Mr. Siva Murali Mohan Reddy
Assistant Professor

Cleaning is a very necessary and unavoidable daily routine. The purpose of the present work is to design and fabricate cattle shed floor cleaning machine. it helps farmers for easy cleaning and maintenance of their cattle shed. This serves the basic needs of cleaning large and medium shed. In this project the blade which is at the front ill carry and lift the cow dung to the carrying tub which is placed back to the blade by manual lifting mechanism. And the motor fitted to brush through pulley by means of belt, which helps in cleaning the floor. The water supply is arranged such that it will help in easy cleaning..

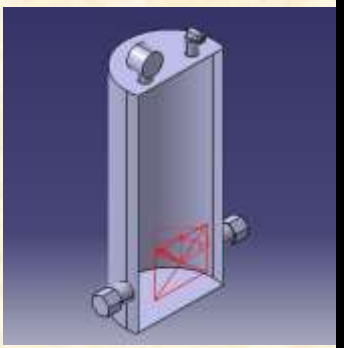
“WATER POWERED ENGINE”

PALLAVI K N 1SG16ME060
PARINITH K M 1SG16ME061
PRIYANKA K 1SG16ME069
SUNIL KUMAR R 1SG16ME103

Guide
Mr. Siva Murali Mohan Reddy
Assistant Professor



People have been working seriously in the search of best alternative fuels to safeguard the environment ever since the transportation and industrial fields started growing widely. Among such alternatives Acetylene has proved to be a better fuel for internal combustion engines due to its low cost, simplicity in manufacturing and excellent combustion characteristics. Moreover it has less carbon content compared to other fuels, which place a central role in environmental degradation. However the fuel must be safe and environmentally friendly and also readily usable in existing engines without any significant modifications in the design of the engine. Acetylene is produced in parallel to the engine operations taking proper care to avoid back firing



"VERTICAL AXIS WIND TURBINE"

Mr. CHARAN H K	**1SG16ME016**
Mr. GAURAV B	**1SG16ME031**
Ms. HEMANTH B S	**1SG16ME033**
Mr. KARAN KUMAR S	**1SG16ME041**

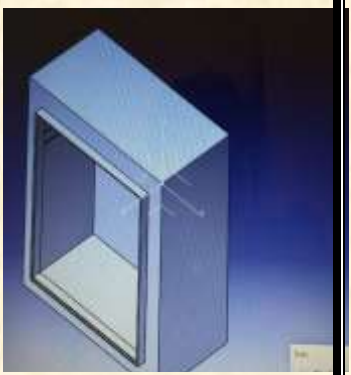
Guide
Mr. Padmanabha G
Assistant Professor

We have developed a wind turbine system that consists of a diffuser shroud with broad-ring flange at the exit periphery and a wind turbine inside it. The flanged-diffuser shroud plays a role of a device for collecting and accelerating the approaching wind. Emphasis is placed on positioning the flange at the exit of a diffuser shroud. Namely, the flange generates a low-pressure region in the exit neighborhood of the diffuser by vortex formation and draws more mass flow to the wind turbine inside the diffuser shroud. To obtain a higher power output of the shrouded wind turbine, we have examined the optimal form of the flanged diffuser, such as the diffuser open angle, flange height, hub ratio, center body length inlet shroud shape and so on.

“FABRICATION OF SMART GARBAGE BIN”

Lekha M	**1SG16ME046**
Chethan A	**1SG16ME114**
Raghavendra	**1SG16ME117**
Mahantesh S	**1SG16ME119**

Guide
Mr Ram Kumar M
Assistant Professor



Our proposed project aims at smart waste management as there is a rapid growth in the rate of urbanization and thus there is a need of sustainable urban development plans .As the concept of smart cities is very much trending these days ,smart cities cannot be completed without smart waste management system .There needs to be system that gives prior information of the filling of the bin that alerts the municipality so that they can clean the bin on time and safeguard the environment and health. In this proposed system there are multiple dustbins located through the city or campus, these dustbins are provided with low cost embedded device which help in tracking the level of the garbage bins and sending alerts to the authorities. In addition to that waste is crushed simultaneously to reduce the space consumed.

"FABRICATION OF MULTIPURPOSE AGRICULTURAL TILLER"

AMRUTH S **1SG16ME010**
DEVANTHG **1SG16ME025**
KISHOR R **1SG16ME045**
NAMITHA S **1SG16ME054**

Guide
Prof. Satish Kumar Y D
Assistant Professor

Comfort coupled with safety & simplicity is what man strives for. Our project's intension is to bring about both. The culmination of our effort has resulted in development of "MULTI PURPOSE AGRICULTURAL TILLER" The project presents a basic as well as very professional treatment of the subject based on learning efforts & understanding capability of today as per their levels. The device is simple & comfortable. The salient features of our machine can be listed as the mechanism used is very simple, easy for operation; no skill is required to operate this machine. Agriculture being one of the major occupations in India, Agriculture plays a vital role in the Indian economy. Indian agriculture has registered impressive growth over last few decades. It is very essential to discover and implement new idea in this field, though lot of work has been done in this area. It is unfortunate that, these ideas are not being implemented properly in actual field. This is due to high cost and is complicated for rural people. Multipurpose agricultural tiller is basic and major machine involved in agriculture for maximum yielding. The Conventional method of ploughing and seed sowing is laborious process and hence for that reason there is a scarcity of labours and basically,

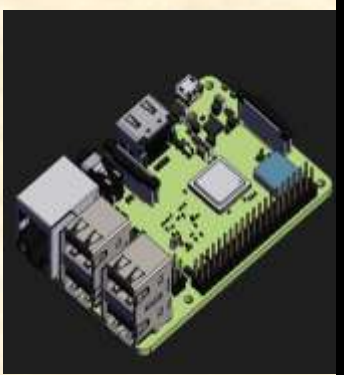
KISHOR R 1SG16ME045
NAMITHA S BHARADWAJ
1SG16ME054

“GENARALISED DEEP REINFORCEMENT ALGORITHM DEVELOPED USING VIRTUAL ROBOTIC COMPUTER SIMULATION”

SHIVASHISH BORAH	**1SG16ME094**
SHASHANK R	**1SG16ME093**
HITESH T M	**1SG15ME039**
RAHUL PRASANNA	**1SG16ME072**

Guide
Mr. RAM KUMAR M
Assistant Professor

The successes of deep reinforcement learning (DRL) in recent years have led many researchers across various engineering fields to develop methods to control robots and markets using variations of DRL. RL is an area of artificial intelligence concerned with agents ought to take actions in an environment so as to maximize some notion of cumulative reward. In other words, it’s a technique to automate the process of designing, sensing, planning and controlling just by letting the robot learn autonomously so as to achieve a generalized algorithm for everything. But developing individual physical mechanical systems to train the algorithm for each task, increases the cost of the project rapidly. Traditionally, the go-to approach when desiring extremely low sample complexity in RL is model-based RL. In model-based RL, instead of learning a policy only based on rewards obtained by interaction with the environment, the agent tries to learn a model of the environment and use it to plan and improve its policy, thus dramatically reducing the number of interactions it needs with the environment.



“DESIGN AND FABRICATION OF SIX-LEGGED ROBOT (HEXAPOD)”

DHANUSH V **1SG16ME026**
JOEPETER FRANCIS **1SG16ME038**
MANASA K S **1SG16ME051**

Guide
Mr. Pramod S
Assistant Professor

Conventionally robots were being utilized for automation. They use the technology based on computer, electronics, pneumatics and also hydraulics. When it comes to traversing or locomotion the wheeled and legged robots come into picture. Where, the wheels in wheeled robots can be rotated so that it provides swift and mere locomotion which can be easily setup and controlled. When it comes to many real-world problems like traversing on uneven terrain, flood areas or traversing on debris, wheeled robots fail to perform the required tasks. To overthrow the drawback of these wheeled locomotive robots, and to formulate likewise vigorous and solid solution, we create an all-terrain robot, which uses legs rather than rotating elements. Certainly, a robot with foot becomes an acceptable entity in many circumstances. These robots resemble a spider locomotion which grants us farthest skills like traversing on vertical planes. It also aids an individual in insecure places, inspection in border areas, rescuing people from natural disasters. Foot arrangement has distinct connection spot with the ground, which are preferred deliberately.

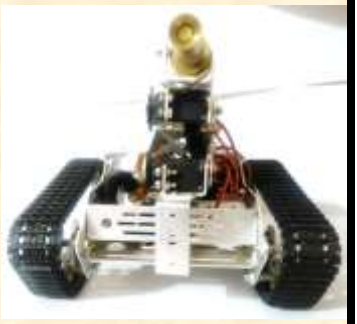
“FIRE FIGHTING ROBOT”

SHYLESH GOWDA S	**1SG16ME100**
YASHAS GOWDA K N	**1SG16ME111**
SAGAR S T	**1SG16ME085**
SHIVSHANKAR	**1SG16ME095**

Guide

Mr. Pramod S
Assistant Professor

The project helps to generate interests as well as innovations in the fields of robotics while working towards a practical and obtainable solution to save lives and mitigate the risk of property damage. Fire fighters face risky situations when extinguishing fires and rescuing victims, it is an inevitable part of being a fire fighter. In contrast, a robot can function by itself or be controlled from a distance, which means that firefighting and rescue activities could be executed without putting fire fighters at risk by using robot technology instead. In other words, robots decrease the need for fire fighters to get into dangerous situations. This robot provides fire protection when there is a fire in a tunnel or in an industry by using automatic control of robot by the use of microcontroller in order to reduced loss of life and property damage. This robot uses dc motors, castor wheel, microcontroller, sensors, pump and sprinkler.



PROGRAM OUTCOMES (POs)

Engineering Graduates at the time of completion of degree will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

These outcomes are specific to Mechanical Engineering at Sapthagiri College of Engineering should be able to attain the following at the time of graduation.

	PROGRAM SPECIFIC OUTCOMES
PSO1	Expertise in specialized areas of Mechanical Engineering such as Design, Thermal, Materials and Manufacturing with a focus on research and innovation.
PSO2	Apply analytical, numerical and experimental skills with awareness of societal impact for solving Mechanical Engineering problems.
PSO3	Apply modern tools and managerial skills to develop product in Mechanical and allied Engineering fields.