1. <u>Solar Electric Vehicle Charging System</u>

Electric vehicles have now hit the road worldwide and are slowly growing in numbers. Apart from environmental benefits electric vehicles have also proven helpful in reducing cost of travel by replacing fuel by electricity which is way cheaper. However electric vehicles have 2 major disadvantages:

1. Long charging time – 1-3 hours required for charging

2. Non availability of power for charging stations in off city and remote areas.

Well here we develop an EV charging system that solves both these problems with a unique innovative solution. This EV charging system delivers following benefits:

1. Wireless charging of vehicles without any wires

2. No need to stop for charging, vehicle charges while moving

3. Solar power for keeping the charging system going

4. No external power supply needed

5. Coils integrated in road to avoid wear and tear

The system makes use of a solar panel, battery, solar to DC converter, controller and LCD display to develop the system. The system demonstrates how electric vehicles can be charged while moving on road, eliminating the need to stop for charging.

The solar panel is used to power the battery through a charge controller. The battery is charged and stores dc power. The DC power now needs to be converted to DC for Battery charging. Thus the system demonstrates a solar powered wireless charging system for electric vehicle that can be integrated in the road.

Components

- Battery
- Voltage Sensor
- LCD Display
- Vehicle Body
- Wheels
- Switches
- LED's
- Cables and Connectors

2.0 Solar Seaweather & Pollution Transmitter Buoy

Unlike weather on land, seaweather is highly unpredictable and changes drastically at times. Keeping track of sea weather at all times is a very tough task. Also sea pollution is a growing issue of concern and the first step to controlling pollution is measuring it. Another problem is the unavailability of cellular or other data networks in sea or data transmission. It is necessary to use small seaweather stations with own data transmission capability in the sea at all times to get data about these details.

So we hereby design and develop a small seaweather as well as sea pollution monitoring station that can transmit this data over to the monitoring station on sea shores. The system uses a range of sensors all controlled by an STM32 controller in order to achieve this task. Along with it we also develop a receiver system to receive and display the data from the transmitter.

The transmitter unit is always in the sea and its not possible to constantly charge itself from time to time, so we use a solar panel to allow it to generate its own power and keep working in the sea. The solar panel charges the onboard battery which is used to power the circuitry.

The transmitter uses ph sensor to measure ph level of water, turbidity to check pollution, temperature of water and humidity above the water. Also the system has an accelerometer to detect sea state, depending on weather the sea is rough or calm, the accelerometer throws values that can be used to check if sea is calm or rough.

These values are constantly monitored by the stm32 controller and transmitted at certain intervals by through a rf transmitter. The transmitter is fitted with a high gain antenna in order to achieve maximum transmission range.

Now the receiver unit is developed using a n atmega microcontroller and display in order to receive data transmitted by the transmitter buoy and display it. The

receiver unit consists of a rf receiver with antenna that is used to receive the data values transmitted by sea unit.

This data is now received and processed by the atmega microcontroller. The microcontroller now displays these values on the LCD display. If a value is not normal or beyond set range it also sounds a buzzer alert and displays alert in order to notify station officers to take action and warn ships/people in the vicinity.

Components

- Stm32 Controller
- Atmega328 Controller
- LCD Display
- Solar Panel
- Battery
- PH Sensor
- Turbidity Sensor
- Temperature Sensor
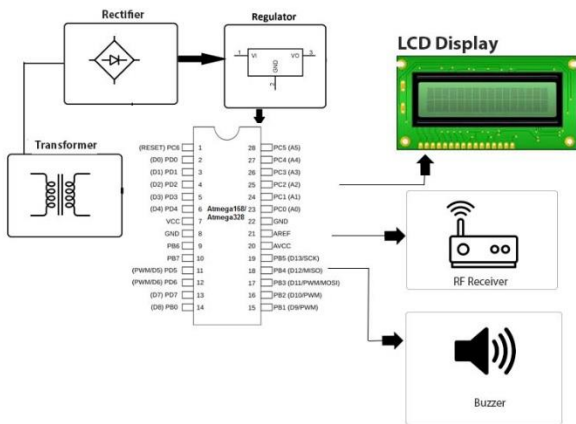- Humidity Sensor
- Accelerometer

- LCD Display

- RF Transmitter

- RF Receiver

- Antennas

- Buzzer

- LED's

- PCB Board

- Resistors

- Capacitors

- Transistors

- Cables and Connectors

- Buoy Body Frame

Block Diagram

Transmitter Unit

Receiver Unit

Block Diagrams
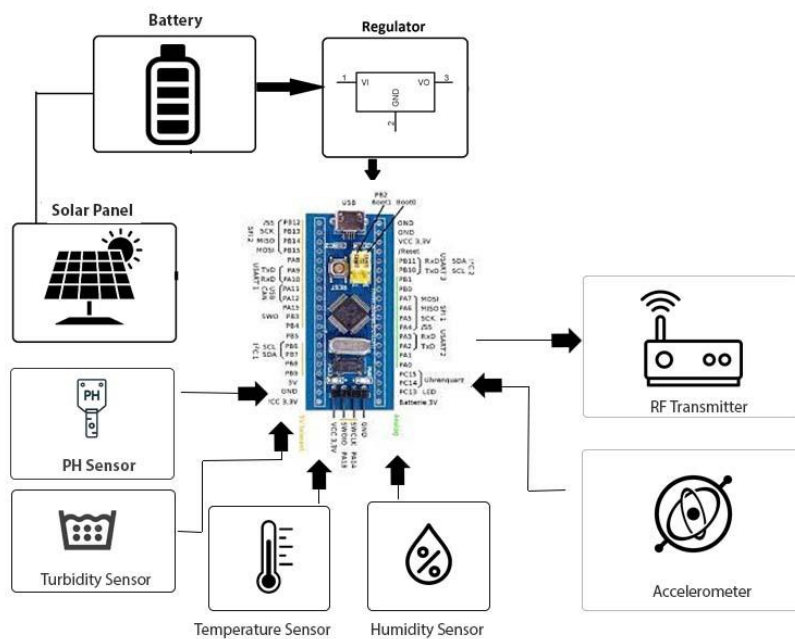
3. Solar E lawn Mover for gross cutting

Personal lawns, public parks, gardens are a major recreational places but require a lot of maintenance to keep them operational. The major maintenance activity involved here is grass cutting and weed removal. This requires a lot of time and effort on a regular basis to maintain the lawn.

Also the problem with lawn movers and motorized cutters are that they need to be moved by a human thus requiring human effort and moreover depend on either furl or electric charging. These devices involve recurring cost of either fuel or electric charging to keep running.

Well we here solve all these problems with an automated robotic grass cutter that can cut grass of any lawn/garden without human effort as well as it charges itself using solar power without the need of fuel or electric charging.

The solar grass cutter robot delivers following benefits

- It can cut grass with ease using high powered motor

- Variable head to define the grass cutting height

- Heavy Duty body, wheels and drive motors to navigate offroad

- Autonomous motion with obstacle avoidance using ultrasonic

- Motorized drive using DC motors

- Solar powered machine for self-charging

The robotic vehicle uses a set of geared motors with wheels, metal robotic frame, ultrasonic sensors , controller circuitry, battery along with a solar panel to achieve this mechanism. The system uses the control circuitry with ultrasonic motors to help move easily through gardens and lawns.

The robotic vehicle is mounted with 4 x Geared motors to deliver the desired torque that will be required to move through lawns and gardens. We use 4 large size rubber wheels to motor shafts that wont get stuck in grass and weeds.

The robotic body is a mild steel chassis that is integrated with 4 Drive motors below it. Also we make a hole in the centre of the frame to mount the grass cutter motor in the middle. The high torque high speed motor in the center is used to move the tool that cuts grass. The grass cutter tool is then attached to the motor shaft so that blades can cut grass below.

The cutter motor mount allows user to loosen the screw and vary the height of cutter motor which allows to define the desired grass cutting height. All these motors are powered by a battery which is charged automatically using a solar panel mounted on top of the robotic frame. This allows for a smart and automated solar powered grass cutter system.

Components:
- Solar Panel
- DC motors
- Robot Body
- Wheels
- Motor Mounts
- Ultrasonic Sensors
- Controller Circuitry
- Bearings
- Base Frame
- Supporting Frame
- Screws and Bolts

Applications:

- Useful for automatic lawn cutting and backyard cutting

- Automatic grass and weed cutting in gardens
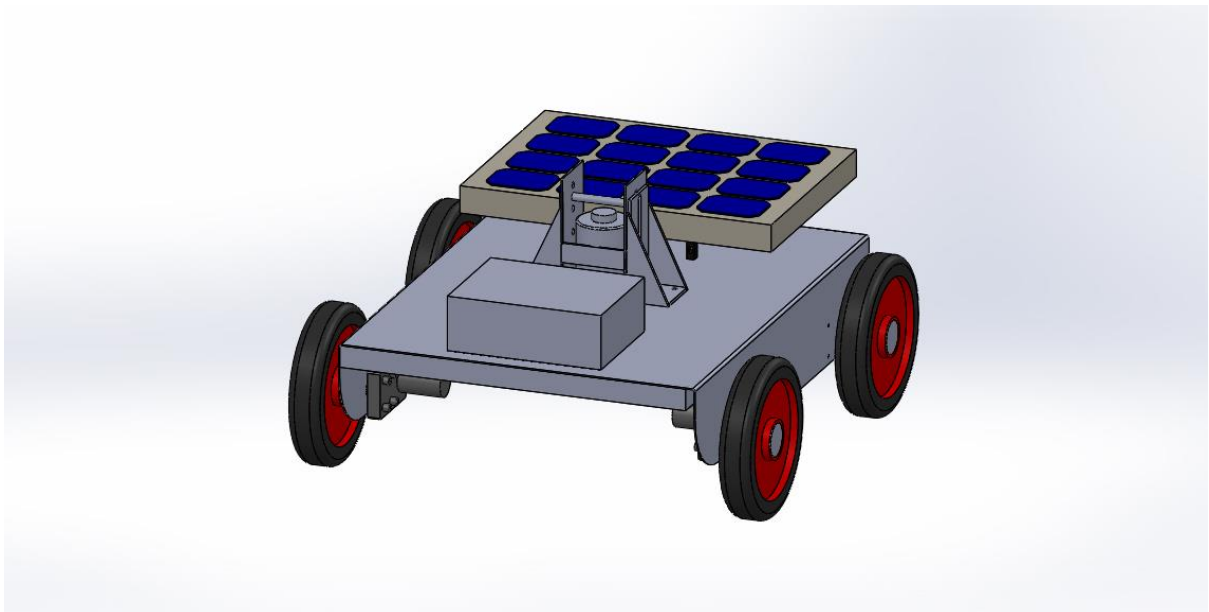
Advantages:

- It can cut grass with ease using high powered motor

- Variable head to define the grass cutting height

- Heavy Duty body, wheels and drive motors to navigate offroad

- Autonomous motion with obstacle avoidance using ultrasonic

- Motorized drive using DC motors

- Solar powered machine for self charging

Block Diagram:

Front View
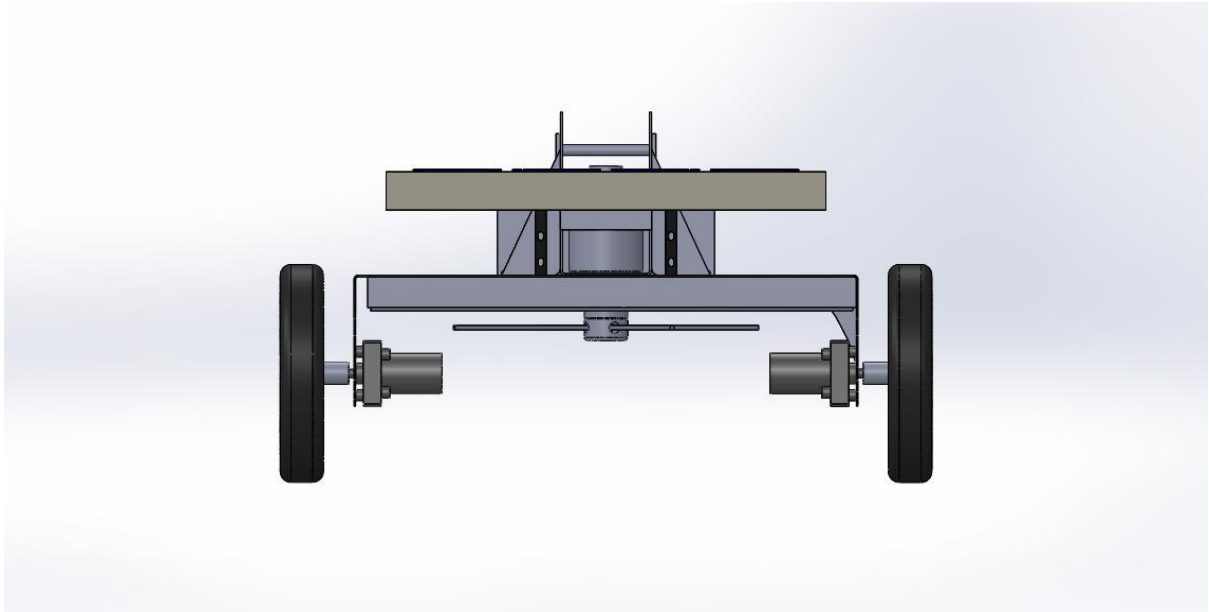
3D View

4.0 DUAL ENERGY GENERATOR USING SOLAR & TIDAL POWER

While we look at solar and wind power as two of the main sources of renewable power, we are ignoring another huge source of renewable energy on planet earth. Sea waves or tidal power is another immense power source we are missing out on. Sea waves have immense power generation capacity that we can harness as another source of renewable power.

Well here we propose a dual power generator that utilizes solar as well as sea wave power to generate unlimited energy using sea waves. This system will allow us to utilize the third source of renewable power on planet earth using a specialized alternator based generator arrangement.

The Solar plus sea wave generator provides following advantages including:

- No Dependency on Solar or Wind For Generation
- Efficient use of sea waves to generate tidal power
- Portable machine for ease of transport
- Dual power generation for guaranteed power generation in all climates
- Lightweight and anti-rust design for long term usage

The sea wave plus solar generator is one of a kind unique generator machine that makes use of 2 sources of alternative energy to generate electricity. The machine is includes a buoy that is used to float and move with the sea waves in vertical motion. The buoy allows to transfer sea wave power to the generator motor using a rack and pinion arrangement. The power transferred to this shaft is not transferred to motor using a pulley system for efficient power transfer.

The machine uses a second power source that is solar to generate an additional watt of power for a reliable power generation. The machine is made portable with wheel structure so that it is easily portable. Also the machine is designed using lightweight and rustproof materials to avoid rusting during usage in the sea. The machine can prove as a lifesaver as well as a reliable source of power supply to be carried by ships or backup generators on costal areas.

Components:

- Generator Motor
- Solar Panels
- Shafts
- Motor Mounts

- Rack & Pinion
- Pulley & Belt
- Hinges
- Charge Controller
- Castor Wheels
- Switches
- Electrical & Wirings
- Mounts and Joints
- Supporting Frame
- Screws and Fittings

Applications:

- Coastal Areas Power Generation
- Remote Islands and Ships

Advantages:

- No Dependency on Solar or Wind For Generation
- Efficient use of sea waves to generate tidal power
- Portable machine for ease of transport
- Dual power generation for guaranteed power generation in all climates
- Lightweight and anti-rust design for long term usage

Disadvantages:

- Needs Sea shore/beach to Generate Power
- Cannot float on mid sea for generation

5.0 SOLAR POWERED QUDCOPTER DRONE

Drones are a common sight today and are being used in a wide range of applications. From selfies to pesticide spraying to military surveillance. Well the problem with surveillance/monitoring is that many applications require long time surveillance. Drones do provide a good view for surveillance monitoring but have a huge drawback. This is the drone battery life.

The major fear a drone pilot faces in surveillance is that the battery may run out and drone may land on a tree or building or some inaccessible area from where it cannot be retrieved and thus cannot be charged. This is also the case in military surveillance, the possibility of battery life running out and drone being inaccessible creates limitations for drone pilots during surveillance/monitoring.

Well we here develop a drone with solution to these problems using solar power to constantly charge the drone to increase its flight time as well as the ability to land the drone anywhere and automatically its battery remotely to take flight later. This will lead to improved flight time as well as automatic battery charging of drones in inaccessible areas so that it can take off from the same spot on charging.

This solar powered drone provides the following advantages:

- Increased flight time
- Solar changing capability
- Anywhere daytime charging without chargers
- Easy To Use and no manual efforts
- No worries of battery run out over inaccessible areas

The drone is a quad rotor drone that makes use of 4 x high powered drone motors with propellers to provide required lift to the drone. The drone body is integrated with solar panels for high efficiency charging during idle time as well as during flight time for improved flight times.

The drone is integrated with a wifi camera that can be monitored over an android smartphone using wifi connection. It makes use of a rc remote controller to receive control commands for the user. The drone onboard rc receiver is used to receive control commands from the user and operate drone motors to achieve desired flight.

Components:

- Drone Motors
- Solar Cells
- Wifi Camera
- RC Receiver
- RC Controller
- Drone Body
- Controlling Circuitry
- Buttons & Switches
- Electrical & Wirings
- Mounts and Joints
- Supporting Frame
- Screws and Fittings

Applications:

- Filming & Videography
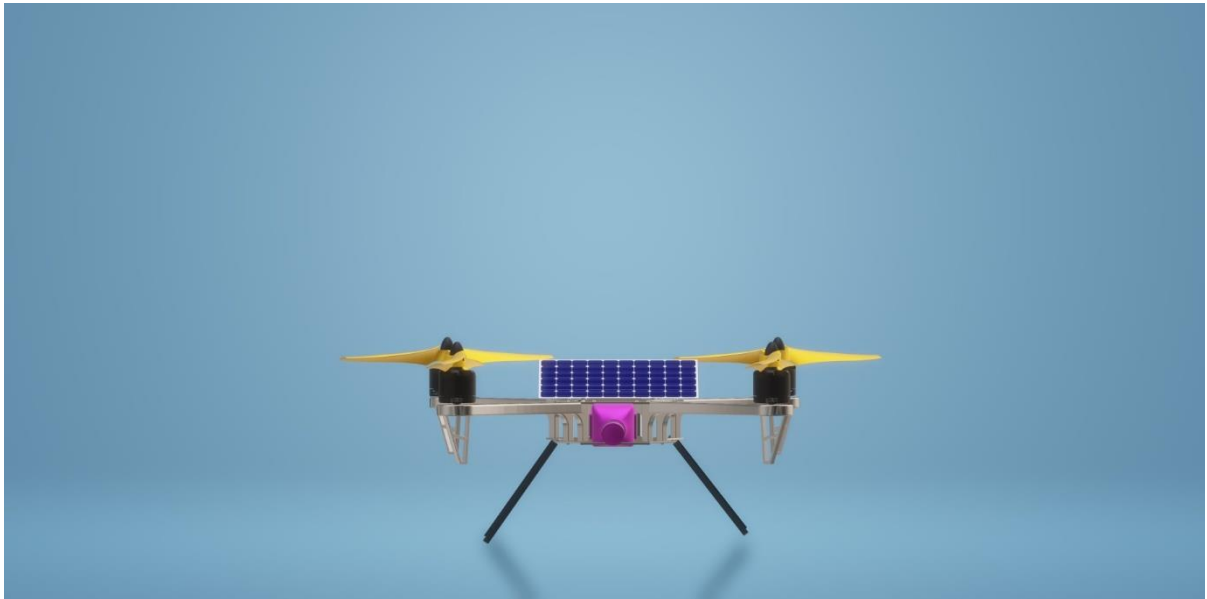- Military & Other Surveillance

Advantages:

- Increased flight time
- Solar changing capability
- Anywhere daytime charging without chargers
- Easy To Use and no manual efforts
- No worries of battery run out over inaccessible areas

Disadvantages:

- It cannot charge as much as is discharged during flight
- It requires sunlight for charging

Block Diagrams:

Front View

6.0 WATER FLOAT SOLAR POWER PANELS WITH SUN POSITION TRACING

Solar power is the future of renewable power generation. The problem with solar panels is that they use up a lot of space on rooftops or open areas and are difficult to mount, maintain and clean regularly. Additionally, the solar panels are moved as per sun position can generate upto 40% more solar power.

We here by propose a new kind of solar panels that can be mounted on water bodies like lake pools so that they don't occupy any land space. Additionally, we introduce an innovative sun tracker and panel movement system using hydraulic mechanism to move the solar panels as per sun position and generate more power.

The Floating solar panel power generator introduces following key aspects

- Does not occupy space on land

- Efficiently floats on water 24 Hours

- Sun Position Tracking throughout the day

- Automatically adjusts solar panel position using hydraulic system

- Reduces evaporation in water bodies by covering them and keeping them cool

- Water is in-turn used to keep the solar panels from overheating

- Easy to clean solar panels using Lake/pool Water

The system makes use of a solar sensing circuitry with a micro hydraulic power system. The circuitry senses the voltage and power efficiency at particular position. The hydraulic motor is then used to drive the fluid movement from one cylinder to another. As the liquid level moves between 2 cylinders, the pistons linked to each cylinder varies in height resulting in a change in the solar panel rotation.

This allows for increased efficiency of solar panel while at the same time incurring a very negligible power usage required to adjust solar panel movement. Also it helps environment and save water by minimizing evaporation.

Components

- Solar Panel
- Support Rods
- Mini Hydraulic Pump
- Piping arrangement
- Controller Circuitry
- Water Floats
- Mini Hydraulic Cylinders
- Pistons
- Shaft Rod
- Base Frame
- Supporting Frame
- Mounts and Joints
- Screws and Bolts

Advantages

- Does not occupy Land Space
- Easy to Mount and Install
- Automatic Sun Position Tracking
- Automatic Panel Position Adjustment
- Saves Water by Avoiding Evaporation
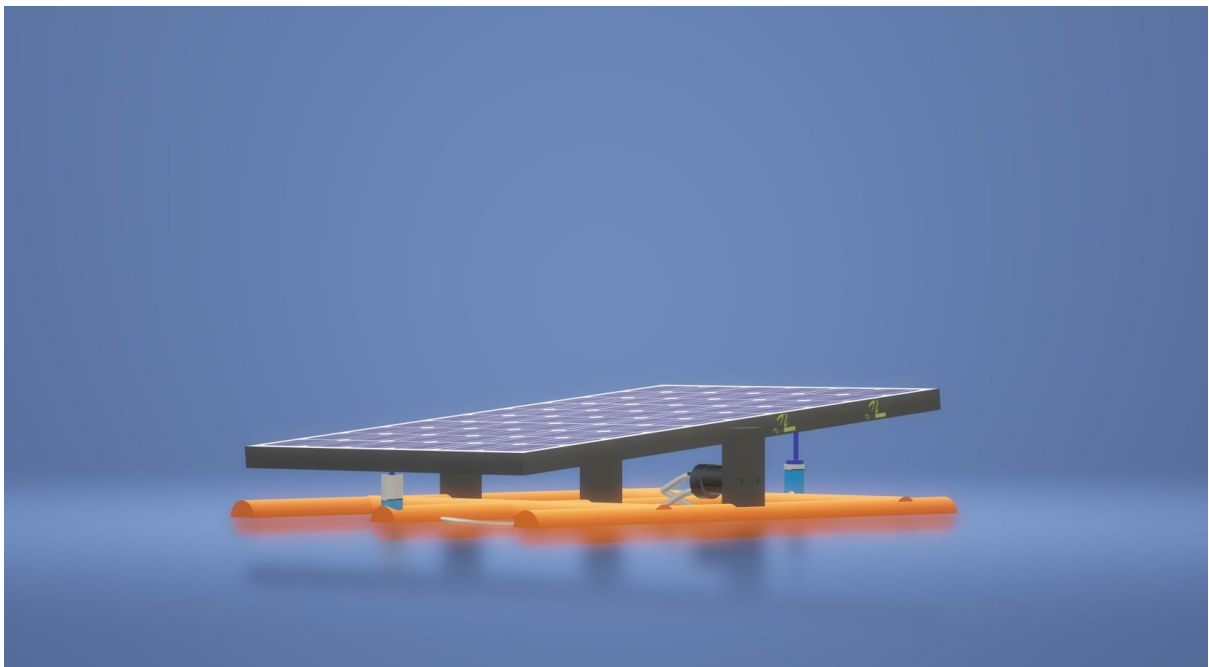- Easy to Clean using Lake/Pool Water

Disadvantages

- Maintenance Team needs Boats to Check Repair faulty Panels
- Cannot be used in Sea due to rough waters

Block Diagram

Front View

3D View

# 7.0 DESIGN AND MANUFACTURING OF SOLAR POWERED SEED SPRAYER MACHINE

Abstract:

In today's era all sectors are moving towards the rapid growth using many advanced technologies. Of all these sectors, agriculture is also one of them. In order to meet the increasing demand of food, farmers have to implement advanced techniques so that the soil texture is not affected and the overall food production is increased. Hence, in this project we aim at designing and fabricating a solar operated seed sprayer machine. Seed sowing process is usually carried out by humans using manual power. In this solar seed sprayer machine project, seed in a hopper gets sprayed by means of fan or blower directly to the land without any manual effort. Using this process, the seeds are fed in the land during the time of plough. The main advantage of using this technique is that, it reduces the time of seed to land and reduces human efforts. In this solar agriculture sprayer solar panel is used as power source which is used to run the fan, and thus does not require any additional power supply. This innovative mechanical project of seed sowing equipment can save more time for sowing process and also it reduces a lot of labour cost. This solar agro sprayer project is very helpful for small scale farmers.

Components:

- Hopper
- Solar panel
- Battery
- Fan
- DC motor
- Wheel
- Frame and Mountings

Block Diagrams:
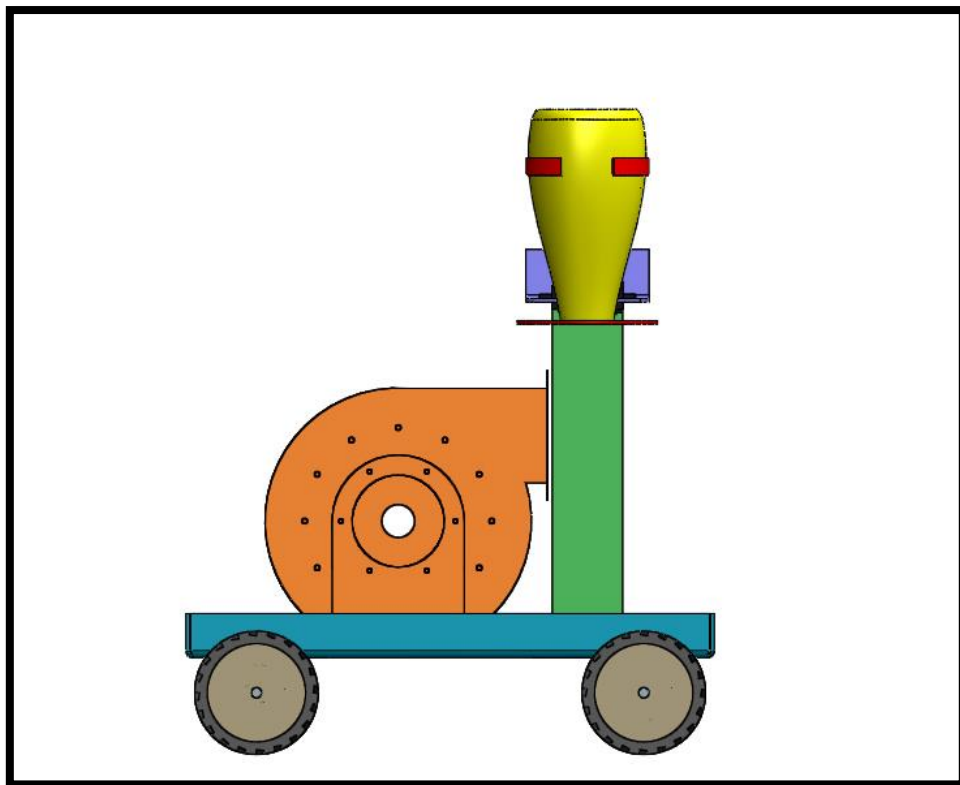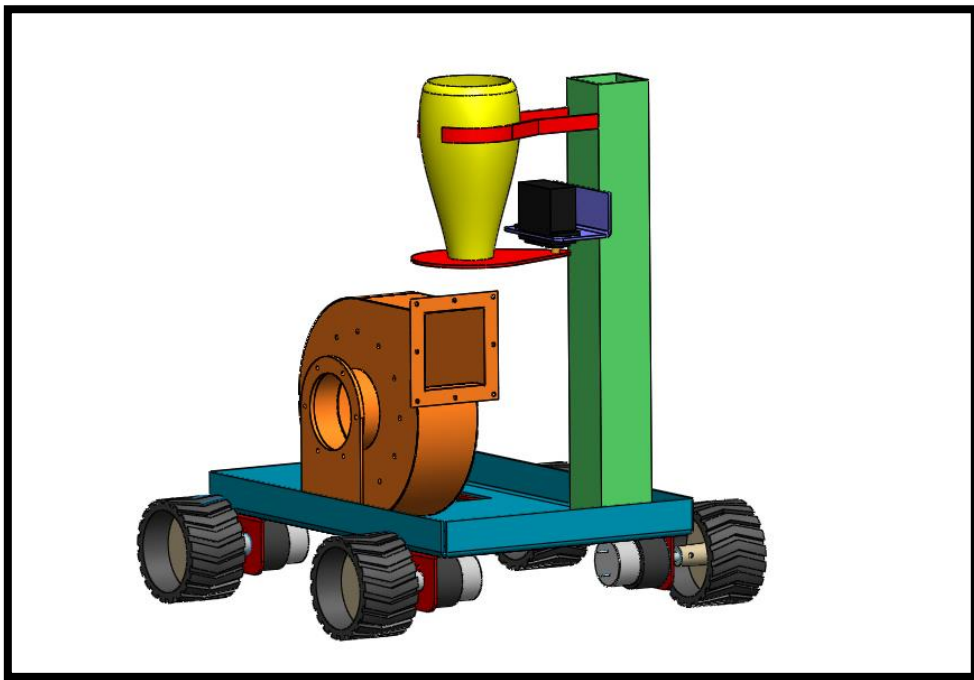
Advantages:

- It is simple in operation.
- Maintenance cost is low.
- No seed loss in terms of remaining in the hopper.
- Low cost.
- It is more suitable for small farmers.
- Reduced size and complexity when compared to existing machine.
- No Power needed.
- Human power is not necessary.

Dimensions of projects (Length, Width and height) in mm:

420 x 300 x 350

8.0 Pneumatic Sand Filtering Project

Pneumatic Sand Filtering is used to remove metal chips, stones, nails, and so forth from elaboration sand which is utilized for casting purpose and development works. Filtering is done manually which takes out unwanted parts from construction sand. In order to reduce timing and do the process effectively, we are going to fabricate a pneumatic sand filter which works using pneumatic mechanism. The main objective of the compressor is to produce high pressurized air which is used to activate the cylinder. The air from the compressor is pumped with high pressure. The pneumatic actuator is connected to a filter frame with mesh below and with enclosing frame on the sides. As we start the sand filter system, the actuator pulls the frame forward and backward so that a mesh strainer, isolates the sand for the construction work.

Components

- Pneumatic Actuator

- Pneumatic Parts & Fittings

- Filter Sheet

- Slider Wheels

- Box Frame

- Connecting Rods

- Base Frame

- Mounts & Joints

- Screws & Fittings

- **Block Diagram**
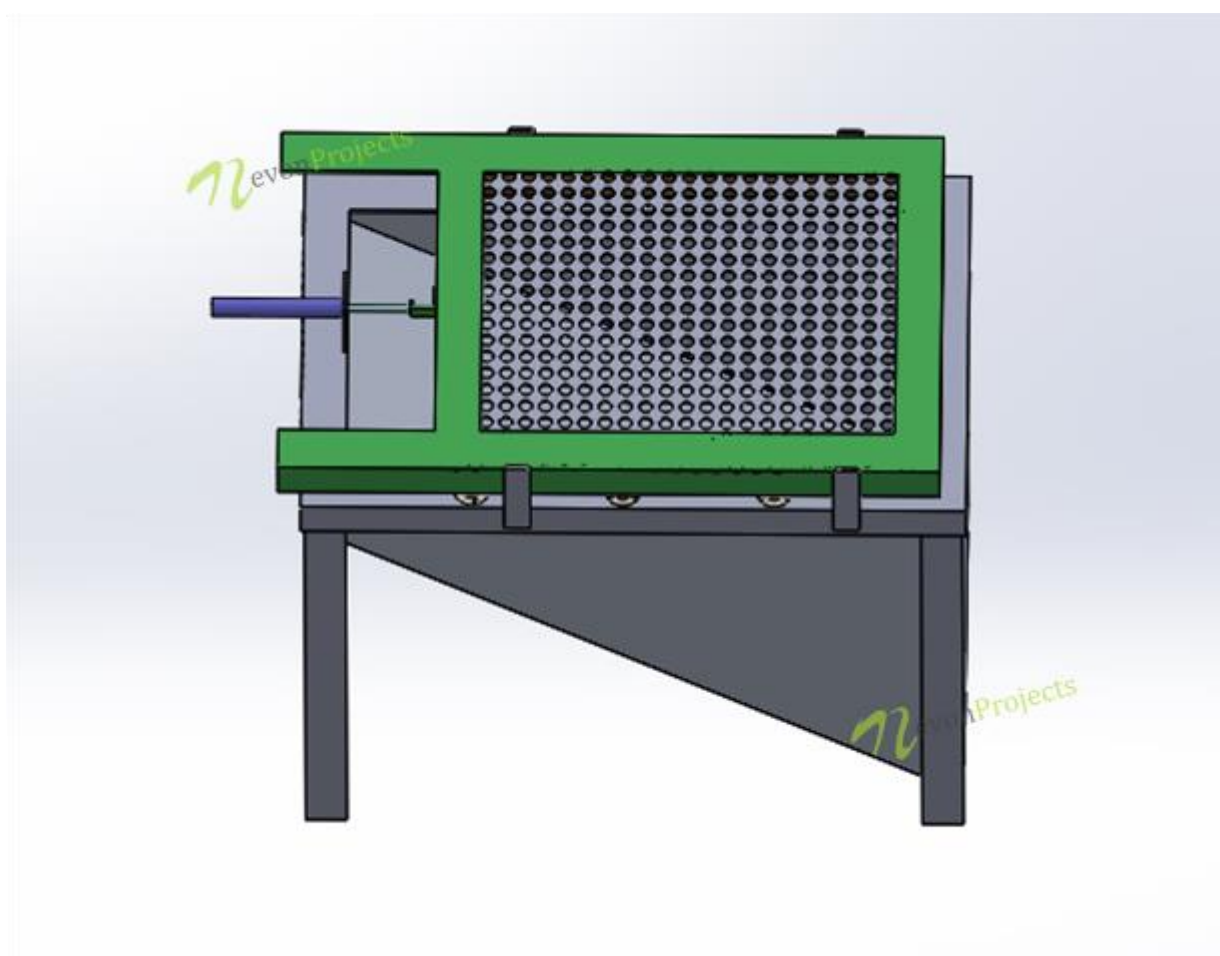
9.0 Colour Product Sorting using Pneumatic Conveyor belt

Abstract:

Due to the environmental aspect as well as increasing prices for raw materials, product separation is a global topic and also the business model of the future. Sorting systems are used to kind things supported varied criteria in order that they will be packed consequently. Manual sorting is a time and effort-intensive process. Automatic sorting systems allow for the fast and efficient sorting of products. To demonstrate the sorting system, we develop a PLC based sorting system project that uses pistons with a colour sensing system powered by PLC control to achieve this functionality. The sorting system consists of a conveyor belt to carry products from one end to the collection baskets. It consists of a colour sensor to sense the type of product using colour sense, the system currently utilizes three pistons with piping and control valves to regulate their operations. Two pistons are used to sort two colours and for an already sorted product, the third piston is used which attach to another conveyor. The system is powered by a PLC to manage the sorting system. Three assortment baskets are used to collect samples sorted by the pistons mounted parallel to everyone. The PLC coordinates with sensors and piston valves so as to achieve the specified functionality and demonstrate the totally automated product sorting system.

Components:

- Delta PLC
- Color Sensors
- Push Buttons
- LEDs
- Pneumatic Actuator
- Pneumatic Pipes
- Valves
- Motor
- Shaft
- Electromagnet
- Conveyor Belt
- Proximity Sensor
- Connecting Rod
- Roller
- Mounts
- Supporting Frame
- Joints Fixtures & Screws

10.0 AUTOMATED WASTE SEGREGATOR

Abstract:

Rapid increase in volume and types of solid and hazardous waste due to continuous economic growth, urbanization and industrialization, is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of waste. It is estimated that in 2006 the total amount of municipal solid waste generated globally reached 2.02 billion tones, representing a 7% annual increase since 2003 (Global Waste Management Market Report 2007). The segregation, handling, transport, and disposal of waste needs to be properly managed to minimize the risk to the health and safety of patients, the public, and the environment. The economic value of waste is best realized when it is segregated. Currently, there is no such system of segregation of dry, wet and metallic wastes at the household level. This paper proposes an Automated Waste Segregator (AWS) which is a cheap, easy to use solution for a segregation system for household use, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste. The AWS employs parallel resonant impedance sensing mechanism to identify metallic items, and capacitive sensors to distinguish between wet and dry waste. Experimental results show that the segregation of waste into metallic, wet and dry waste has been successfully implemented using the AWS.

Components:

- Bending Rollers

- Spindle Wheel

- Chain Sprockets

- Bearings

- Housings

- Screw

- Moving Roller

- Supporting Frame

- Mounts

- Joints & Screws

Block Diagrams:
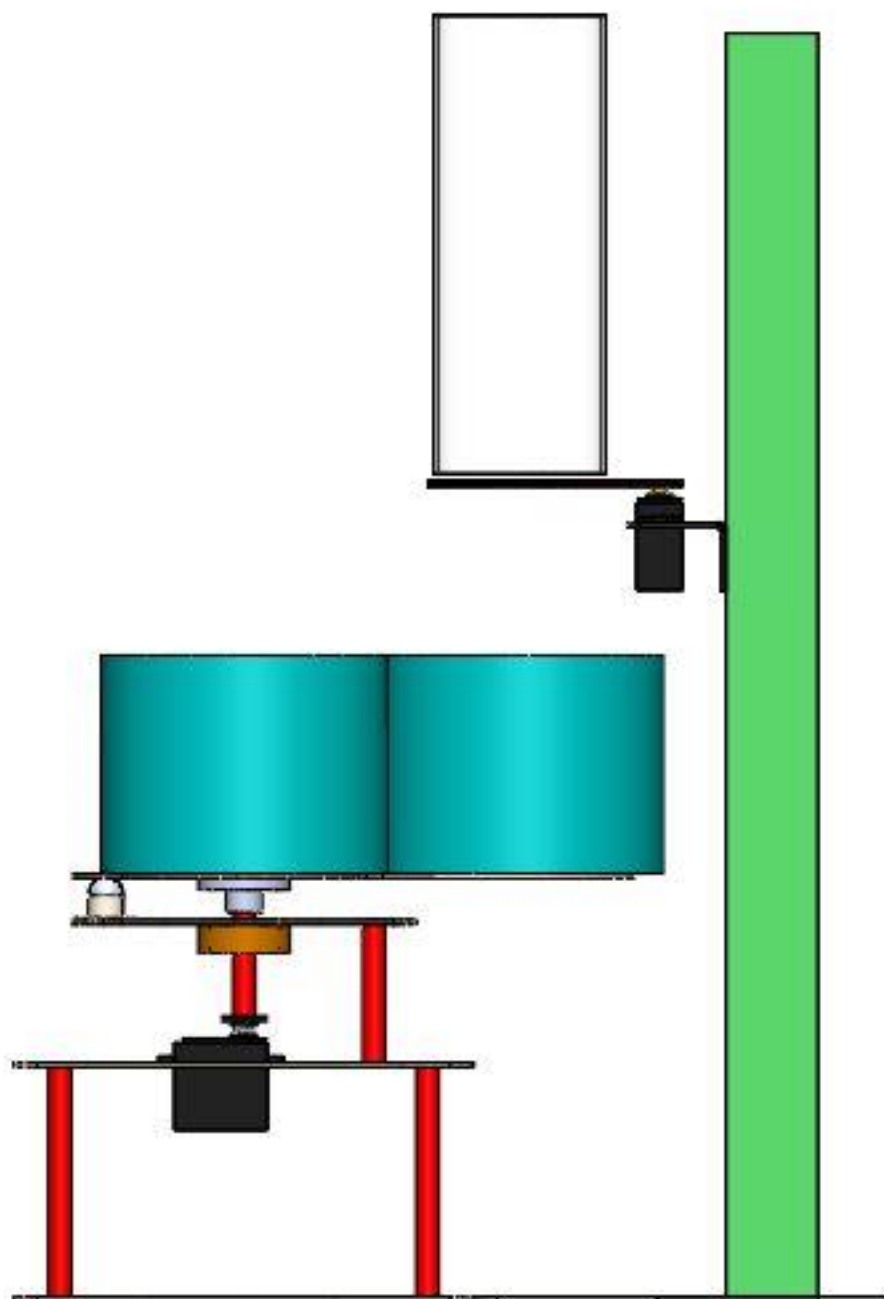
Advantages:

•   Sorting of waste at the primary stage will make the waste management more effective and fruitful.

•   Giving way to cleaner environment.

•   Eco friendly.

•   Lower initial investments

Dimensions of projects (Length, Width and height) in mm:

400 x 200 x 550

11. Plant Irrigation Water Sprinkler Robot

Irrigation systems require large piping setups along with many sprinklers in order to achieve proper irrigation. This system has many problems associated with it. It requires expensive piping as well as sprinkler costs along with high powered motors in order to drive water through such long pipes. There is always a chance of leakages that may cause oversupply of water to a particular area and under supply in another leading to plantation loss. Also this will incur heavy repairing costs. Our proposed system uses a robot with a single sprinkler that moves through the field with a water tank that moves throughout the field spraying water all over it. It is like a moving water tank that automatically moves all over the field spraying water through it. This robot can be equipped with geo fencing sensors so it will cover complete fields without needing any manual intervention
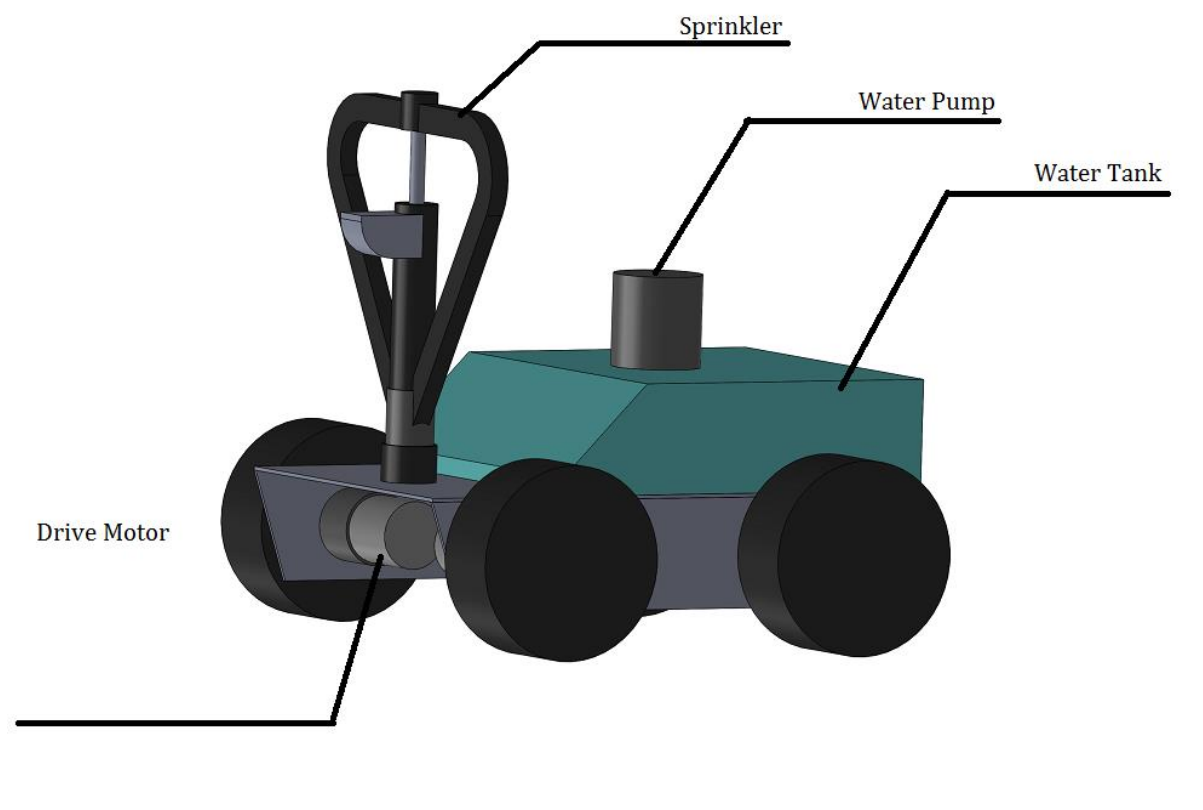
Components

- Sprinkler
- Four DC Motors
- Pipes
- Pump Motor
- Water Tank
- Wheels
- Waterproof Robot Body

Advantages

- Smart Irrigation
- Irrigation at Very Low Cost

Block Diagram

Sprinkler

Water Pump

Water Tank

Drive Motor

12. GEARLESS TRANSMISSION USING ELBOW MECHANISM

This system demonstrates efficient gearless transmission of power at right angles. This saves gear manufacturing time and costs along with teeth matching and gear placement issues. The elbow mechanism is an efficient design of gearless transmission technique and the kinematic system that allows for efficient power/motion transmission at right angles. This mechanism allows for motion transmission at 90 degree angles between the driver and the driven shafts. We use mounts to mount a DC motor with shaft coupled to it. We then use 90 degree bent rods to link driver shaft with the driven shaft. We use accurate drilling with relatively spaced and diametered holes to attach the connection rods with precision. We then use mounts to hold the driven rod in precise position. Now the motor can be powered using 12V supply and can be used to drive the other shaft using elbow mechanism.
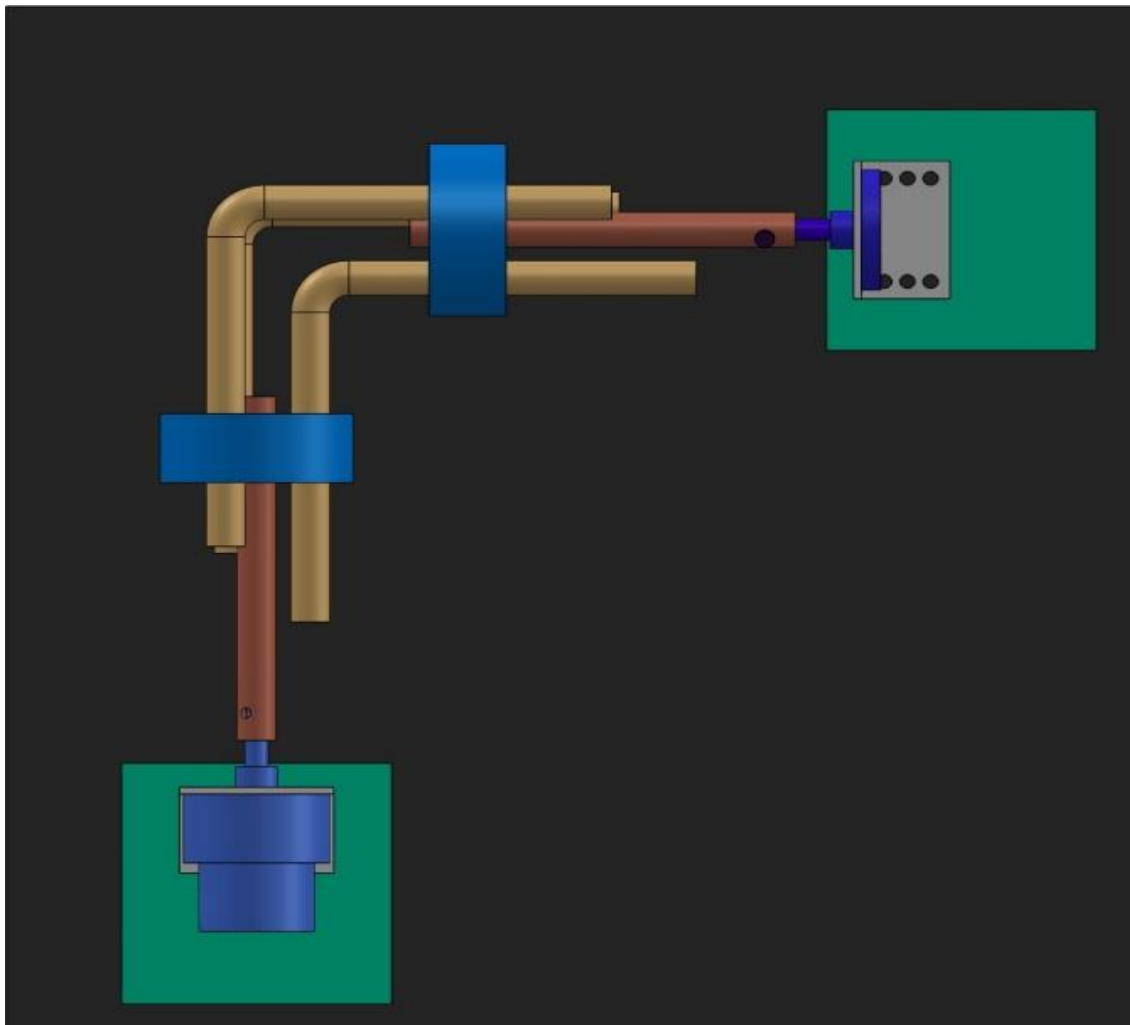
Components

- Driving Shaft
- Driven Shaft
- Shaft Mounts
- Rods
- Motor
- Supporting Frame

Advantages

- No Gears Needed
- Easy placement in restricted spaces

Block Diagram :

13. solar powered Sand Filter & Separator Project

Here we demonstrate the design & fabrication system. Sand is used in construction, manufacturing and many industries. Sand needs to be filtered and separated from unneeded particles, stones and other large particles before it is put to use. Our system puts forward a fully automated sand filtering and separator system that automatically filters sand poured on it. Here we use a motorized shaft that is mounted horizontally using mounts. The shaft is connected to a filter frame with mesh below and enclosing frame on the sides. We now have a rod connected from the shaft to the filter frame in a way such as to achieve the best horizontal motion. Also we have a frame to hold the filter frame in place while ensuring proper horizontal motion at the same time. On switching on the motor using our motor controller circuit, the system allows to operate the motor. This allows us to operate the sand filter motion for appropriate sand filtering needs.
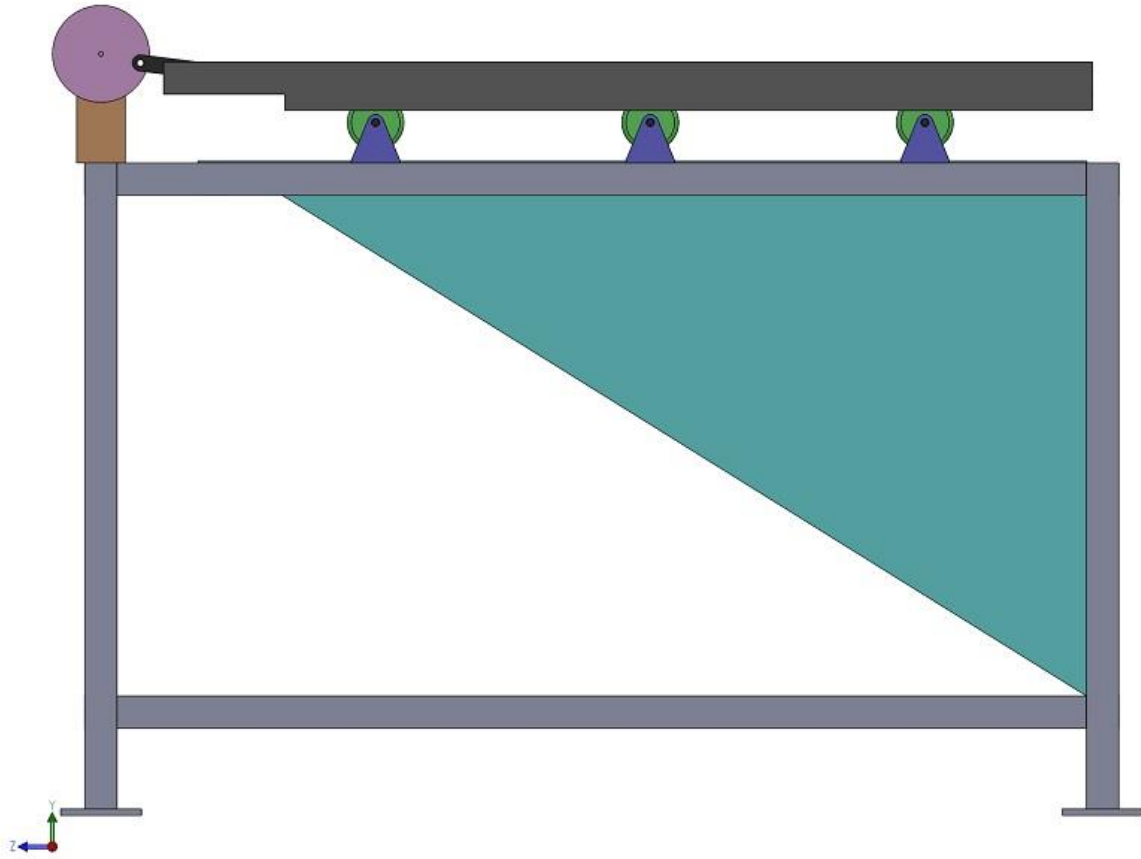
Components :
- Shaft
- Motor
- Mounts
- Mesh
- Connecting Rod
- Supporting Frames

Advantages :
- Automatic Filtering
- Fast Filtering
- Easy To Dispose off Unneeded Objects

Block Diagram:

14. TWO WHEEL DRIVE FORKLIFT FOR INDUSTRY WAREHOUSES

Factories, industries and storage go downs need forklifts and cranes for storage and moving large goods. Also there are a number of goods weighing around 40 – 60 kgs that are comparatively lighter but cannot be moved around easily by human labor. To fill this need we here propose a 2 wheel drive forklift to lift and transport such medium weight goods across factories & industrial warehouses. The 2 wheel drive is a fast, efficient and low power consumption vehicle that does not require much space to move around. The mini forklift will run on 2 dc motors and can drive small weight with pickup arrangement across small distances easily. For this we use a mini 2 wheel vehicle body frame designed with a platform with 2 motorized wheel mounts. It has a perpendicular handle ahead to hold on as well as take turns. Also we design a forklift type mechanism on the front handle of vehicle using 2 bent metal strips and lifting mechanism. The lift mechanism comprises of large rotating chain mechanism. This mechanism is connected to a high power motor. We now mount the control circuitry on the vehicle with wireless controllers that allow the vehicle to be controlled by person on it as well as by operating it remotely from 5-6 meters range. Thus we provide a remote controlled forklift for small goods transportation in industrial sector. The demonstration version can lift 10 – 20 kgs to demonstrate the concept.

Components
- Wheel Hub
- Wheel Axcel & Supporting Frame
- Handle Rods
- Vehicle Motor
- Chain & Sprockets

- Lifter Motor
- Lifter bearings
- Supporting Rods & Bearings
- Pulley & Rope
- Tires
- Shaft & Bearings
- Wires
- Mounts, Fixtures & Screws
- Supporting Frame

Advantages

- Easily Attachable & Detachable
- Industrial Goods Transport
- Warehouse Internal Transport

15. SOLAR POWERED WATER TRASH COLLECTOR

Water is essential to life, yet water pollution is one of the most serious environmental threats that we face today. Our lakes and river are increasingly getting polluted. Reversing the effect of water pollution is very difficult and can take years to remove all the harmful substances from the water. Also, huge manpower and budget would be required for the same.

The innovative system that we propose offers a unique and automated way to tackle water pollution by eliminating manual labour thus increasing efficiency and decreasing the cost and time needed. The main aim of this floating waste collector project is to clean the waste that gets accumulated on the surface of water bodies thus keeping the water clean hence decreasing pollution.

This project being remote-operated is controlled by an RC remote using which it can be maneuverer accordingly, we use DC pumps to provide the direction control and servo motor arrangement for the steering. To make the boat self-sustainable we have implemented two Solar panels which would charge the battery. Wire gauge net is used for garbage collection.

Automatic Sugarcane Bud Cutter Machine | Variable Cutting Size

Sugarcane is one of the most widely farmed crop over the globe. After harvesting sugarcane, cutting the sugarcane into chunks is a very time consuming process. All sugarcane cutting machines are either manual or semi automatic. This involves a lot of time and labor for each machine since the operation is not fully automatic.

So here we propose a fully automatic sugarcane bud cutter that utilizes pneumatic power for automatic sugarcane cutting mechanism. The system makes use of a mini tabletop machine with a powerful motorized arrangement to push an entire sugarcane bud into the machine cutter. Once a sugarcane stick.bud is inserted a rubber gripper roller powered by geared motor is used to drive the stick towards the cutter at a specific rate.

A second roller is attached to the system through a screw based arrangement is used to push the sugarcane stick towards the other roller and maintain a grip over the cane. The system is further integrated with a pneumatic cylinder. A cutter blade is attached to the front end of the actuator. The pneumatic cylinder is powered by an external compressor to drive it back and forth using high air pressure.

This blade is used to cut the sugarcane bud into equal pieces in coordination with the feeder rollers. The machine uses rollers to pull in the sugarcane stick and cutter to cut it. Now the system also includes a controller circuitry that controls the cutting length of each piece. This allows the operator to cut the sugarcane in desired pieces.

Components:

- Pneumatic Cylinder
- Pneumatic Piping

- Pipe Joints and Fittings
- Valves
- Cutter Blade
- High Torque Motor
- Shaft
- Couplings
- Rubber Rollers
- Bearings
- Base Frame
- Supporting Frame
- Mounts and Joints
- Screws and Nuts

Advantages:

- Single Operator Machine
- Automatic Operation
- Variable Size Cutting
- Accurate Cutting

Disadvantages:

- Requires Air Supply
- Blade needs to be replaced/sharpened from time to time

16. SMARTPHONE CONTROLLED PROGRAMMABLE ROBOTIC ARM ARDUINO

Robotic arms are now used in a wide variety of applications, from industrial automation to automatic burger making arms. The key component of any automatic robotic arm is its ability to learn motions or the ability of arms to be programmable by the user. This usually involves programming the arm each time with set of instructions to be followed.

Well we hereby develop a smartphone controlled programmable robotic arm that can be easily programmed via a smartphone to perform any automated repetitive tasks as desired by user. The arm makes use of 6 servo motors controlled by an arduino Uno to achieve the task.

This Arduino powered arm provides the following advantages:

- 6 DOF arm for 360° Movements
- Programmable Arm as per user automation process
- Smartphone controlled system with no added programming hardware needed
- Easy to control movements with sliders instead of complicated programming

The 6 Dof arm makes use of 6 servo motors controlled by an arduino Uno controller. The controller is interfaced with a Bluetooth receiver that is used to receive commands via the android app. The arm gripper is made up of 2 claws which are also controlled by a servo motor. The gripper angle is also be rotated by another servo for a 180° orientation to pick up and place objects of any orientation.

The android app consists of an easy to use gui with sliders used to transmit servo movement commands. The user can record steps and save each step through the app.

The programming commands transmitted by app are received by the Bluetooth receiver and passed over to arduino controller. The controller records movement commands of each servo step and saves it. The controller can now repeat the set of steps so as to execute the entire movement command with desired coordination with each servo to achieve the program repetitively.

Thus the system provides a smart mechanism to use a 360° programmable robotic arm with smartphone controlled system.

Components:

- Arduino Uno
- Servo Motors
- Servo Motor Driver
- Base Frame
- Gripper Claws

- Supporting Frame
- Servo Mounts
- Castor Wheels
- Resistors
- Capacitors
- Transistors
- Cables and Connectors
- Diodes
- PCB and Breadboards
- LED
- Transformer/Adapter
- Push Buttons
- Switch
- IC Sockets

Software Specifications

Programming Language: C

Applications:

- Production Lines Automation
- Automated Cooking Robots
- Fruit/Vegetable Sorting Robots
- Wall Painting Robots
- Medical/Surgical Operation Robotics

Advantages:

- 6 DOF arm for 360° Movements
- Programmable Arm as per user automation process
- Smartphone controlled system with no added programming hardware needed
- Easy to control movements with sliders instead of complicated programming

Disadvantages:

- It cannot pick up heavy weights
- It has a low speed of operation

PNEUMATIC HOLDING GRIPPER

ABSTRACT

A pneumatic Holding Gripper can be thought of as a large flexible mechanical structure that is moved by some sort of control system. The control system takes its input from a human operator and translates this command into the motion of actuators, which move the mechanical structure. The high performance and highly powerful, Pneumatic Holding Gripper together with the capacity for high volumes are suited for Holding Heavy Objects.

One form of inefficiency in current systems is due to the link between the flows of the two ports of the cylinder. This is because most valves use a single spool to control the flow in both ports. Because of this link, it is impossible to set the pressure levels in the two sides of the cylinder independently.

Therefore, the outlet side will develop a backpressure, which acts in opposition to the direction of travel, which increases the pressure required on the inlet side to maintain motion. Since the force generated by the actuator is proportional to the pressure difference between the two sides, the actual pressures in the cylinder don't affect the action of the cylinder.

Diagram:

Gripper
Mechanism

Pneumatic Pump

Pneumatic
Actuator