

# **Multipurpose Agricultural Solar robot**

Submitted in partial fulfillment of the requirements  
Of the degree of

## **BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING**

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2017**

# **CERTIFICATE**

This is to certify that the Research work titled Multipurpose Agricultural solar robot that is being submitted by **Pardeep Rao, Prakash sharma, Tarun bhati and Keshav jakhar** is in partial fulfillment of the requirements for the award of **Bachelor of Technology**, is a record of bonafide work done under my guidance. The contents of this research work, in full or in parts, have neither been taken from any other source nor have been submitted to any other Institute or University for award of any degree or diploma.

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**External Examiner**

# Approval Sheet

This thesis/dissertation/project report entitled Multipurpose Agricultural solar robot by **Pardeep Rao, Prakash sharma, Tarun bhati and Keshav jakhar** is approved for the degree of bachelor of technology in mechanical engineering.

**Examiners**

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**Supervisor**

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## Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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# **ABSTRACT**

**The motive of this project is to present design and fabrication of multipurpose agricultural solar robot. This robot is able to carry out different types of operations like seeding, spraying and levelling together with a automated process, the mechanism is guided by Arduino.**

**Relays are used to control the speed of the motors. The major part of Indian GDP is dependent on agricultural activities and about half of its populations earnings are came from agriculture, unlike foreign nations our country is heavily dependent on the old and conventional and machines for agricultural activities, but this machine is a solution for this issue. In the era of automation all over the world the machine are being automated which declines the involvement of human. So keep this thing in mind we decided to use robotics in the agricultural field, which is more advanced and efficient than conventional system. If we looking from economic point of view this machine has its edge over conventional machine. Although the process are automatics but the farmer can control all its function by buttons which are being available on its panel. The estimated cost of this robot is 25000 INR, with the use of this machine the farmer can doubles it income and reduce the initial cost .**

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## **List of abbreviations**

**1.Ard –Arduino**

**2.DC- direct current**

**3. Spd- Speed**

**4. Hyd- Hydraulics**

**5. AMR- agricultural multipurpose robot**



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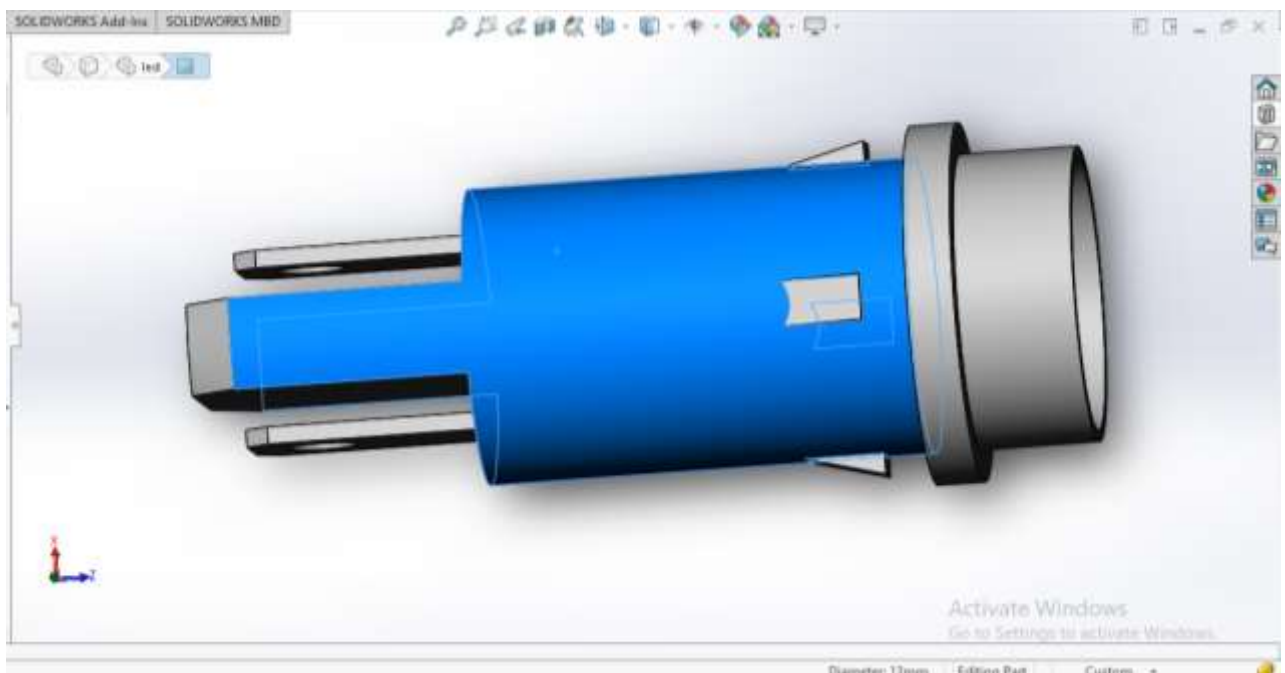
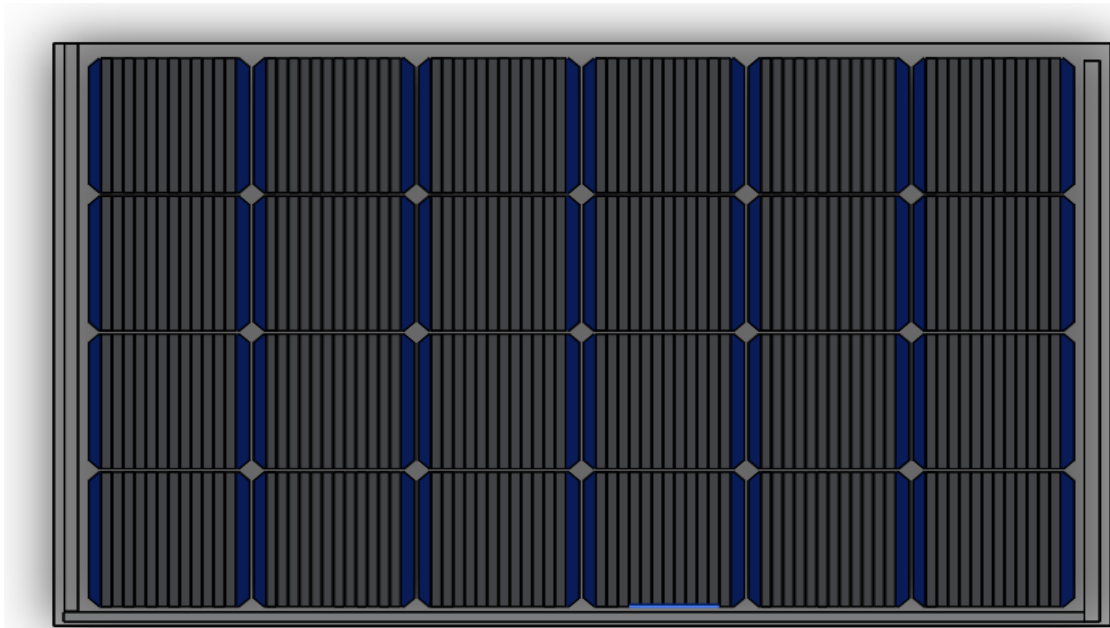


Fig-4.1



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Fig-4.2

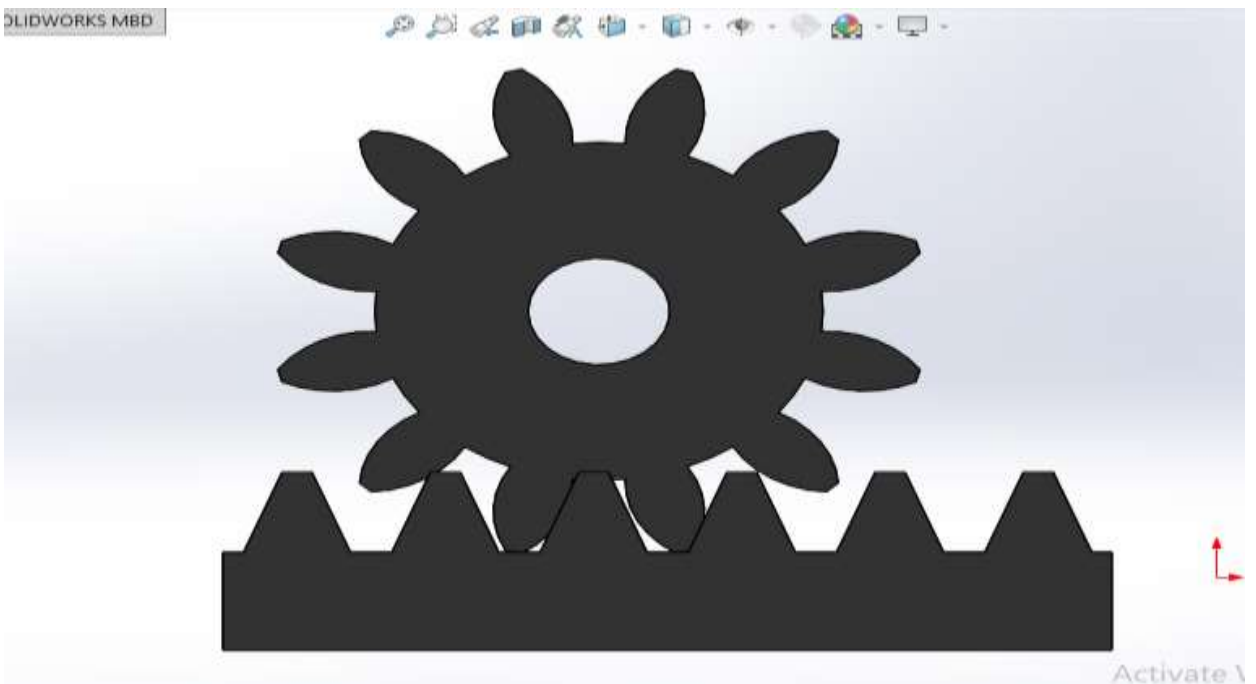


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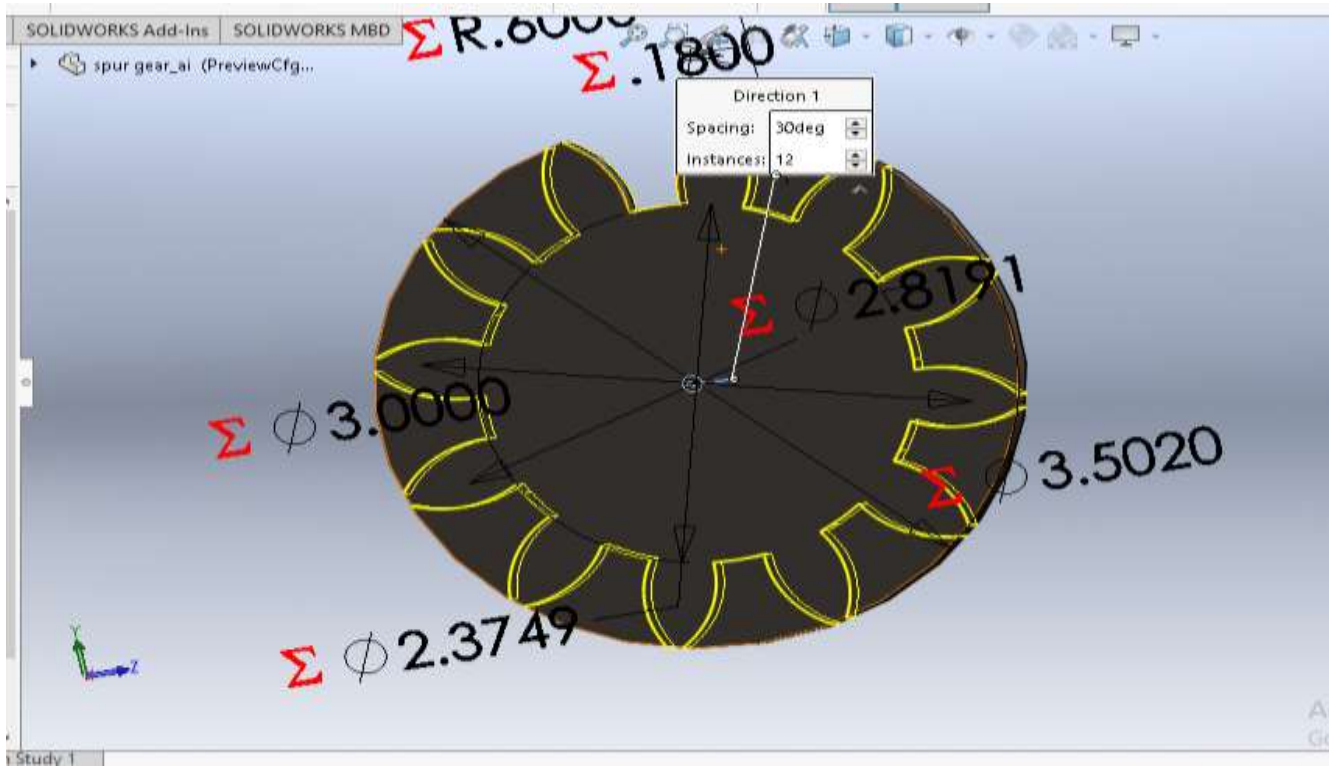


fig-4.4



Fig-4.5

## **Introduction**

### **1.1 Project background**

In India about half of its population is depends on the agriculture and its GDP is majorly depend on agriculture. India has enormous population about 1.35 billion, it is second most populous country after china and statics says that it will overcome china soon. So demand are increasing exponentially, so there is challenge among to fed this large amount of population. So it is very natural that the demand is very high, it put a large amount of stress on our agricultural system. According to a report about 10 million are died due to lack of food if the conditions are not Improve this scenario can be worsen. In India the agricultural is still based on old and conventional machine, unlike developed nations which uses advanced technology for farming. So in this century of science and technology the world is becoming automated . So we have to be align ourself with the world so that we can contribute more to our nation development and economy.by use of technology we can reduce our agricultural cost and improve its efficiency and reduce the losses. So we find that that we should apply some modern solutions in this field at a cheaper rate. Another point of view is that conventional system involve more human involvement which makes the process time taking and less efficient , so by using theis technology we can reduce the time and also able to reduce the labour involvement,As we know the technology is increasing rapidly and the resource are limited so this is a major challenge

in front of us to deal with this challenge , so this present a need in front of us to use these resources very effectively and carefully. This machine uses advanced technology such as Arduino and solar panel. Arduino makes all the process autonomous and very accurate so the effectiveness and more productivity can be achieved. This machine is also equipped with various sensors like humidity, weed detector etc.

## **Research purpose and its meaning**

Agriculture filed affects majorly our country economy and its development. India is a home to 1.35 billion people, so it has to feed these large amount of people, to fulfill the requirement of these number of people is a big challenge in front of ourself . The resources are also being limited so we have to look up for alternatives to deal with this . The aim of this project is t develop a machine which present a alternative in front of farmers to deal this these issues, so we can improve and present a much better than conventional system. With the use of this machine we can farmer can perform functions like weed cutting , seeding and leveling. The robot is powered by solar power ,and a 12 v battery which runs this whole mechanism. Approximately half of India population works in in this field so by making a small change we can get some significant change like cost reduction ,time saving and more efficient operation. Currently all the operations are being done by human such as weed cutting, seeding and leveling by use of tractors. We can eliminate the use of tractors and human involvement so this methods also saves fuel and energy. So we make the whole system automated with the help of Arduino, this robot can cut the weeds , digging and seeding and also spraying the waters using sensors.This machine also consist of 3 sensors and atmega328p chip and a solar panel.

## **Objective of study**

The aim of this paper is to fabricate a robot which can perform several functions in agricultural field.

- To bring more automation in agricultural field so that the initial price can be reduce and can be made more effective.
- to perform several functions like seeding, weed cutting and leveling and water spraying at a single time.
- to reduce the complexity of the robot, so that the farmer can operate it more easily.
- More agricultural work can be done in less time.
- install solar power so that dependence of electricity can be reduced.

## Literature review

### 2.1 Introduction

Indian economy is largely based on agriculture. The trace of agriculture in India can be found in Indus valley civilization and other civilization also. In today world India has its dominance in agricultural field. The vehicle like tractors, cultivators, harvesters plays a major role in farming operations. These machines use much fuel and cost is very high as much as 300 rs per hour for just laboring. Some of the major problems in the Indian agricultural are rising of input costs, availability of skilled labor, lack of water resources and crop monitoring. To deal with these issues we make this automated machine. The automation reduce the cost and efforts of human. The robot is being used for seeding, weed cutting and leveling. All of these functions are being performed by single machine. These robots also have a good life and very less maintenance and they are very easy to install.

### 2.2 Reviews

1. M.V. singh – The aim of this paper is to do design and analysis of a farming machine which can perform several functions like digging and seeding. It can measure the depth and rate at which seeding is being done, so no amount of raw material can be waste, the prototype made by this model is very useful in cost reduction.
2. The seeding and fertilizing agriculture robot using microcontroller, The aim of this project is to measure and calculate the seeding rate and moisture content in the soil and perform the machine function according to it. The automated system predetermined the route of the robot, the robotic system and the remote framework are associated

through networking framework. DC motors speed controlled by relay. The solenoid is used to control the speed of seeding.

- 3.** Seed Sowing Using Robotics Technology, this proposed a system which while seeding and water spraying control all the factors by using sensors and advanced technology. This system is fully automatic and have very less involvement of human and all the process are being done very precisely. The issues of the existing system in seeding operation can be removed completely in this proposed system.
- 4.** “Multi-purpose agriculture machine”, This uses the concept of solar energy in agricultural fields, as the resources are being decreasing rapidly so this project uses solar energy as an alternative. Solar energy is the very power full energy it plays very significant role in agriculture. This can be used in irrigation purpose for drawing water in the well remotely to the towns without power supply. This mechanism can be used in remotely areas also. This proposed system is very cost effective and very much efficient than conventional system.
- 5.** R. Pundkar , this paper proposes an idea of using flash in agricultural filed for the operations like seeding, watering and leveling. The system is based on AI, so it tells us the depth and the sepration between the two seeds.
- 6.** Srinivasan R.Zanwar, This research paper present some modification in current system as the vehicles use for agricultural purpose are very bulky and fuel consuming so they design a robot which has hopper seeding mechanism ,power transmission and this machine is of very small size .It consist of a tiller and its working is also very easy a tiller the working is very simple as the tiller rotates it directly transmit motion into ground wheel which directly connected through main shaft. A main shaft has a disc with scoops inside the hopper. When the ground wheel rotates the main shaft also rotates with the help of power transmission system.
- 7.** Blackmore S, the aim of this paper is to design a sowing system and fertilizer system which can works automatically by use of sensors and programming. It also measure the required depth and quality of the soil. The calculated depth and spacing may vary from place to place and season to season. From this we know that mechanical factors effects on seed germination like uniformity of depth of placement of seed, uniformity of distribution of seed along rows.
- 8.** Dr. Rakesh Solanki, the paper aims on the design, development and the fabrication of the vehicle which can dig the soil, sow the seeds, leveler to close the soil and pump to



spray water, these whole systems of the vehicle work with the battery and solar power, the vehicle is controlled by toggle switch. In recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The advantages of these vehicles are hands-free and fast input operations.

## **3**

### **Problem description**

#### **3.1 Problem description**

We know that in our country agricultural plays a major role in economic development, our farmers still uses the conventional old machines for farming operations unlike foreign countries , but this machine opens gateway to new technology. Robotics is emerging field in this century so here we make use of robotic technology in agricultural field in order to make this multipurpose agricultural solar robot, which is more advanced and efficient than conventional system. From the economic perspective this machine has an edge over conventional machines. Arduino based system controls all the operations by just pressing of buttons so it makes it less complex and user friendly.

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