Title of the Project: “DESIGN AND FABRICATION OF HYBRID MULTIPURPOSE HEXAPOD ROBOT”.

Name of the College: Dayananda Sagar College of Engineering.

Department Name: Industrial Engineering and Management

KSCST Ref:No. 42S_BE_3301

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Keywords: seed sowing, ploughing, leveling, farmers oriented, agriculture based.

ABSTRACT: The project entitled here is “Design and Fabrication of Hybrid Multipurpose Hexapod Robot”. involves finding solutions to the problems faced by farmers. The goal is to reduce fatigue for farmers and use the renewable source of energy to power the hexapod robot. It was inspired by an six legged insect. The project aims on the design, development and the fabrication of the hexapod robot which can dig the soil, put the seeds, leveler to close the mud and sprayer to spray water, these whole systems of the robot works with the battery and the solar power. More than 40% of the population in the world chooses agriculture as the primary occupation, in recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The vehicle is controlled by Relay switch through IR sensor input. The language input allows a user to interact with the robot which is familiar to most of the people. The advantages of these robots are hands-free and fast data input operations. In the field of agricultural autonomous vehicle, a concept is been developed to investigate if multiple small autonomous machine could be more efficient than traditional large tractors and human forces.
**PROBLEM IDENTIFICATION AND STATEMENT**

Based on the real time data collected during our survey near farming lands and farmers, we were able to identify the following problems.

1. Lack of automation in farming methods.
2. Consumption of conventional and environmentally hazardous energy sources.
4. Existing methods are ergonomically imperfect.

**PROJECT OBJECTIVES**

1. To design a hybrid hexapod robot which helps to navigate smoothly in irregular terrains where the seed sowing has to be done. This is by converting rotary motion to walking motion by the legs.
2. To eliminate the working costs of the robot by using renewable energy sources such as solar and wind instead of fossil fuels.
3. To loosen the soil to facilitate the seed sowing with the help of arm.
4. To drop the seed through the delivery nozzle which is connected to feed hopper.
5. To spray fertilizer/insecticide mixture and water.
6. To give a cushioned enclosure to protect the seed which in turn increases the moisture in the surroundings of the seed which facilitate germination.
7. To provide accuracy in the sequence of operations which are necessary for the seed sowing process and full fill the process requirements which increases the productivity.

**METHODOLOGY**

1. Construction of the base six leg structure walking mechanism using motor and chain drive, upon which the main frame lies.
2. The frame has to be fabricated in such a way that it has to house the parts which perform specific operations.
3. The soil loosening arm is inclined towards the ground to perform the piercing action.
4. The hopper is erected above the seed dispensing nozzle in a perfect rigid manner.
5. The solar panel are connected to the battery so the charging takes place.
6. The water come fertilizer/pesticide tank is erected on the frame and connected to the sprayer which is powered by a pump.
7. The soil closing action is performed by an arm which pushes the soil on the areas where the seed is sowed.
8. The systematic working of the planned multipurpose operations are tested and alignment is checked to make sure the robot works in a smooth manner.

**3D DESIGN**

![Figure 1: left view](image1)

![Figure 2: ISOMETRIC VIEW](image2)

**PROTOTYPE**

![Prototype image](image3)
CONCLUSION

• In agriculture, the opportunities for robot-enhanced productivity are immense – and the robots are appearing on farms in various guises and in increasing numbers. The other problems associated with autonomous farm equipment can probably be overcome with technology. This equipment may be in our future, but there are important reasons for thinking that it may not be just replacing the human driver with a computer. It may mean a rethinking of how crop production is done. Crop production may be done better and cheaper with a swarm of small machines than with a few large ones. Robots can improve the quality of our lives but there are downsides. The present situation in our country all the agricultural machine is working on manual operation otherwise by petrol engine or tractor is expensive, farmer can’t work for long time manually to avoid this problem, we need to have some kind of power source system to operate the digging machine. Scope for future work is to implement a prototype model of drilling and seed sowing machine system within the limited available source and economy. The system can be subjected to further development using advanced techniques. It may become a success if our project can be implemented throughout our country.

• We would like to thank KSCST for providing us the funds and support in building up this project.

FUTURE SCOPE

1. Battery capacity can be increased in the future depending upon the requirements.
2. Efficiency of the solar panel can be increased with the new technologies in electronic field.
3. Weight of the model can be decreased further using aluminium, but would increase the cost.
4. Size of the working model has to be increased depending upon the size of the lawn or farm.