

Name of the Institute – Walchand College of Engineering, Sangli.

Project Title- “Design and Development of Farm Automation System for Small Agricultural Lands”.

Project Sponsored by: La Fondation of Dassault Systems, Pune.

Project Vision –

World’s population is increasing at exponential rate. This growing population is causing scarcity of food. Traditional agricultural practices aren’t sustainable to provide required quantity and quality of food with utilizing minimum resources. Use of automation in agricultural sector promises to evolve different farming techniques using integration of advanced technologies. By reducing heavy labor and tedious task they also improve the quality of life for farm workers. Our vision for this project is to develop a standalone mechanical system capable of carrying out necessary agricultural functions with minimal human intervention.

Project Objectives –

1. To develop a system capable of carrying out necessary agricultural functions with minimal human intervention.
2. To develop a standalone mechanical system for the ease of automation in farming.
3. To develop smart control system so that agriculture tasks are carried out with minimum possible energy expenditure.
4. To develop a systematic user interface.
5. To automatically store the coordinates of the planted seed and further use it for driving the entire unit.
6. To sense moisture content in the soil.
7. To develop a sowing mechanism.

Working of Robot:

“Design and Development of Farm Automation System for Small Agricultural Lands” is a robot designed for agricultural purposes, which can be used in open farms by small and marginal farmers for farm automation. The aim of this project is to develop a system capable of carrying out multiple agricultural functions with minimal energy expenditure and human intervention, thus increasing the speed, accuracy and reliability. The robot is able to perform elementary operations a like ploughing, sowing, watering and fertilization, and soil moisture detection.

For these operations, we have used rotating tool magazine on which all the tools are mounted and that magazine is mounted on the robotic arm i.e., YZ assembly. The position of the plants is

predefined which varies according to type of crop. The soil moisture is measured with the help of moisture sensor and watering is done accordingly. Robot is operated from a mobile application through Bluetooth connection. This technology is useful to grow crops up to height of 1 ½ feet with minimum physical labor and saving a tremendous amount of water. For the movement of the robot, we have used 4 wheels which are equipped with the hub motor within it. Stepper motor are connected to the wheels for the directional change as per input. Up to 1 acre size of farm can be covered using this machine and this capacity can be increased by increasing the range of LIDAR sensor and increasing battery life. The time of operations can be reduced by using high speed motors and a sturdier belt and pulley.

Photographs / Videos –

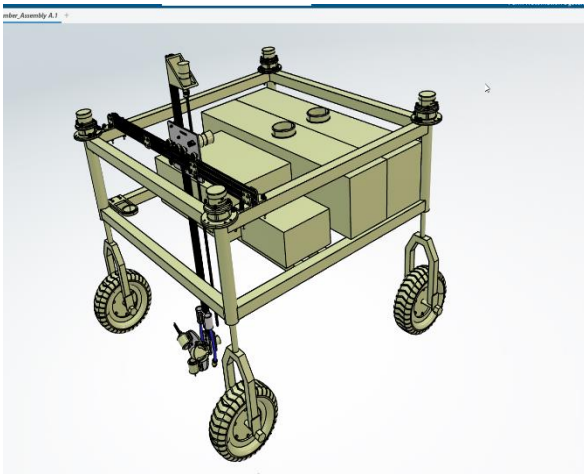


Fig 1: - CAD model designed in 3D experience

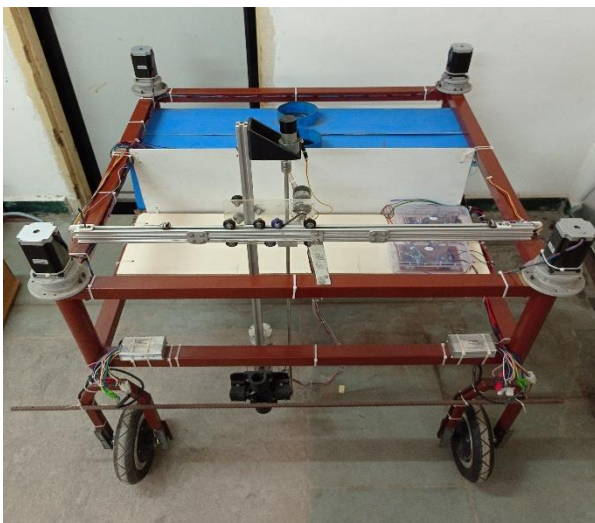


Fig 2: -views of the actual Robot

➡ Tap here to access videos related to this project

<https://drive.google.com/drive/folders/1aHIZkM9pt8A39W0PQOn7qq4I0BH4r10J?usp=sharing>