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"Janani" The Farming Robot

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Abstract: ***Farmers and farm workers suffer from increased rates of respiratory diseases, noise-induced hearing loss, skin disorders, certain cancers, chemical toxicity, and heat-related illnesses. Organic Dust Toxic Syndrome (ODTS) is a common respiratory illness manifested by temporary influenza-like illness with fever, headache, and muscle aches and pains. Contact dermatitis is a skin disorder that occurs among agricultural workers. Heat stress occurs when the body builds up more heat than it can handle. High temperatures, high humidity, sunlight, and heavy workloads increase the likelihood of heat stress. So, the Janani bot will perform all the farming practices like Ploughing, Sowing, Levelling, Irrigation, Harvesting and Soil Moisture Monitoring. Which will help reducing the human effort and prevent them from many of the health issues cause during performing the farming practices.***
Keywords: Ploughing Sowing Levelling, Irrigation, Harvesting and Soil Moisture Monitoring.

I. INTRODUCTION

As farmers face many problems due to the farming practices like increased rates of respiratory diseases, noise-induced hearing loss due to the big tractors noise, contact dermatitis is a skin disorder that occurs among agricultural workers. And High temperatures, high humidity, sunlight, and heavy workloads increase the likelihood of heat stress. And after so much hard work some time the crops fail due to less effort given by the in the field.

It consists of various frameworks. We can also have a live view of what is being seen by the robot through a wireless camera and perform all the farming practices while sitting under a shade or they can control from their homes itself and it's having a feature of self-charging by the help of solar panel installed in it. and in case of less sun light, we can directly charge it by the adapter. The robot mainly consists of the following frameworks: -

1) Smartphone Control Framework: The robot consists of a smartphone control framework that will help people to wirelessly control the robot. For the smartphone control framework, a technology titled "Bluetooth" is being used.
2) Live View Framework: The robot consists of a system that captures what is in front of the robot and transmits it wirelessly to the receiver. This helps the controller in controlling the robot and evacuating the place as soon as possible. This framework works on a wireless camera setup.
3) *Ploughing:* The robot will plough the ground while moving in the front direction as the plough has been aligned to word the front of the robot. As every time the farmer will not plough the ground so he can remove it as it's detachable.
4) *Seed Sowing:* The robot will sow the seeds after getting command by the farmer with the help of Bluetooth.
5) *Levelling:* The levelling part is the manual part which can be detach from the robot as per the wants.
6) *Irrigation:* The robot will get the command from the farmer then the irrigation (water sprinkler). Will sprinkle the water from the water tank.
7) *Harvesting:* The Harvesting part would also control by the farmer with the help of Bluetooth coordination.

II. WORKING ON THE FRAMEWORKS

The working of all the frameworks has been explained below.

A. Smartphone Control Framework -S.C. F

As discussed in the introduction, this framework will help the controller of the robot to wirelessly control the robot without risking his life. This is a system that is capable of connecting with any smartphone through which the robot can be controlled to reach its destination. This system will be used to rescue any person. By knowing his location, we can control the robot and send it to rescue the person. Suppose there is a fire in a building and the person controlling the robot knows that where the public is gathered so the person can send the robot by guiding it to the location so the public can get rescued. This system works on Bluetooth and consists of various electronic components i.e., Arduino, Bluetooth module, L298n Motor Driver, Chassis, and a power supply unit.

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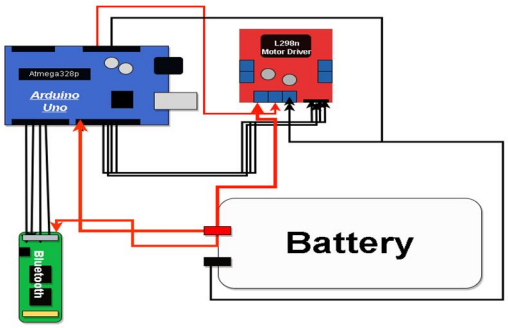

Fig -1: Block-Diagram for S.C.F.

B. Live view Framework

This is one of the additional features offered in this robot. The live view framework will help the controller of the robot to see what's coming in front of the robot and guide accordingly. This will ensure the correct path being followed by the robot. This framework consists of a wireless camera that can be accessed on the web through authorized personnel or anyone in time of emergency.

C. Ploughing Framework

As ploughing the ground is the primary activity done by the robot to turns the soil over ready for seeds to be planted. The robot will plough the ground while moving in the front direction as the plough has been aligned to words the front of the robot. In case farmer don't want to plough at the particular time so he can remove it as it's detachable. As shown in Fig-2.

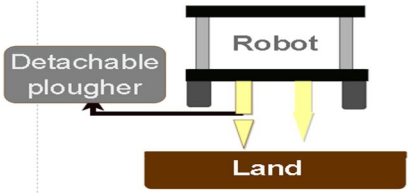

Fig -3: Block-Diagram for ploughing framework.

D. Seed Sowing framework-S.S.F

The robot will sow the seeds after getting command by the farmer with the help of Bluetooth. As the robot have a servo motor connected with the seed container plate, when the farmer will give the command to seed sowing mechanism so the microcontroller will give the command to the servo to move 45 degrees as a loop to ensure that only 2-3 seeds fall at a time in the funnel to prevent seed wastage. The microcontroller will be receiving the command through the Bluetooth module. And the seed will fall in a uniform manner.

As shown in Fig-3.

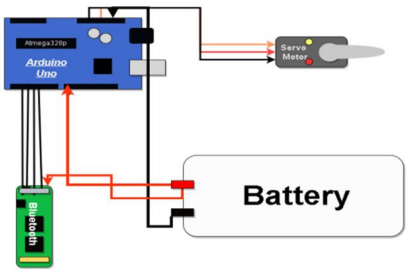

Fig -3: Block-Diagram fo r S.S.F.

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E. Levelling Framework

The levelling part is third initial process after the ploughing and seed sowing. So, the levelling part has been aligned at the back part of the robot, to ensure that it covers the air patches created by the plougher and it's a manual part which can be detached from the robot as per the wants.

F. Irrigation Framework

As Irrigation is the most important process in the farming. seeds and plants always want water but in a sufficient quantity.so it has been designed in a way. That when the farmer will give the command for irrigation so the Bluetooth will forward the data to the microcontroller, and it will on the sprinkler pump with the help of relay bord. As shown in the Fig-4.

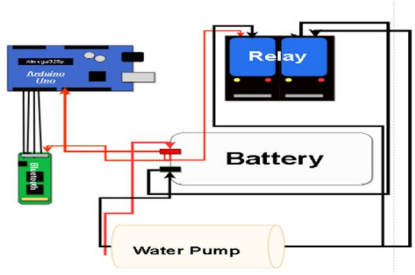

Fig -4: Block Diagram of irrigation framework.

G. Harvesting Framework

Harvesting is the operation of gathering the useful part or parts of the plant and is carried out at the time when all the nutrients have developed, and the edible parts have reached the appropriate degree of maturity.so for that we have used two high powered motors align at the side parts of the robot with sharp blade propellers. It works in a way when the farmer will give the command of harvesting from the mobile with the help of Bluetooth so when the robot will receive the command, the microcontroller will start the motors with the help of relay. and the Harvester is designed in a way the crop will falling in a lain. As shown in Fig-5.

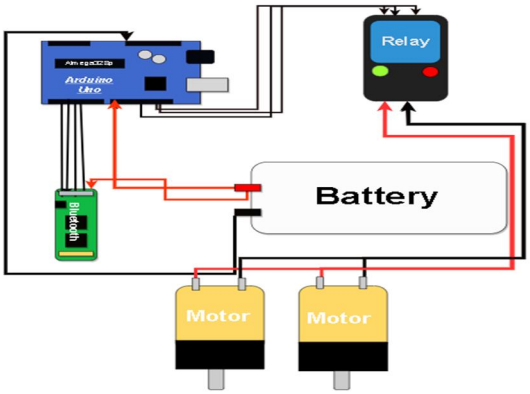

Fig -4: Block Diagram of Harvesting framework.

III. CONCLUSIONS

By using the robot the effort done by the farmers can be reduce and health related problems can be reduce as almost all the farming practices can be performed by the robot while sitting at home. So, many problems can be solved , and it would also prevent soil erosion as it uses modern technology to Plough.

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IMAGES OF PROTOTYPE

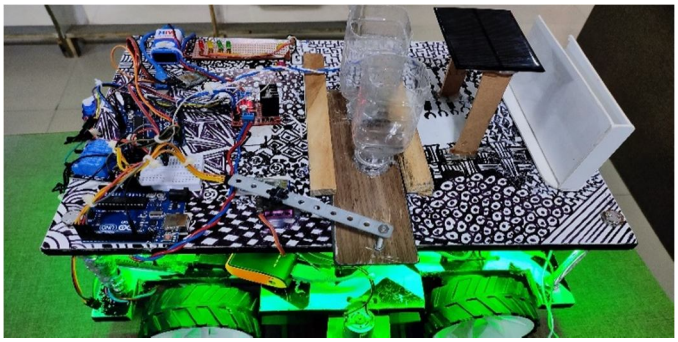


Fig -5: Top view of prototype

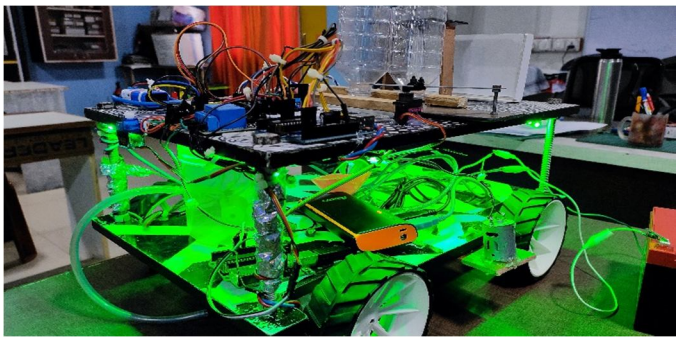


Fig -6: Angle view of prototype

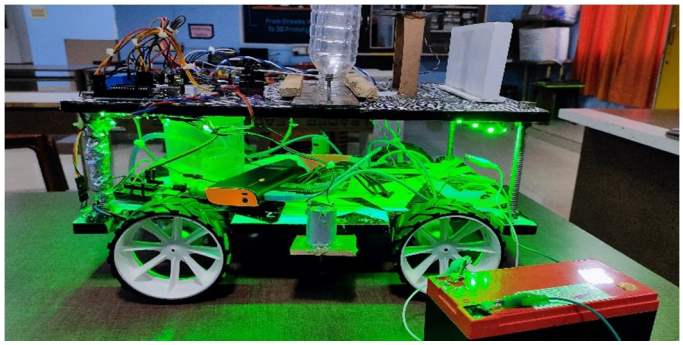
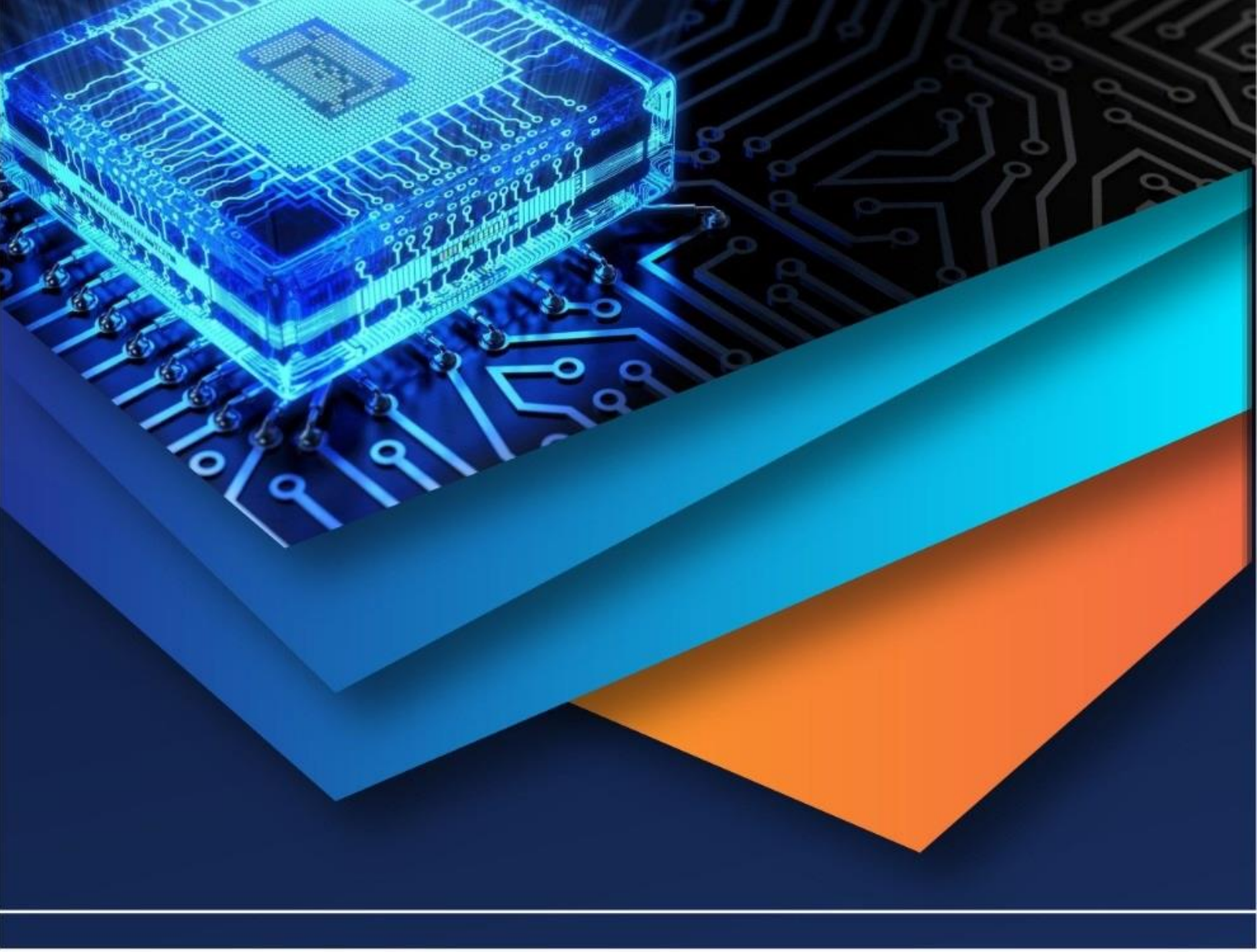


Fig -7: Side view of prototype



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