Implementation of Solar Based Multipurpose Agriculture Robot using Random Forest Algorithm

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Abstract: *In India nearly about 70 percentage of people are depending on agriculture. Numerous operations areperformed in the agricultural field like seed sowing, grass cutting, ploughing etc. The present methods of seed sowing, pesticide spraying and grass cutting are difficult. It is becauseof lack of awareness towards soil i.e., which crop should be grown on particular area. All these factors will make the farmers not to do thefarming in an efficient way. The equipment's used for above actions are expensive and inconvenient to handle. So the agricultural system in India should be encouraged by developing a system which will reduce the man power and time. This work aims to design, develop and design of the robot which cansow the seeds, cut the grass and spray the pesticides, this whole system is powered by solar energy. This proposed system will do operations like seed sowing, pesticide spraying,solar panel for getting the energy to run the robot etc. The total work should be done with amost emerging technology like Machinelearning. In this we are using a random forest algorithm concept for getting an efficientoutput which will be more helpful to the farmers and output can be displayed with a mobile app so that he/she can see the details of the field in an easier manner.*
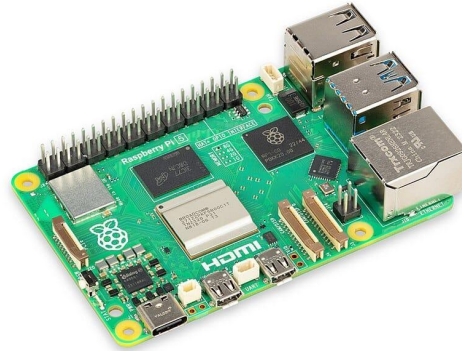
Keywords: Random Forest algorithm, IoT Cloud, Seed Sowing, Pesticide Spraying, Solar panel, Robot mechanism

I. INTRODUCTION

The history of agriculture spans thousands of years, and various climatic conditions, cultural traditions, and technological advancements influenced and shaped its growth. The agricultural system therefore should be improved to lessen the farmers' labor. The model created to mechanically plant seeds and spray Using pesticides and cutting the grass. The prototype is an example of modern technology for enhancing agricultural processes, including planting seeds, trimming grass, and applying pesticides based on robotic support. As the population is increasing day by day the consumption of food is also increased so in order of that the farming has also increased. To also benefit in time, quality and quantity of food there are various technologies being used and invented to use in the fields of Agriculture Some of those technologies are like internet of things, machine learning. So, these technologies areused for monitoring and controlling of a device anywhere in the world. So as the population has been Increasing enormously, there is also a study saying that food demand may increase between 59%-98% by 2050. But due to the present environmental conditions and climate changes such a high cultivation of crop may become difficult. So,more advanced technology, equipment's may be used for farming at a very low price.

Purpose:
1. Firstly, all the sensors will be initialized.
2. Then after the sensors starts detecting the values.
3. The values which are detected are read i.e., displayed.
4. Next the idol measurement values that will be needed will be already dumped into the program and then the taken sensors detected measurements and the idol measurement values are compare.
5. Then our Machine code will be run which uses the random forest algorithm and sensor readings.

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The Raspberry Pi 3 Model B+ is the final revision in the Raspberry Pi 3 range.

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 1 GB LPDDR2 SDRAM
- 2.4 GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- Full-size HDMI®
- 4 USB 2.0 ports
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- 4-pole stereo output and composite video port
- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input
- Power-over-Ethernet (PoE) support (requires separate PoE HAT)

Solar Panel

Photo voltaic (PV) cells, as depicted in Fig. 3, are solar cells that are used in calculators and spacecraft. As the name suggests (photo means "light" and voltaic means "electricity"), PV cells convert solar energy directly into electricity. A module is a collection of electrically connected cells that are crammed into a frame (most frequently referred to as a solar panel). Everyone wants to be self-sufficient or at least lessen the carbon imprint of their home, and solar panels make this dream a reality. Solar panels are a terrific way to lower your electricity usage. Photovoltaic (PV) cells are used in solar panels to turn sunlight into electricity.
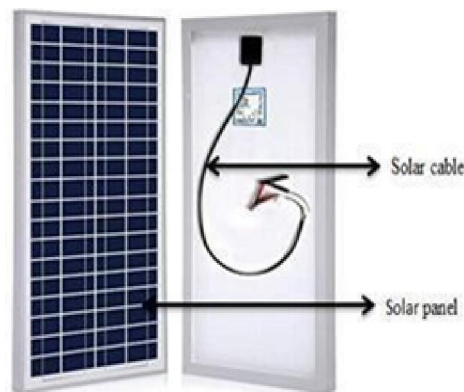
Bluetooth Module HC-05

The Bluetooth Serial Port Protocol (SPP) module and the HC05 module are both made for straightforward wireless serial connection setup. The HC-05 Bluetooth module, which is depicted in Fig. 4, can be used to connect with any Bluetooth-enabled device, including a phone or laptop, as well as two microcontrollers like the Arduino.

Bluetooth HC05 is wirelessly connected to the Arduino and an Android smartphone in order to control the complete system.Because the HC05 module utilizes the SPP to function, pairing it with microcontrollers is fairly simple .

Motor Driver IC L293D

The motor driver is a motor module that enables simultaneous control of two motors' working speed and direction. Based on the L293D IC, the motor driver was created and developed. According to Fig. 5, the L293D is a 16 -pin motor driver IC. At voltages ranging from 5 V to 36 V, it offers bidirectional drive currents. The L293D is an IC that can simultaneously operate two DC motors with eight pins on each side. Each motor has two enable pins, four output pins, and four input pins.

Relay

As seen in Fig. 6, a relay is a switch that is electrically actuated. It utilizes an electromagnet to function mechanically as a switch, but it also makes use of other working concepts, such as solid-state relays. A circuit can be controlledby a relay using either a separate low-power signal or a single signal that controls several circuits. In early computers and telephone exchanges, relays were widely utilized to carry out logical operation.

II. CONCLUSION

In this proposed system we are going to perform enormous operations like seed sowing, pesticide spraying, water pumping and removing excess water from the field by using pipes, harvesting, checking the nutrients like Nitrogen, Phosphorous, Potassium values in the field by using an efficient code. All these things will be effectively done by writing the code using Random Forest Algorithm concept with efficient output. This will give a more amount of efficiency and by using a robot we can perform multiple operations.

REFERENCES

[1] R. Ramya, C. Sandhya, and R.Shwetha published paper on "Smart farming systems using sensors" (IEEE-2017).

[2] Manjunath, Gurucharan, Shwetha and Prof. Melwin D Souza published paper on "IoT Based Agricultural Robot for monitoring plant Health and Environment" (Journal of Emerging Technologies and Innovative Research (JETIR-2019).

[3] Chandana, Nisha M, Pavithra B, Sumana Suresh and Nagashree published paper on "A Multipurpose Agriculture Robot for Automatic Ploughing, Seeding and Plant Health Monitoring" (IJERT-2020).

[4]Jaya Priya, Anagha, Megha, Harshitha published paper on "Automatic Farming Robot for Smart and Effective Cultivation" (IJARCCE-2021).

[5] Kasara Sai Pratyush Reddy, Y Mohana Roopa, Kovvada Rajeev, Narra Sai Nandan published paper on "IoT based Smart Agriculture using machine Learning" (IEEE-2020).

[6] T Rahul Sudharsan, Gowtham S, Dr. S.Revathy, Dr. T.Bernatin, L.Mary Gladence and V. Maria Anu published paper on "Smart Farming Using IoT" (ICCM 2022).

[7] Abhiram MSD, Jyothsnavi Kuppili and BS N. Alivelu Manga published paper on "Smart Farming using IoT for Efficient Crop Growth" (IEEE 2020)