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Smart Agriculature Robot Using IOT

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Abstract: *Smart agriculture robots using IoT (Internet of Things) technology are designed to revolutionize the way farming is done by integrating sensors, devices, and equipment to enable precision agriculture. IoT- enabled agriculture robots use data collected from sensors and other devices to provide real-time information about soil moisture levels, temperature level, and other critical factors that affect farming operations. The IoT-enabled smart agriculture robots are equipped with various sensors that collect data on the soil, and environment, and transmit it wirelessly to a central system for analysis. This data isthen used to optimize farming operations, including planting, watering, fertilizing, and harvesting. One of the key benefits of using IoT technology in smart agriculture robots is that it enables farmers to monitor and control farming operations remotely, from anywhere in the world, using a smartphone, tablet, or computer.*

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I. INTRODUCTION

Agriculture is the backbone of India. The history of agriculture in India dates back to Indus valley civilization era and even beforethat in some parts of southern India The vehicles are being developed for the processes for ploughing, seed sowing, mud leveling, water spraying and grass cutting. All of these functions have not yet performed using a single vehicle. In this the robots are developed to concentrate in an efficientmanner and also it is expected to perform the operations autonomously. The proposed idea implements thevehicle to perform the functions such as ploughing, seed sowing, mud leveling, water spraying and grass cutting. These functions can be integrated into a single vehicle and then performed. The idea of applying robotics technology in agriculture is very new. In agriculture, the opportunities for robot- enhanced productivity are immense - and the robots are appearing on farms in various guises and in increasing numbers. We can expect the robots performing agricultural operations autonomously such as ploughing, seedsowing, mud closing, water spraying and grass cutting. We can expect the robots performing agricultural operations autonomously such as ploughing, seed sowing, mud closing, water spraying and grass cutting. Watching the farms day & night for an effective report,allowing farmers to reduce then firmamental impact, increase precision and efficiency, and manage individual plants in novel ways.

II. Literature Survey

[1] The agriculture plays a vital role in the economic development of our country. Crop yield primarily depends on soil fertility and moisture level. Fertilizers are normally recommended based on the nutrient present in the soil. The proposed Internet of things (IoT) based software system has the intelligence to recommend the quantity of water and fertilizer which improves the quality of the soil and ensures optimum growth of the crop.

[2] An optical transducer is developed to measure and to detect the presence of Nitrogen (N), Phosphorus (P) and Potassium (K) of soil.Such transducer is needed to decide how much extra contents of these nutrients are to be added to the soil to increase soil fertility. The nutrient absorbs the light from LED and the photodiode convert the remaining light that is reflected by reflector to current.

[3] In One of the essential and basic services to survive on earth is Water. Recent time increasing the scarcity of water due to growing in population. So this is becoming as a universal obstacleTemperature Sensor sense the both water vapor content and temperature around the plant. The Soil Moisture Sensor sense the soil moisture of a plant, if water content is below minimum requirement, then water will supply from water reservoir using relay and Ultrasonic sensor measures the water level of reservoir afterthat sends the data to ESP8266 Node MCU.

ESP8266 Node MCU isa Microcontroller gets the data from smart wireless sensors, process the data and send to destination through A Message Queue Telemetry Transport (MQTT)protocol.

[4] Organic culture has been widely promoted to famers as the best solution for many kinds of fruits and vegetables. However, the serious issue of organic culture is to optimal control soil moisture. This paper presents a soil moisture sensor based on internet ofthings (IoT) technology. The results show that the proposed soil moisture sensor not only shows the real- time soil moisture data but also analyze the soil moisture regulation.

[5] Agriculture plays a vital role in the economic growth anddevelopment of any nation. Changing climatic condition have badly affected the production of agriculture products. Therefore, to improve the quality and quantity of agriculture products, many new technologies are being developed to practice smart agriculture which can adapt to the changing climatic condition. The proposed approach helps in remote monitoring and water conservation process.

[6] To meet the growing demand of irrigation in India due to uncertain climatic conditions it is necessary to focus on sustainable irrigation approaches and improving the efficiencyof the existing irrigation systems. The main purpose of this paper is to analyze the soil moisture level and to afford with auto irrigation to the crops. Depending upon the observedvalue the crops are automatically provided with water to the preferred level which maintains the humidity of the soil.

III. Summary of the Literature survey

The outcome for the literature survey are as follows:

- Use of available technology in a good combination can build a cost efficient and bestperforming electronic system for our use.
- There is a need for development of system which gives more production of crops in aproperway and monitoring the environmental conditions in theproduction area.
- In large production there might be a chance of diseases of crops. Hence forth there exists a necessity to verify the disease and infection before the distribution of crops
- To improves both productivity and working conditions for machine and worker.
- Framing robots can perform various repetitive jobs like weeding, sowing, fertilizing andspraying

IV. Methodology

The basic aim of this paper is to develop a multipurpose machine, which is used for digging the soil, seed sowing, and leveler to close the mud and water sprayer to spray water with least changes in accessories with minimum cost. This whole system of the robot works with the battery or adapter power. Microcontroller, Bluetooth,dc motors for the robot movements and geared motors for the cultivator lifting control, as shown in figure 1

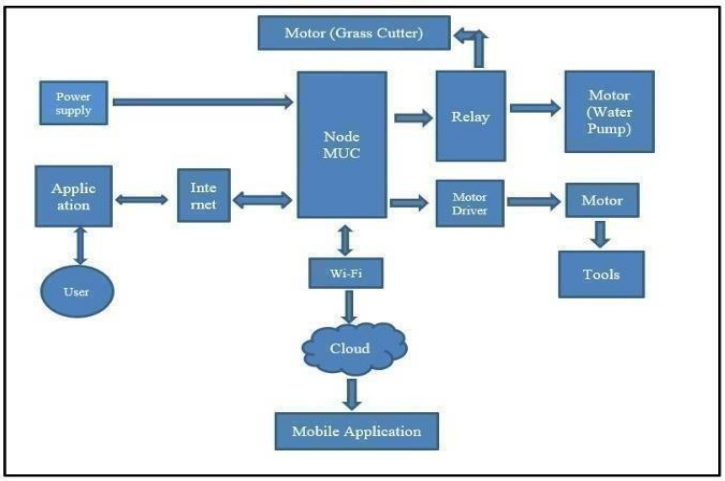

Figure 1: Block Diagram

Working of the proposed system

The node MCU contains a WI-FI connection and can connect to the internet through Wi-Fi. The node MCU are required because the simplicity of its hardware and network interface.

Relay is used to control high voltage, high current load such as motor, solenoid valves, lamps and AC load. The relay module is an electrically operated switch that can be turned on or off. The moisture sensors measure the level of moisture in the soil and sendthe signal to Node MCU if watering is required. A temperature sensor measures the presence of heat energy in the soil. The temperature-based sensors are helpful when growing crops that need wet or dry condition. Controlling of all these operations will be through any smart device connected to internet and the operations will be performed by interfacing sensors, WI-FI. Node MCU based smart farming system is developed for monitoring the status of crop fields. Digging the soil breaks up the soil, making it light enough for crops. Digging the soil is essential for good crop growth. Sowing is the process of planting seeds into the soil. Mud covering prevent the seed from absorbing the necessary nutrients, water and oxygen that it needs to sprout and develop roots. Grass cutting is used for cutting a grass surface. Irrigation is used to controlled amounts of water to land to help grow crops, lands capeplants.

Steps Involved in the Working are:
Step 1: Start
Step 2: Initialize Wi-fi and motor Step 3: Connect to blynk Iot Server
Step 4: Get user command from the server
Step 5: Run motor accordingly to command (F-B-L-R)
Step 6: if the command is given as on then the pump turns on or elsepump is turned off
Step 7: if the command is given as on then the cutter turns on or else cutteris turned off
Step 11: Stop

V. Results and Discussions

The data collected by smart agriculture robots using this technology can be diverse and can include various types of information related to the farming operation, as shown in figure 2. Here are some examples of the types of data that can be collected: Environmental data: Smart agriculture robots can collect data related to the environment, such as temperature, humidity, soil moisture. This data can be used to monitor growing conditions and make adjustments to optimize crop growth.

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VI. Result Analysis

Applications	Soil types	Time Consumption	Power supply
Digging the soil	Red Soil Black Soil Silty Soil	30min 18min 5min	12V
Seed sowing	Red Soil Black Soil Silty soil	30min 18min 5min	12V
Irrigation	Red Soil Black Soil Silty soil	30min 18min 5min	12V
Mud leveller	Red Soil Black Soil Silty soil	30min 18min 5min	12V
Grass Cutter	Red Soil Black Soil Silty soil	30min 18min 5min	12V

Figure 2: Smart Agriculture Robot using IoT

VII. Conclusion

In conclusion, the use of smart agriculture robots with IoT technology has the potential to revolutionize farming practices and lead to more sustainable and profitable operations. By collecting andanalyzing real-time data on environmental conditions, crop growth, equipment performance, and other factors, farmers can make data-driven decisions that optimize resource usage, increase efficiency, and improve crop yield and quality. Smart agriculture robots can automate tasks such as planting, watering, fertilizing, and harvesting,reducing labour costs andincreasing efficiency.

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