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An IoT Based Multifunction Agribot

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***Abstract*: Agriculture is the science and art of cultivating Plants and livestock. More than 40 percent of the population in the world choose agriculture as the primary occupation. In recent years, increased interest has grown for development of the Autonomous vehicles like robots in agriculture. The proposed system aims at designing multipurpose autonomous agriculture Robotic vehicle which performs the tasks such as ploughing, seed sowing, watering the crops. This robotic vehicle is an agricultural machine of a considerable power and great soil clearing capacity. This multipurpose system gives an advance method to sow, plow, water the crops with minimum man power and labor making it an efficient vehicle. The machine will cultivate the farm by considering particular rows and specific column at fixed distance depending on crop. Moreover, the paper aims at making use of evolving technology i.e. IoT and Bluetooth which results in Smart agriculture. The whole process calculation, processing, monitoring is designed with motors & sensor interfaced with microcontroller.**

***Keywords*: IoT.**

1. Introduction

Agriculture Robot is a robot deployed for agricultural purposes. Internet of things (IoT) is widely used in connecting devices and collecting data information. The main area of application of robots in agriculture is at the harvesting stage. Picking robots, driverless tractor / sprayer, and sheep shearing robots are designed to replace human labor. In most cases, a lot of factors have to be considered (e.g., the size and color of the fruit to be picked) before the commencement of a task. Robots can be used for other horticultural tasks such as pruning, weeding, spraying and monitoring. Robots can also be used in livestock applications (livestock robotics) such as automatic milking, washing and castrating. Robots like these have many benefits for the agricultural industry, including a higher quality of fresh produce, lower production costs, and a smaller need for manual labor.

In field of agriculture, various operations for handling heavy material are performed. For example, in vegetable cropping, workers should handle heavy vegetables in the harvest season. Additionally, in-organic farming, which is fast gaining popularity workers should handle heavy compost bags in the fertilizing season. These operations are dull, repetitive, or require strength and skill for workers.

2. Literature review

In paper [1] They proposed a smart Agriculture System (AgriSys) that can analyze an environment and intervene to maintain its adequacy. The system had an easy-to-upgrade bank of inference rules to control the agricultural environment. AgriSys mainly looked at inputs, such as, temperature, humidity, and pH. The system also could deal with desert-specific challenges, such as, dust, infertile sandy soil, constant wind, very low humidity, and the extreme variations in diurnal and seasonal temperatures. The system also provided increased productivity, enhanced safety, instant interventions, and an advanced life style. The system made was ubiquitous as it enables distant access.

In paper [2] they proposed a system which is useful in monitoring the field data as well as controlling the field operations which provides the flexibility. They also introduced a smart agriculture using automation and IoT technologies. They have used smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, etc.

In paper [3] they have used microcontroller based monitoring system which was developed and which monitors different environmental parameters like soil moisture, relative humidity and atmospheric temperature. Different experiments were performed by them to examine sensors as well as wireless module. It was found that there was little variation in moisture sensor's reading when it was exposed to different temperature. Wireless module worked effectively when introduce to various obstacles. Actual implementation of their system on large scale was challenging task for them.

In paper [4] They explained an empirical model of how the Internet of things can be applied to the Indian agriculture. They initially proposed a model outline of how the IoT concept can be illustrated with respect to their Agricultural practices. Later in the construction of sensors they discussed about the various types of sensors and the type of sensors that will be required for their Agricultural purposes. They also discussed about the types of communication that they have for near and far nodes communication.

3. Block diagram

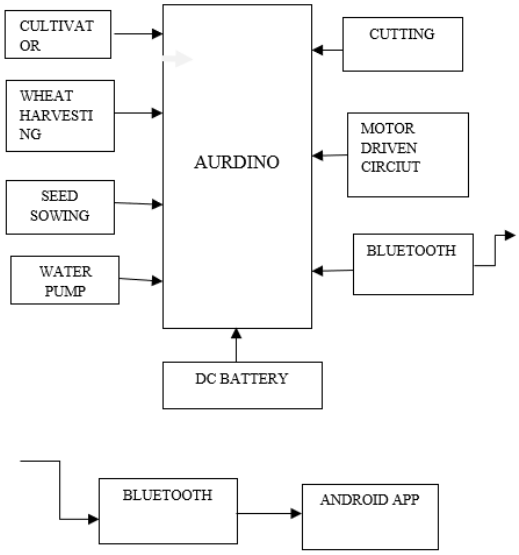

Fig. 1. IoT Based block representation of proposed system

4. Methodology

Microcontroller is the heart of the framework which is customized such that it will screen and control the parameters within the threshold values. We use a temperature sensor (DHT11). The DHT11 sensor measures the temperature and relative humidity which splits over a digital signal with temperature and humidity that is present in the farm.

The proposed system does the following:

- Plough the field.
- Sow the seeds based on fixed rows and columns.
- Detect the moisture content of soil.
- Based on moisture content waters the soil.

5. Conclusion

The "IoT based multifunction agriculture ROBOT" gives automation and guided environment in agriculture advances, the project is designed using structured modeling and is able to provide the desired results. The sensors and microcontroller are successfully interfaced and wireless communication is achieved between various nodes. This project is a complete solution to field activities and irrigation problems. Implementation of such a system in the field can definitely help to improve the yield of the crops and overall production.

It can be successfully implemented as a Real Time system with certain modifications. Science is discovering or creating major breakthrough in various fields, and hence technology keeps changing from time to time. Going further, most of the units can be fabricated as a single along with microcontroller thus making the system compact thereby making the existing system more effective. To make the system applicable for real time purposes components with greater range needs to be implemented.

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