Integrated Smart Agriculture Using NodeMCU

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Abstract: Smart Agriculture is an emerging concept. This allows the former to manage their crops with new age in farming. The area of implementation of IoT is vast and can be implemented in every field. This paper is about the implementation of IoT in Agriculture. The proposed model is a simple architecture of sensors that collect information and send it to the node MCU that sends the data to the mobile application and we can take action depending on the information. This project is to develop a system which minimizes the labor cost and also reduces the time for digging operation and seed sowing operation.

I. INTRODUCTION

In the Agriculture sector farmers were facing issues in monitoring the crops especially there was a major problem regarding irrigation. Due to over or under irrigation the crops may be damaged, which is not good for crops. As we all know that in agriculture, irrigation is the most important part of it.

Fig.1. Block Diagram

There are two important parameters to keep in mind while doing agriculture, (i) to collect the information about soil productiveness, (ii) and to measure the amount of moisture which is present in the soil. By manual method, there is a wastage of water and also there should be over or under irrigation which is not good for crops.
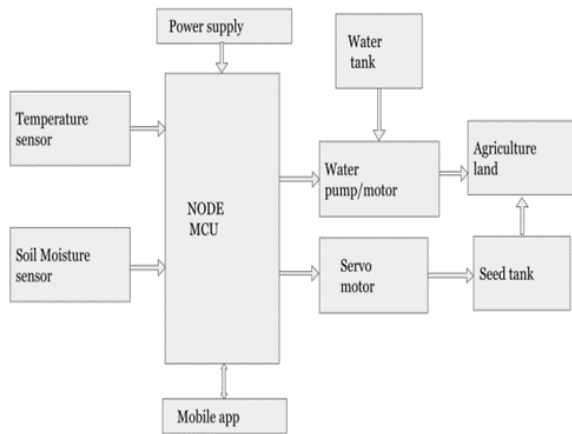
II. PROPOSED SMART AGRICULTURE SYSTEM

The proposed system was developed using nodeMCU ESP8266. And the proposed system has two phases which is,

- Monitoring the crops.
- Automated seed sowing.

Nearly 60% of the water used in irrigation is wasted, and also facing issues in water scarcity, we conserve the water by reducing the wastage of water in farming land. So, our proposed system plays an important role for water conservation by using our sensor like soil moisture, temperature and humidity sensor.

These sensors collect the data from the farming land and send the data to nodemcu through a wifi module. And it is impossible to distribute the seed uniformly by manual method so we introduced a seed sowing truck. With the help of a driver the truck moves and it is programmed to distribute the seed in a particular distance at a certain depth.
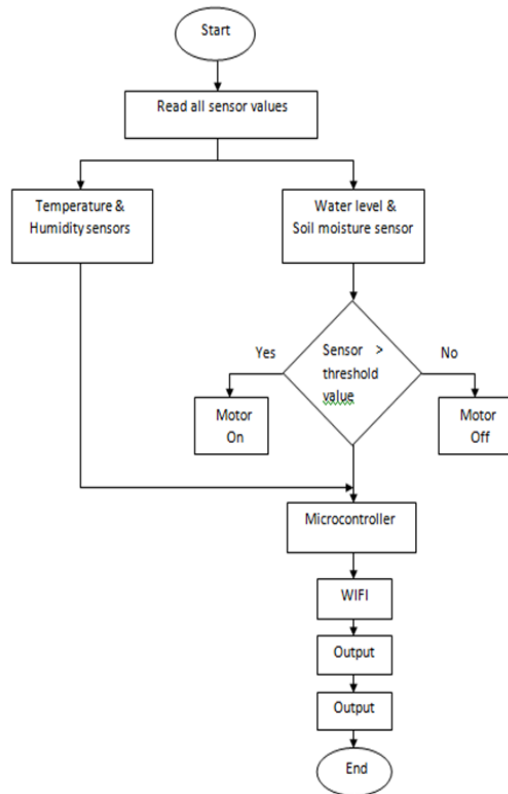
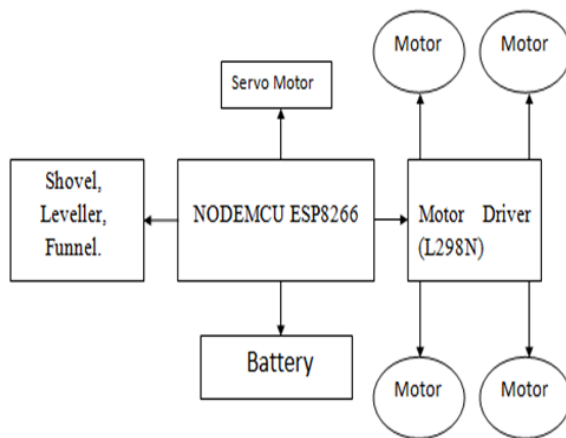Fig.2. Temperature & Humidity, Soil moisture

Fig.3. Seed Sowing Machine

III. HARDWARE COMPONENTS

- NodeMCU ESP8266
- Temperature and humidity sensor
- Soil moisture sensor
- Motor driver
- TT motors
- Battery
- Funnel, Digger & leveller.

This are the hardware components which is required for our project, and from the flow chart we can see the working system, the flow chart is given below.

Software And Language Requirements:

- Arduino IoT Cloud
- C language
- Embedded C

IV. RESULTS AND DISCUSSION

The above picture shows the implementation of smart agriculture, which is the sensor like soil moisture, temperature and humidity sensor are connected into the nodemcu ESP8266 from the data output it reaches the webpage with the help of the internet and from that we can control the water pump.

When the soil moistures threshold voltage is high the pump will turn ON, or if the threshold voltage of soil moisture is low the pump will turn OFF automatically. It's also done by manually, and the other side of our project is a seed sowing truck which also works under the nodemcu. It's the heart of our project.
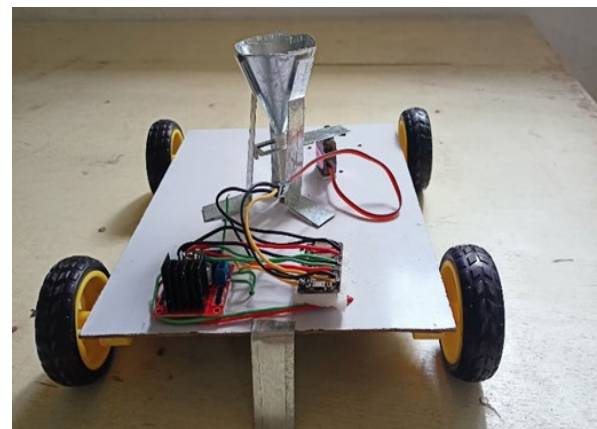
Here, an ultrasonic sensor is used for obstacle detection, and this sensor is to direct the machine in a pathway. And the motor driver is used to control the movement of the machine. These things are controlled by the heart of the machine which is a nodemcu. And this truck will help the farmers to sow the seed in a uniform manner and also helps to save the time and labour wage.
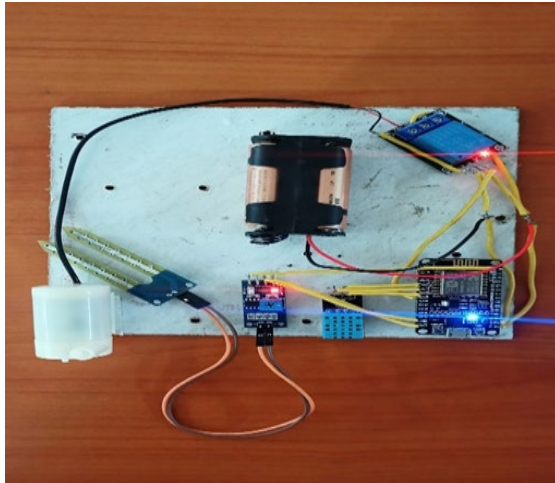
Fig.4. Temperature Humidity, Soil moisture

The proposed system produces ranking decisions that were relatively highly consistent with those of the human experts. This system will enable a more effective way to short list submitted candidate CVs from a large number of applicants providing a consistent and fair CV ranking policy.

The presented system automates the processes of requirements specification and applicant's ranking. This system can be used in many business sectors that may require expert candidates and also reduce workload of the human resource department.

V. CONCLUSION

We have designed a system which helps to make agriculture smarter. Our proposed system consists of a sensor which helps to monitor and another is seed sowing which helps to sow the seed uniformly. This will help the farmer to reduce the time and labor wages, also the manpower. And the proposed system is also cost efficient.

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