

Crop Automation System using Raspberry Pi and IOT

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ABSTRACT

Agriculture plays a vital role within the development of agricultural country like India, China. That can issues the concerning agriculture are always hindering the event of the country like India. The solution of this problem is sensible agriculture by modernizing the present the traditional methods of agriculture using IoT. Hence the proposed ideas to creating the agriculture smart using automation and IoT to detect the plant leaf diseases using various mobile applications. Internet of Things (IoT) enables the various applications like crop monitoring, selection of irrigation time in crop field, irrigation decision support and also uses the fertilizer; analysis and update the data in certain report in think speak. A Raspberry Pi 3 model B is used automatic irrigation system, which is proposed to modernization and improves production of the crop in the field. The crop developed on low quantity of water consumption, so we can focus the water available for plants at the concern level to avoid the most of the farmers in their fields. The management of water should be developed, therefore the system complexity be reduced. The proposed system developed the report which sent from the sensors and estimate the water level needed for the soil to concern on the time. The two sensors are getting the info of the humidity and temperature of the soil, duration the sunshine. The systems support the values and calculate the water quantity for irrigation is required for the crop. The main advantage of the system is implementing of Precision Agriculture (PA) with a cloud computing on think speak, which optimize the water scarcity on during summer. The Raspberry-Pi 3 B model and cloud based IoT system obtain the data from crop field. The system mainly focuses on the moisture and temperature changes in the soil.

Keywords-- IoT (internet of things), humidity sensor, moisture sensor, raspberry pi 3, cloud computing

INTRODUCTION

In agriculture new changes are enabling to

the farmers with wide selection of entries in the field. IoT technology which helps to collecting the different data's about the conditions like weather condition, soil moisture, and fertility of the soil condition. The best problems are faced by the world is water scarcity and agriculture being a demanding occupation of farmers, where consumes more water within the land. The restoring the water level as we required on field to minimizing the supply of water use.

LITERATURE SURVEY

In India, agriculture is backbone of our country, where 50% of the population is involved in farming in directly or indirectly. Different sorts of fruits, cereals and vegetables are produced here and exported to other countries like Singapore, Malaysia.

The farmer where provided the water to crops at different time and different quantity [1]. In the irrigation system observe the moisture and temperature, which avoids the human errors and check the moisture level through IoT.

On the real time results and the status of the sensors in the system were taken on the mobile phones [2]. The system where displays the temperature and humidity level of the field based on the soil, from the temperature and humidity level. The status of crop filed can also be monitored by IoT technologies. Two sensors are used to control the soil irrigation system on the trouble shooting can easily done.

EXISTING METHOD

Automatic plant irrigation system is regular monitoring without human. The main system uses a hardware, which is subjected to different environmental conditions employing a moisture sensor and humidity and faced problems in the field. Sensors are measuring the soil moisture and soil temperature components are developed and evaluated the scheduling irrigation on the crop field. This technique is majorly restricted the concerned water capacity. Proper scheduling of irrigation is very critical for efficient water to the crop filed, particularly under different conditions of water scarcity. Automation of some technique is not properly detected.

Disadvantages

- Automation identification is low.
- Power consumption More (>12V)
- Temperature is high

Things peak data sheet. It avoids the human errors. It will exhibit with the smart technology. The full hardware circuit is very low complexity level, showing the connections for the monitoring.

Advantages

- Easy irrigation
- Suitable for fertilizing system
- low consuming of water
- Under conditions of water scarcity

PROPOSED TECHNOLOGY

This proposed idea, helps the farmer for providing the water to the crops. On the analysis of the rate of moisture level and humidity level will be in the data report converted to excel sheet with

BLOCK DIAGRAM

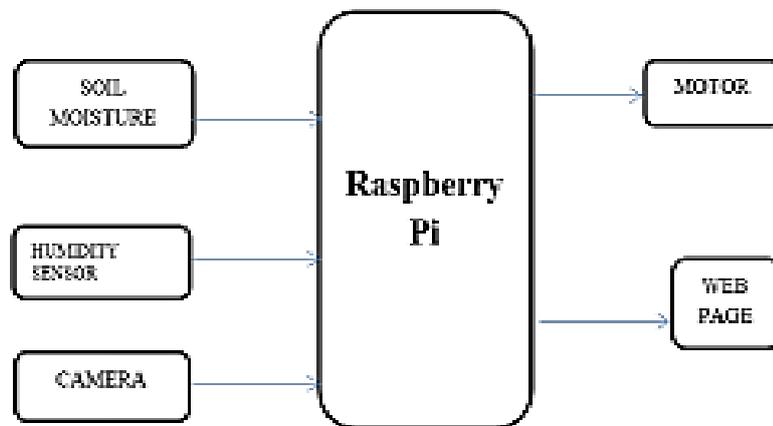


Figure 1: Block diagram.

HARDWARE DESCRIPTION

Raspberry Pi 3 - Model

The Raspberry Pi 3 is an upgrade ARMv7 multi core processor and Single core processor, Gigabytes of the RAM, it can be able to move from being a 'toy computer' to a real desktop-PC requirement. The Fig. 3 shows the circuit board of raspberry Pi 3 Model B. Fig. 3 shown big upgrade is a move from the BCM2836 (ARMv6) to BCM2837 (ARMv7). The Processor speed of the Raspberry increase two times of the time is equal to

multi core processors. By efficiently using the architecture of Raspberry the speed may increases from 4 to 7.5 times on quad core.

The Raspberry Pi 3 will be run the all other daughter boards at 99 % efficiency. Pi 3 model B is quad core 64-bit CPU and on- the board have a Wi-Fi and Bluetooth connections. There's no change in the USB and Ethernet ports on the Raspberry board. However, the upgraded of power system should mean the Pi 3 Model B can make use of power-hungry.

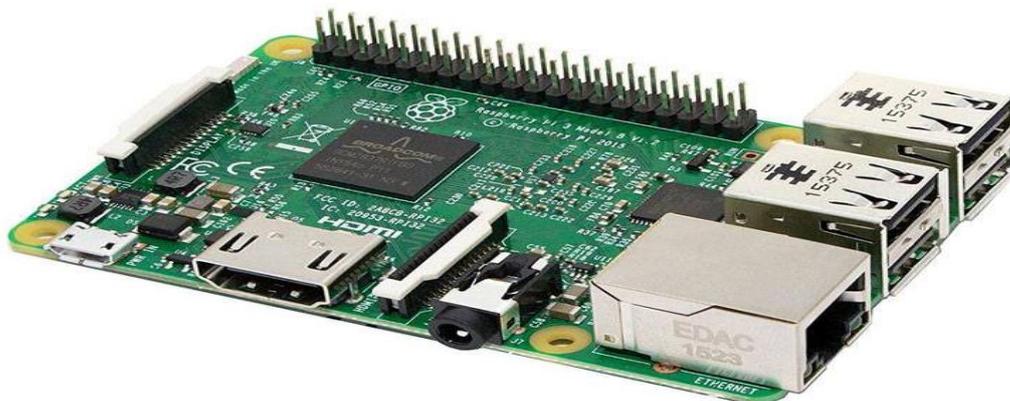


Figure 2: Raspberry pi 3 model B.

SOFTWARE USED

Python is widely used programming languages in the world. For the Raspberry pi 3 Model B also used the python programming. The main advantage of python programmer can be writing the low number of codes that can be used for programming languages. Example: JAVA or C++ at large programming modules.

Soil Moisture Sensor (OKY3442)

Soil moisture consist two probes that are inserted in to soil for testing the level. The variable resistance checks the parameter to spot the soil moisture. Crops always depends moisture available at root level. Water for the plants actual scheduled. Thus, lower the resistance measured across two embedded electrode and also easily calculated the soil moisture level.

Temperature Sensor (LM35)

The LM35 are integrated-circuit sensors, the output voltage is proportional to the Celsius. The LM35 doesn't require any external calibration to supply typical acquire of $\frac{1}{4}$ C temperatures and $\frac{3}{4}$ over a full of -55 to +150 temperature ranges acquire on per day. Moreover, they are inexpensive and quite easy to use for calculation.

Buzzer

A buzzer or beeper is used to give warning signal of the motor is turn on/ off. These provide the audio alarm either by mechanical or electrical. Various types of buzzers are presently available such as alarms.

DC Motor

Our robotics applications with this proposed close to 6V - 24V with a 20A of DC motor driver. DC motor driver is an ideal application, where the motor requires up to 20A of current during start timing. The motor can run at 6V - 24V.

WORKING

By implementing this proposed system there are various benefits for the government and the farmers in the crop field. Crop Irrigation system is automated with usage of web application or mobile application. Moisture and humidity sensors respectively already set on the source. The proposed idea displays in the Mobile and Computer. The Moisture and humidity level of the crop based on different input from the mode of setting in the programming. The two sensors are used to control the irrigation system on the field. The main trouble shoot can be easily rectified.

HARDWARE



Figure 3: Prototype kit.

Output

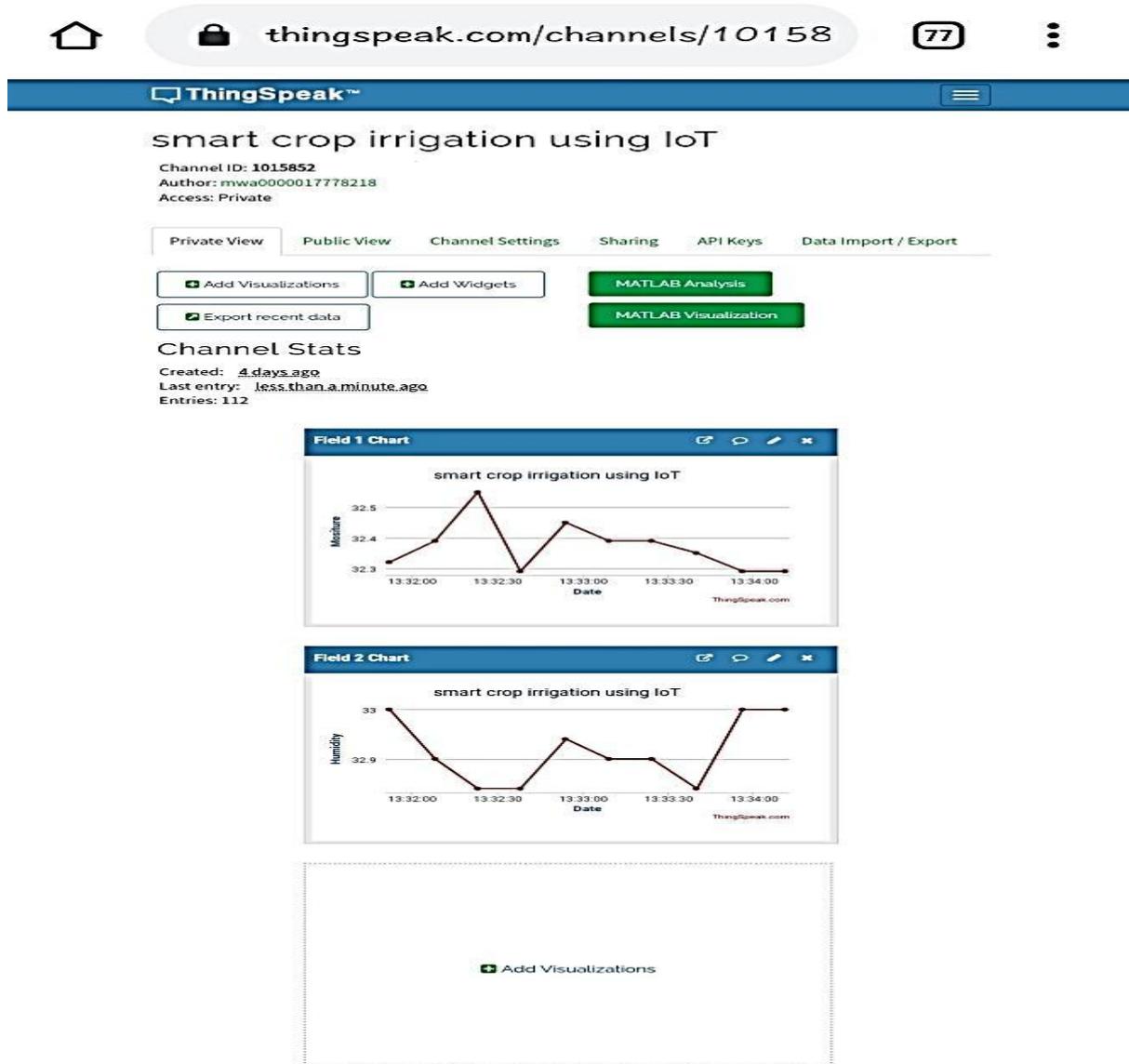


Figure 4: Output of Moisture and Humidity sensors.

CONCLUSION

The Precision Agriculture irrigation system is mainly developed with lower complex circuitry. The values vary depending upon the crop and soil. Two sensors are used efficiently in the soil which get the calibration of some information to the system which uploads in the think speak datasheet. It is mostly helpful for uneducated people on the water scarcity and storing the data's in database allowed for future research. Web and mobile application with a user-friendly interface make the system easy to understand without requiring any special skills. The automatic irrigation system, it can optimizes the usage of water by reducing the wastage and reduces the water for crops.

FUTURE SCOPE

It is very useful method in the agricultural field, can be look the modernization in the field of agriculture viva using the IoT and other processing unit. In future robotics device can be used to detect the leaf disease and same time put the fertilizer for certain diseases.

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