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IOT Based Irrigation System for Polyhouse

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ABSTRACT: The water harvesting is the backbone of family industry. As per India is censured lot of water gets wasted due to many reasons. So the requirement of water for farm can't get fulfil. Due to the improper maintenance and wrong water harvesting plan the irrigation of water is also the main problem. Day by day the rain percentage is also becomes less and so a very small amount of water is available for the farming. Most of water percentage also get wasted due lack of proper attention by farmer. So we are present a smart provision to deals with this problem that is nothing but "Automatic irrigation system". This system can also predict the rain changes. Actually we are sensing the water level by using the moisture sensor and accordingly control the motor. This unit can predict the change of rain by mince of humidity and temperature sensor. By this we can achieve more accurate result and save the most of water wastage.

This is very cost efficient unit as the cost of sensor is very economical. The heart of the system is controller (ATmega328).

KEYWORDS: IOT, Sensors, Microcontroller, Wi-Fi

I. INTRODUCTION

In late decades, there is a quick advancement in Smart Agricultural Systems. Show that agriculture has great importance worldwide. Indeed, in India for example, about 70 % of the people realize upon the vital sector of agriculture. In the past, irrigation systems used to be dependent on the mills to irrigate the farm by conventional methods without knowing the appropriate quantities of these crops. These old systems are a major cause of the waste of large quantities of water and thus destroy some crops because of the lack of adequate quantities of water. However, with the recent technological developments, there have been innovative systems for irrigation without the farmer interfering in the irrigation process.

The continuous increasing demand of food requires the rapid improvement in food production technology. In a country like India, where the economy is mainly based on agriculture and the climatic conditions are isotropic, still we are not able to make full use of agricultural resources. The main reason is the lack of rains & scarcity of land reservoir water.

Agriculture is developing from mechanized by simple methods in the 20th century to being automated in the 21st century. There is evolving in field operation in agriculture section, which requests a high accuracy in processes to optimize output and quality of the crops, in addition, limiting the production cost. To reach these prerequisites, automation systems must be introduced. It is important that producer considers on the early framework periods of mechanics and actualizes, so can achieve an elevated level of automation.

In this project, we try to solve the problems of irrigation such as errors caused by farmers and the consumption of large quantities of water. These errors affect trees as their fungi may also affect the overall stock of water. Expected objectives of this project are facilitated and simplify the irrigation system by installing and designing the whole automatic irrigation system, increase crop performance by reducing overwatering from saturated soil. It can prevent irrigation happening on the day at the wrong time, to switch engine ON or OFF by utilizing the irrigation system, the controller will work to switch the engine, so no need for employers, to reduce mistakes of operation due to employees as much as possible and to preserve water from waste.

II. PROBLEM STATEMENT

The economy of many countries depends on agriculture. To achieve the best quality from this research, it is important to focus on some vital characteristics such as the appropriate amount of electricity as well as water supply and a suitable schedule for irrigation of crops. Farmers are facing problems in meeting these standards, especially those living in poverty. This project looks into developing an automated irrigation system that could be controlled through mobile application. This system will work to minimize the number of workers in a crop field, control and save water and electricity, Increase agricultural production using small quantities of water, minimize manual intervention in

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watering operations with increasing watering speed and preserving plants from fungi. All these features make this research sustainable option to be considered to improve the agriculture and irrigation efficiency.

III. PROPOSED SYSTEM

The software application and the hardware implementation help the microcontroller read the data. From the Humidity sensor verify the data with the already stored data and take the next action. The system is totally designed module and embedded systems technology. The Controlling unit has an application program to allow the microcontroller interface with the Humidity sensor, Soil moisture sensor, the reader reads the data from the sensor, passes the data to the microcontroller and the controller verifies this data with the already existing data in the controller's memory and then

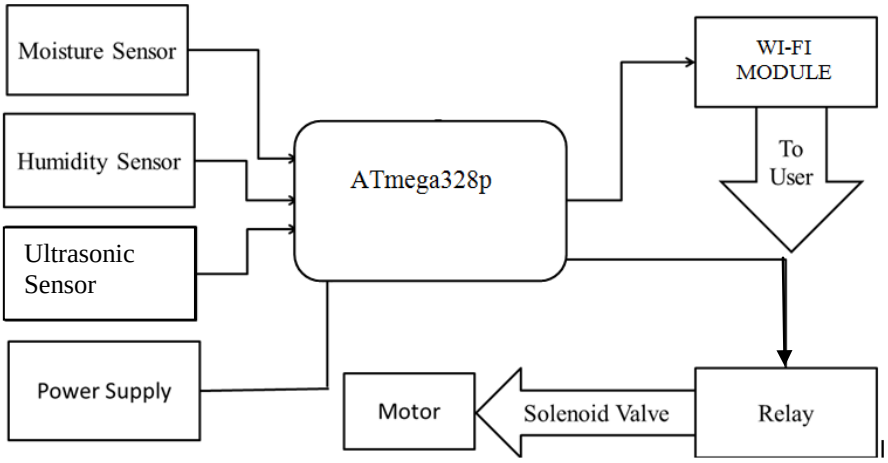

Fig 1. Block diagram of IOT based irrigation system for polyhouse

implements the commands directed by the controller section. The performance of the design is maintained by controlling unit. It also contains the Ultrasonic sensor to know the Water level of tank, LDR sensor for opening of the curtain in morning for limited sun rays for plants in polyhouse. When in morning the sunrays are of less intensity the curtain will open and as intensity of sunrays increases the curtain will close due to which our plants will remain safe. The user will get all this data of sensors on his mobile on Blynk app through wifi module and access to control the system by the Same App i.e. by Blynk app.

IV. WORKING OF SYSTEM

The Controlling unit has an application program to allow the microcontroller interface with the Humidity sensor , Soil moisture sensor, the reader reads the data from the sensor, passes the data to the microcontroller and the controller verifies this data with the already existing data in the controller's memory and then implements the commands directed by the controller section. The system has Ultrasonic sensor to know the water level of tank. If the water is less than the set value then the farmer get message of it. So, farmer can decide to turn the water supply on or off or for how much time the water should be supply. Farmer can turn on or off the motor through the mobile using blynk app. The System also contains the LDR for light detecting. The sensitivity of light is set through the Pot which is present on LDR module. When the sunrays are as per our set value then the curtain of polyhouse will be open and the rays will get to the plants which are in polyhouse. After the rays intensity increases the LDR detects it and send to controller and controller give a command to close the curtain through motor. This all data is send to user on blynk app through the Wi-Fi module. The user can access the control of system through blynk app.

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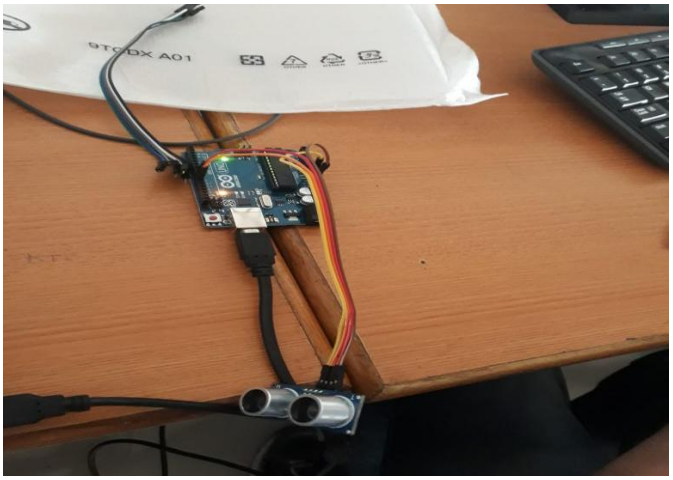

Fig 2. Ultrasonic Sensor

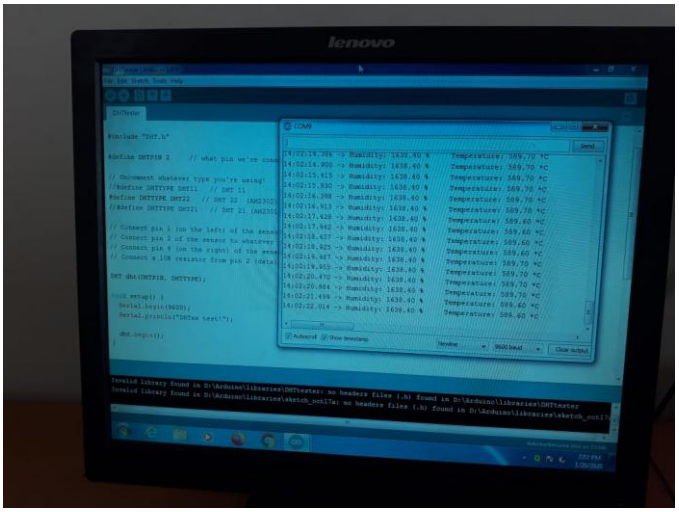

Fig. 3. Ultrasonic sensor simulation result

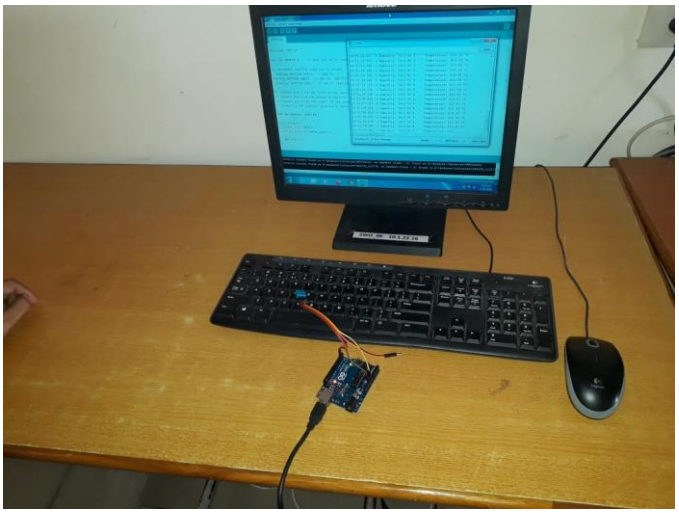

Fig 4. Humidity sensor simulation result

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V. HARDWARE USED

1. Ultrasonic Sensor :

Fig 5. Ultrasonic Sensor

The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver. Its operating voltage is 5v. It can measure upto 2cm to 80cm. Its operating frequency is 40Hz.

2. Humidity Sensor:

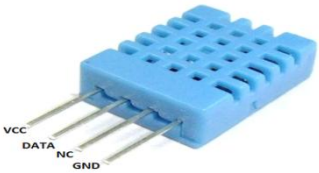

Fig 6. DHT 11 Sensor

It is basically a temperature and humidity measure sensing device. Its temperature measuring range is from -40 to +125 degrees Celsius with +-0.5 accuracy. This sensor measures moisture content and temperature. It consists of thermistor for temperature measurement and capacitive humidity sensor humidity measurement. The feature which gives importance then another sensor is that you can get data after two seconds. It consists of 4.7 K to 10 K resistor, which can be used as pull up from data pin to VCC. It has four pins with 0.1″ spacing.

3. Moisture Sensor:

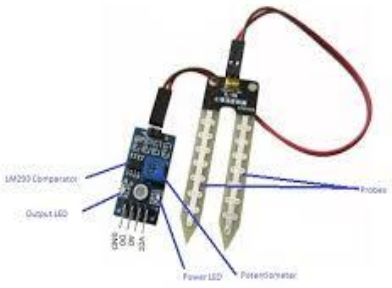

Fig 7. Moisture Sensor

FC-28 Soil Moisture Sensor is a simple breakout for measuring the moisture in soil and similar materials. The soil moisture sensor is pretty straight forward to use. The two large exposed pads function as probes for the sensor, together acting as a variable resistor. The more water that is in the soil means the better the conductivity between the pads will

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be and will result in a lower resistance, and a higher AOUT. Its operating voltage is 3.3V-5V and PCB size : 3.2cm x 1.4cm.

VI. CONCLUSION AND FUTURE WORK

We have successfully built a proper fully functioning working model of the automatic irrigation System. Our model takes soil parameters like moisture and weather parameters like humidity, temperature into consideration to make output more accurate. Our model has a user friendly interface which allows farmer to put eye on his farm from anywhere. We are utilizing features of IOT to process and monitor data. This model also has an actuator, water pump making it an automated irrigation system. And as for the future developments this system can be improved by developing this system for large acres.

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