IOT BASED SMART AGRICULTURE MONITORING SYSTEM

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Abstract - Climate changes and rainfall has been erratic over the past decade. Due to this in recent era, climate-smart methods called as smart agriculture is adopted by many Indian farmers. One of the important applications of IOT is Smart Agriculture. It reduces wastage of water, fertilizers and increases the crop yield. Smart agriculture is an automated and directed information technology implemented with the IOT (Internet of Things). IOT is developing rapidly and widely applied in all wireless environments. In this project, sensor technology and wireless networks integration of IOT technology has been studied and reviewed based on the actual situation of agricultural system. Temperature sensor, Moisture sensor and pH sensor which senses the temperature, moisture content and pH in the soil. A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is proposed. Major objective is to collect real time data of agriculture production environment that provides easy access for cultivation and increases the crop yield. By monitoring the field using the IP address Nutrient deficiency in the soil are detected and rectified.

Key Words: Agriculture, Environment, Temperature Sensor, cultivation.

1.INTRODUCTION

Agriculture is done in every country from ages. Agriculture is the science and art of cultivating plants. Agriculture was the key development in the rise of sedentary human civilization. Agriculture is done manually from ages. As the world is trending into new technologies and implementations it is a necessary goal to trend up with agriculture also. IOT plays a very important role in smart agriculture. IOT sensors are capable of providing information about agriculture fields. we have proposed an IOT and smart agriculture system using automation. This IOT based Agriculture monitoring system makes use of wireless sensor networks that collects data from different sensors deployed at various nodes and sends it through the wireless protocol. This smart agriculture using IOT system is powered by Arduino, it consists of Temperature sensor, Moisture sensor, water level sensor, DC motor and GPRS module. When the IOT based agriculture monitoring system starts it checks the water level, humidity and moisture level. It sends SMS alert on the phone about the levels. Sensors sense the level of water if it goes down, it automatically starts the water pump. If the temperature goes above the level, fan starts. This all is displayed on the LCD display module. This all is also seen in IOT where it shows information of Humidity, Moisture and water level with date and time, based on per minute. Temperature can be set on a particular level, it is based on the type crops cultivated. If we want to close the water forcefully on IOT there is button given from where water pump can be forcefully stopped.

2. LITERATURE THEORY

1. A Sustainable Agriculture System Using IOT

Ramya Venkatesan and Anandhi Tamilvanan explains about a Sustainable Agriculture System Using IOT. This work developed a system a system which will automatically monitor the agriculture fields. As well as performing live video streaming for monitoring the agriculture field from the server itself, through raspberry pi camera. The agriculture fields are monitored for environmental temperature, humidity at soil moisture sensor. IOT and wireless sensor node helps to decrease the efforts, for observing the agricultural fields. IOT also avoids the loss of agriculture parameters database and save in the storage device or cloud for long life.

2. A Model for Smart agriculture using IOT

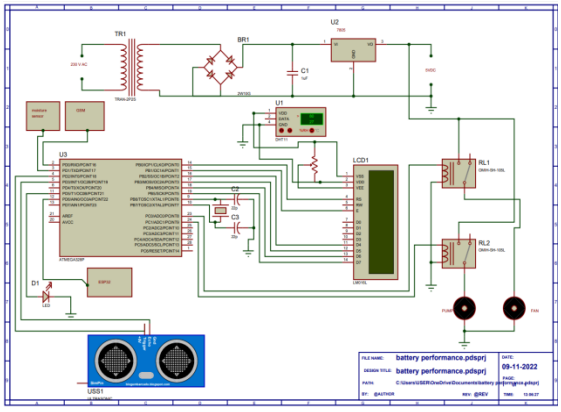
Prof K.A.Patil, N.R.Kale proposes about a model for Smart Agriculture using IOT. Climate changes and rainfall

has been erratic over decade. Due to this, climate-smart methods called smart agriculture is adopted by many farmers. In the existing system, village farmers may have planted the same crop for centuries, but over period, weather patterns and soil conditions and epidemics of pests and disease have been changed. By using the proposed system approach, which senses the local agricultural parameters, identify the location of sensor, transfer the data crop fields and crop monitoring. The Received updated information allows the farmers to cope with and even benefit from these changes.

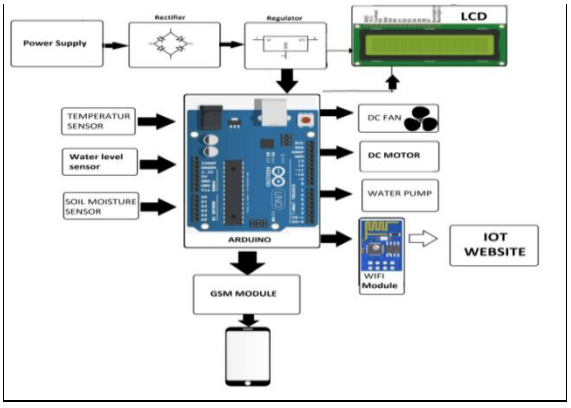
3. Smart Agriculture System using IOT Technology

Muthunoori Naresh, P.Muna swamy explains about the Smart Agriculture System using IOT Technology. In the existing system agriculturists used to figure the ripeness of soil and presumptions to develop certain kind of products. They didn't think about the level of water, dampness and climatic conditions. The profitability relies totally upon the last phase of the harvest in which they depend. In this proposed system, they improved the efficiency of the product which appraises the nature of the harvest. To go up against the challenges in the field, IOT is used in providing accuracy and conservative cultivation.

3. CIRCUIT DIAGRAM



3.1. BLOCK DIAGRAM



4. WORKING

4.1. Arduino board

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro controller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduno, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

4.2. MICRO-CONTROLLER UNIT

The heart of the whole project is the Micro-controller unit. For this project the Arduino Uno Micro-controller was used. It is a low power general purpose microcontroller with good processing speed, small physical dimension, that is durable and cheap.

4.3. POWER SUPPLY DESIGN

The LM78XX series of three-terminal positive regulators is available in the TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut-down, and safe operating area protection. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components for adjustable voltages and currents.

4.4. RELAY

Electromagnetic relays are those relay which operates on the principle of electromagnetic attraction. It is a type of a

magnetic switch which uses the magnet for creating a magnetic field. The magnetic field then uses for opening and closing the switch and for performing the mechanical operation. Relay works on the principle of electromagnetic induction. When the electromagnet is applied with some current it induces a magnetic field around it.Above image shows working of the relay. A switch is used to apply DC current to the load. In the relay Copper coil and the iron core acts as electromagnet. When the coil is applied with DC current it starts attracting the contact as shown. This is called energizing of relay. When the supply is removed it retrieves back to the original position. This is called De energizing of relay. There are also such relays, whose contacts are initially closed and opened when there is supply i.e. exactly to opposite to the above shown relay. Solid state relays will have sensing element to sense the input voltage and switches the output using Opto-coupling.

4.5. TOGLE SWITCH

The toggle switch is a type of electrical switch that is identified by the presence of handle or lever that makes it possible to control the flow of electric current/signal from a power supply to a device or within a device. It is a hinged switch that can assume either of two positions i.e. ON or OFF. It is used to switch between two conditions in a circuit. Toggle Switches employ rocker-type contact mechanism. Being easy in operation, toggle switch can be used in a number of different applications, both in commercial and in house hold appliances. It is housed in an anti- tracking molded case for dust free performance, thus last for many years before being replaced

5. ADVANTAGES

1. Smart system

2. Easy to operate

3. Cost effective
4. Not require man power to monitoring continuously

6. METHODOLOGY

Block Diagram

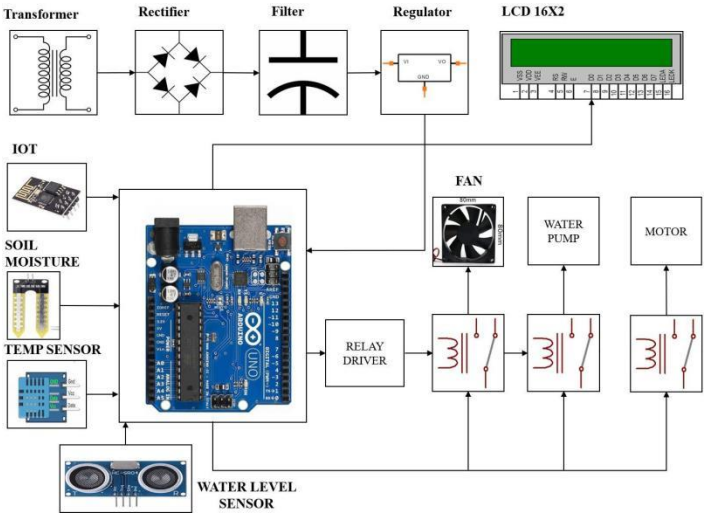


Fig :Block Diagram Of Iot Based Smart Agriculture monitoring System.

7. CONCLUSIONS

IOT will help to enhance smart farming. Using IoT the system can predict the soil moisture level and humidity so that the irrigation system can be monitored and controlled. IOT works in different domains of farming to improve time efficiency, water management, crop monitoring, soil management and control of insecticides and pesticides. This system also minimizes human efforts, simplifies techniques of farming and helps to gain smart farming. Besides the advantages provided by this system, smart farming can also help to grow the market for farmer with single touch and minimum effort.

8.RESULTS AND ANALYSIS

The main aim of this project is to implement the modern technology in required fields like agriculture. Using IOT technology in agriculture, this system makes agriculture monitoring easy. The benefits as mentioned like water saving and labour saving are required the maximum in current agricultural state of affairs. Consequently, using the sensor network in fields of agriculture makes clever irrigation. The information from IOT is sent to the client using cloud. Consequently, any changes inside the crop may be identified effortlessly and early analysis is achieved as such.

9.REFERENCES

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