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Agricultural Crop Monitoring and Controlling using IoT

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Abstract- To get the better crop production in agriculture business the farmer needs regular status of crop. This can be achieved by using Internet of Things (IoT) which collects information about soil moisture, temperature, light intensity etc., from integration of wireless sensors. The IoT technology provides control actions by using micro controllers based on this information through smart phones or laptops when farmers get alerts in their phones. The collected data can be stored and viewed as results based on graphical charts. This work tries to digitalize farming and agricultural activities so farmer can face the challenges by accurately predicting the crop growth. This system will definitely accelerate the agriculture business by keep updating the current conditions of land with the help of IoT at anywhere in the world.

Index terms: Internet of things, monitoring and controlling and sensors.

I. INTRODUCTION

IoT helps to connect humans and things for passing the information. The objective of IoT is draw out a gigantic system by joining diverse composes associated gadgets. IoT targets three perspectives Correspondence, mechanization and cost sparing in a framework. IoT engages individuals to complete routine exercises utilizing web, in this process time and cost can be saved. IoT empowers the articles to be detected and additionally controlled remotely crosswise over existing system. IoT in natural checking thinks about the water level, cultivating to upgrade the efficiency of the homestead. The fundamental point of the venture is to structure agribusiness crop monitoring and controlling using IoT.

In this process, information about soil moisture, temperature, light intensity is collected for monitoring agriculture crop by using integration of sensors. And based on this information controlling actions are taken by using IoT technology through smart phones or laptops when we get alerts in smart phones[1]. The collected information can be stored and viewed as results based on graphical charts. A smart phone helps farmer to know the ongoing situations of the yield by using IoT at anywhere in the world. IoT technology can reduce the cost and enhance the productivity of traditional farming.

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II. EXISTING METHOD AND PROPOSED METHOD

In present Energy management system there are so many draw backs they are,

a. Inflexibility
b. Labor
c. High Power Consumption

These are the fundamental variables affecting the rural product monitoring and upkeep[2]. To defeat this downside here an innovation proposed, and the block diagram shown in below Fig.1.

The block diagram predominantly comprises of three sensors they are Soil moisture sensor, LM35 temperature sensor and LDR sensor. The fundamental point of this task is Agriculture crop monitoring and controlling using IoT. Out of three sensors the moisture sensor measures the content of water in the soil, this information will be passed to cloud through Wifi module and this information can be seen in IoT and dependent on the sensor data we can take control activities.

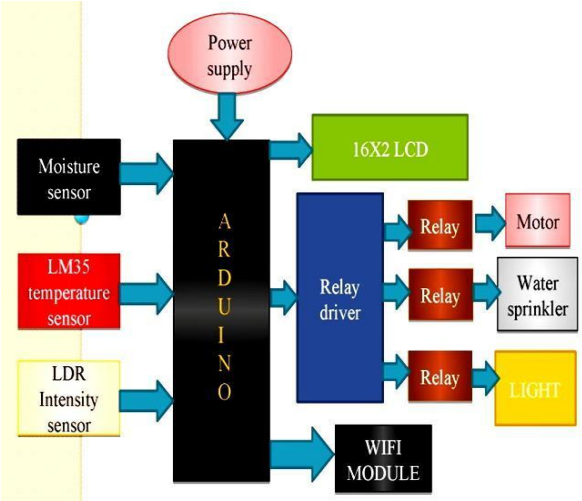

Fig. 1: Block Diagram

In the event that there is no water content in the soil, switch on the Engine through IOT consequently the water will streams to the land generally the engine will be in off condition. The LM35 temperature sensor estimates the temperature of question. In the event that temperature is high, the water sprinkler will on i.e., it keeps the harvest from high temperature generally the water sprinkler will be in off condition.

At last the LDR sensor estimates the light power. It takes a shot at the guideline of photograph conductivity at whatever point the presence of light on the LDR the obstruction will be diminished and conductivity will expanded. In dull condition opposition is high and conductivity is less. In evening no one is there but we can switch on the globule, on the grounds that by utilizing light vitality in evening, it will supportive for quick development of the crop.The whole sensors data will monitor on both LCD and IoT.

III. SOFTWARE AND HARDWARE REQUIREMENTS

A. Software Details:

Keil compiler:

It gives an expansive scope of improvement devices like ANSI C compiler, large scale constructing agents, debuggers and test systems, linkers, IDE, library supervisors, ongoing working frameworks and assessment sheets for Intel 8051, Intel MCS-251, ARM Families.

Embedded C: C programming is arranged by the dialect augmentations and the shared characteristic issues that exist between c expansions are addressed by C guidelines for installed frame works. Colourful highlights like settled point number juggling, numerous memory banks and I/O activities are produced by implanted C programming non standard augmentations.

B. Hardware Details:

Arduino UNO:

The Arduino UNO is a naturally available as open-source microcontroller board dependant on the ATmega 328P microcontroller and it was created by Arduino.cc. The board is furnished by computerized and simple info/yield (I/O) sticks that might be interfaced to different extension sheets (shields) and different circuits. The board consists of 14 advanced pins and 6 Simple pins. It can be programmable with the Arduino IDE (Incorporated Advancement Condition) by means of a sort B USB link.

Fig.2. Arduino UNO board

Soil Moisture Sensor: The soil moisture sensor measures the volumetric substance of water that is the presence of water content in soil and gives us the dampness level.

The soil moisture sensor will be available for two tests in the presence of moisture in soil can be detected. Both the tests are used to enable the flow of electrons that go through the soil later the dampness esteem can be identified by opposition incentive.

Fig. 3: Soil Moisture Sensor

LM35 Temperature Sensor: The LM35 is a sensor that incorporated in circuit to know the value of temperature (in °C). It can quantify temperature more precisely than the sensor thermistor. The sensor hardware should not allow for oxidation and it should be fixed. The LM35 generates a higher yield voltage than the yield voltage produced by thermocouples and it not stated that yield voltage can be increased.

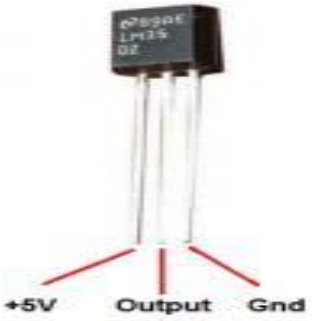

Fig. 4: LM35 Temperature Sensor

LDR Sensor: It is additionally called photograph resistor is in which resistivity is an element that causes electromagnetic radiation. Consequently, they are light delicate gadgets. They are additionally called as photograph conductors, photograph conductive cells or just photocells.

Fig.5: LDR

LCD Display: It acts like a "valve" that passes the light or stops the passage of light. The synthetic properties of each LCC (Liquid Crystal Cell) can be modified by focusing electric field so that the picture in LCD is shaped at last the goal is to change the assimilation properties of pixel's light.

These LCD's sets the backdrop illumination in to the screen yield which is required for the controller. Through the end yield might be in shading, the LCC's are monochrome, and later shading can be added through the separating procedure.

Fig. 6: LCD Display

Wi-fi Module:

Espressif's ESP8266EX conveys exceptionally incorporated Wi-Fi is available in SoC to meet client requirements for productive power utilization, smaller plan and dependable execution in the digital world. Wi-Fi has independent organizing abilities due to this ESP8266EX is used as independent application or works under host MCU.

Fig. 7: Wi-fi Module

As it contains the whole and self-contained networking capabilities, ESP8266EX can be used as a standalone application or works under host MCU.

Relay: It is electrically worked switch, so working standards are also prepared for the purpose like strong state transfers. Transfers can be used for controlling a circuit with a low control flag or some circuits can controlled by one flag. The primary transfers were used as intensifiers for long separation of broadcast circuits. They can transfer the flag rolling in from one circuit and re transmitted it on another circuit. These transfers were used mainly in phone trades and early PC s to perform coherent activities.

Fig. 8: The Relay

Relay Driver (ULN2003):

With the end goal to drive the hand-off, we utilize transistor and just less power can be utilized to get the hand-off driven. The hand-off driver ULN2003 IC having 7 open Darlington sets with basic producers and it is flow Darlington cluster IC, a high voltage and ebb .Darlington pair has two bipolar transistors. This IC consists of group of ULN200x ICs and different sorts of this family interface for differentiating rationale families. This ULN2003 IC is used for 5V TTL and CMOS rationale gadgets. These can be used for driving extensive variety of burdens line drivers, show drivers, etc., and also used as hand-off drivers.

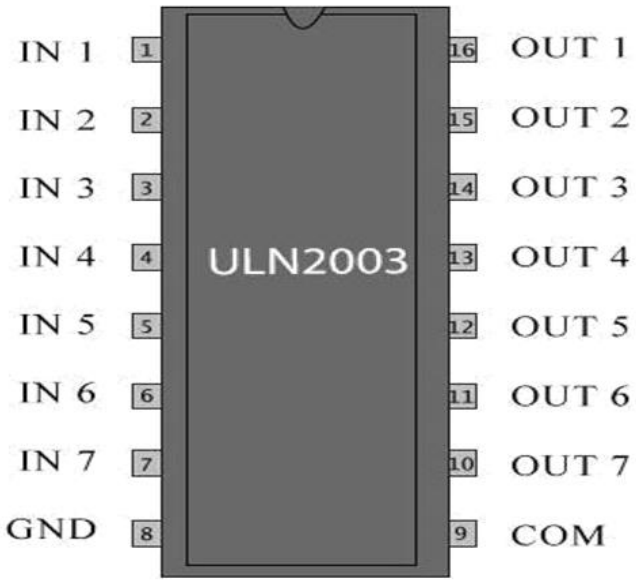

Fig. 9: Pin Diagram of Relay Driver

IV. RESULTS

The networks which uses wireless sensors are used for knowing the current status of the farming so that the yield of the crop and quality can be improved. Different Sensors can be placed to monitor several parameters of environment like temperature, moisture level, temperature, intensity etc. The Outcome Examination is given underneath. This gives the yield's temperature, Light and Dampness investigation. With this venture we can enhance the yield of products successfully.

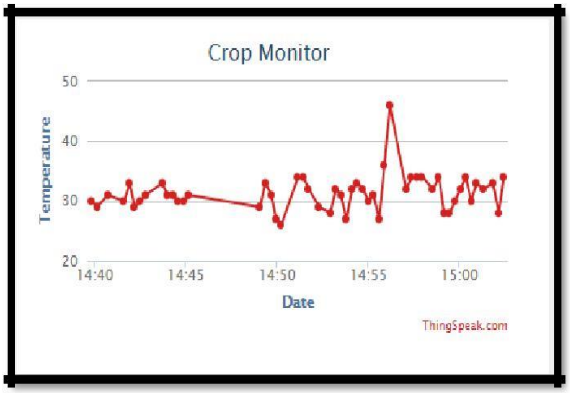

Fig. 9: Shows Temperature analysis of CropMonitor.

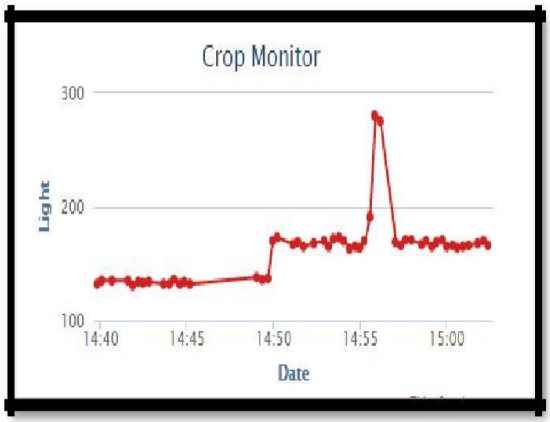

Fig. 10: Shows Light analysis of Crop Monitor

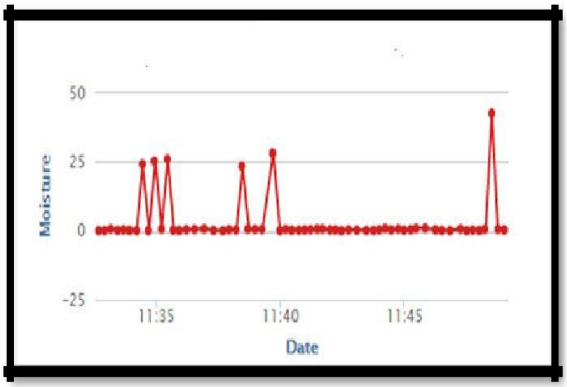

Fig.11: Shows Moisture analysis of Crop Monitor.

V .CONCLUSION

In future this system can be developed for large acres of land by using Raspberry Pi instead of Arduino board. This system can be upgraded to discover the standard of the soil so that for better yield the suited crop can be selected to that particular soil. If this system is implemented then definitely the overall production and crop yield can be enhanced.

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