

MICROCONTROLLER BASED CROP FIELD MONITORING AND AUTOMATION IRRIGATION SYSTEM

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Abstract: Agriculture plays a vital role in the development of agricultural country but lot of issues concerning agriculture have been always create difficulties for the development of the country .The main aim of this paper is to crop development at low quantity of water consumption, in order to focus on water available to the plants at the required time. For that purpose most of the farmers waste lot time in the fields. And efficient management of water should be developed on the system circuit complexity .The system is developed based on information send from the sensors and estimate the quantity of water needed. The major advantage of the system is implementing precision agriculture (PA) with the cloud computing, that will optimize the usage of water fertilizers and maximizing the yield of the crops and also will helping analyzing weather condition of the field, damages due to insects.

Keywords: IOT, Agriculture, Automation, Real time monitoring.

I. INTRODUCTION

India's major source of income from agriculture sector and 70% of farmers and general people depend on the agriculture. The Real-time Automation of agricultural environment for the social modernization of India agricultural system attracts great attention these days. Automation irrigation system observes the temperature variations of around the crop area that's gives a precise time of operation the motor turn ON and OFF. So automatic human avoid the human error and check soil moisture level the internet of things (IOT) simplifies our work for collecting data in various forms from various devices a simple platform is required to assure that the data formats are eligible and that data are readily analyzable.

II. BACKGROUND

In exiting system, the form house is controlled with only sensor and microcontroller sensors used in the systems are,

- (i) Temperature sensor,
- (ii) Humidity sensor.

The temperature sensor is used to detect the form house temperature and drive the water motor.

The humidity sensor is used to detect soil moisture content (i.e.) water contents of the soil and drive the water motor.

Disadvantages

The main drawback of existing system is:

- It does not monitor the type of disease on the crop field.
- It does not fail to monitor the birds and animals entered in to the crop field.

III. PROPOSED SYSTEM

In proposed system the form house is maintained automatically with the help of microcontroller. In the system we are using the following sensor namely temperature sensor, ultrasonic sensor, color sensor, NPK sensor. The temperature sensor detects temperature of form house and also drives the water motor automatically. The ultrasonic sensor is used to detect the animals entered in to the form house and also create alarm. The color sensor is used to detect the insects damage in the leaf turn on chemical motor pump for the pesticide of particular plant .the NPK sensor is used to measure

and detect the presence of Nitrogen(N) , phosphorus(p) and potassium(k) of the soil.

Advantage

Water irrigation automatically done so that water consumption is less. The insects' damage on the leaf is detected automatically. The total amount spent to the farm house is reduced considerably.

IV. BLOCK DIAGRAM

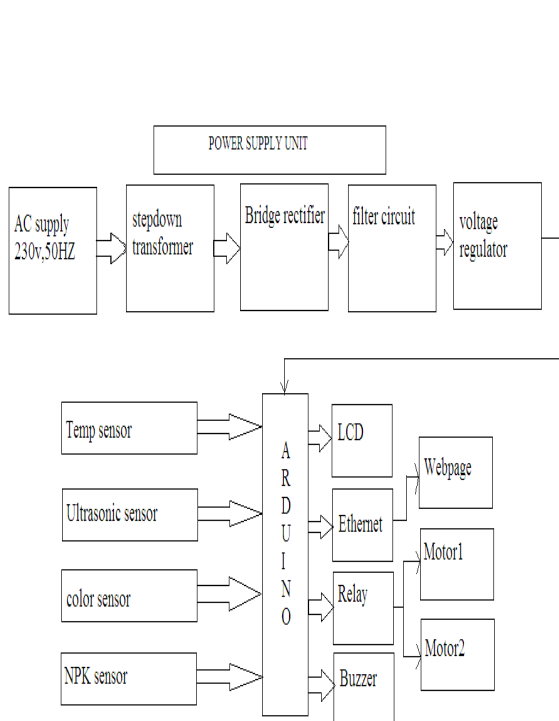


Fig 1: Block diagram

V. HARDWARE REQUIREMENTS

- Arduino UNO
- Ultrasonic sensor
- Color sensor
- Temperature sensor
- NPK sensor
- LCD
- Relay
- IOT module

- Motor
- Power supply unit
- Software requirements:
- Arduino IDE
- Embedded C

VI. CIRCUIT DIAGRAM:

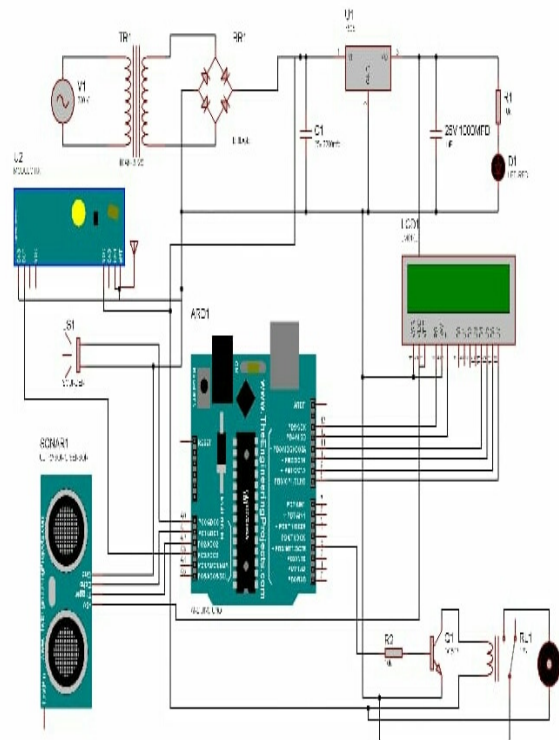


Fig2: Circuit diagram

Need of microcontroller

A microcontroller is a functional computer system on-a-chip. It contains a processor core, memory, and programmable input/output peripherals. Microcontrollers include an integrated CPU, memory and peripherals' capable of input and output.

Arduino pin diagram

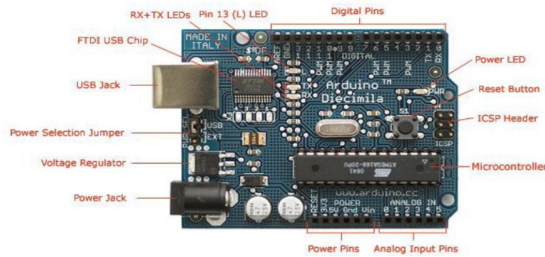


Fig 3: Arduino pin diagram

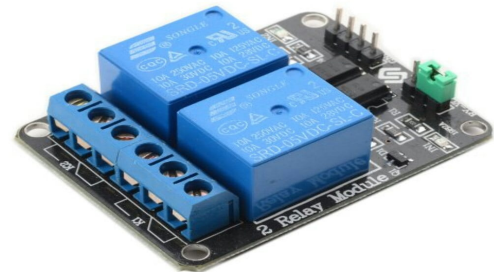


Fig 5: Relay

Arduino

Arduino UNO is a microcontroller board based on the ATmega328p. It has 14 digital input/output pins, 6 analog input, a 16 MHz quartz crystal, a USB connection, a power jack, and ICSP header and a reset button. It contains everything needed to support the microcontroller, simply connected to a computer with a USB cable or power it with a AC to DC adapter or battery to get started.

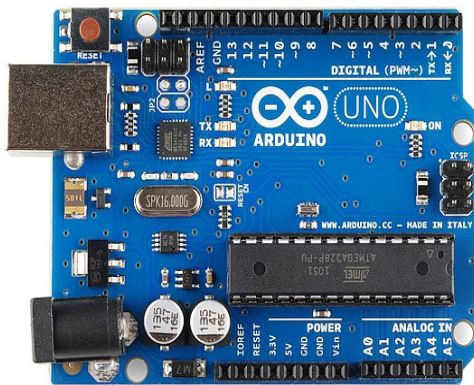


Fig 4: Arduino

Temperature sensor (LM35)

This is a temperature sensor circuit that uses an LM35, an IC that converts the ambient temperature in to an equivalent output voltage. The voltage output of an LM35 increases by approximately 10 mV for every 1 degree kelvin of rise in temperature. Note that 1 degree kelvin is equal to 1 degree Celsius.

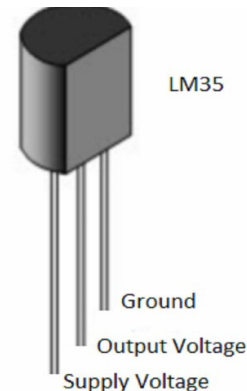


Fig 6: Temperature sensor

Relay

A relay is an electrical switch that opens and closes under control of another electric circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. Because a relay is able to control an output circuit having higher power, than the input circuit, it can be considered, in a board sense, to be a form of electrical amplifier. It is also called found a contact or “make” contact.

Ultrasonic sensor



Fig 7:Ultrasonic sensor

This device detects the distance to an object and shows the result in centimeters. This device is activated by a trigger mechanism , pressing the trigger for one time will give us the distance to an object if there was no error like poor aiming .the distance to an object is displayed using a digital display with high intensity in order to be seen in any lighting conditions.

Colour sensor

Colour sensor detects the color of the surface usually in the RGB scale .color is the result of interaction between a light source , and an observer. The TCS34725 which has RGB and clear light sensing elements. An IR blocking filter , integrated on-chip and localized to the color sensing photodiodes, minimizes the IR spectral component of the incoming light and allows color measurement to be made accurately.



Fig 8:colour sensor

NPK sensor

A key in soil testing for formulated fertilization is to determin the amount of soil nutrients , followed by recommendation of nutrient needs and site – specific fertilization. Conventional soil NPK testing method have been generally performed by three steps : soil sampling ,sample pretreatment and chemical analysis.



Fig.9:NPK sensor

IOT Module

An IOT module is a small electronic device embedded in objects, machines and things that connect to wireless networks and sends and receives data. Sometimes referred to as a “ratio chip”, the IOT module contains the same technology and data circuits found in mobile phones but without features like a display



Fig 10: IOT Module

Buzzer



Fig 11: Buzzer

A Buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical or piezoelectric typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or key stroke. Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices.

Active buzzer 5v rated power can be directly connected to a continuous sound, this section dedicated sensor expansion module and the board in combination, can complete a simple circuit design, to "Plug and play".

Power supply

The operation of power supply circuits built using filters, rectifiers, and then voltage regulators. Starting with and AC voltage, a steady DC voltage is obtained by rectifying the AC voltage. Then filtering to a DC level, and finally, regulating to obtain a desired fixed DC voltage. The regulation is a usually obtained from an IC voltage regulator unit, which takes a DC voltage and provides a somewhat lower DC voltage, which remains the same event if the input DC voltage varies, or the output load connected to the DC voltage changes.

Liquid Crystal Display (LCD)



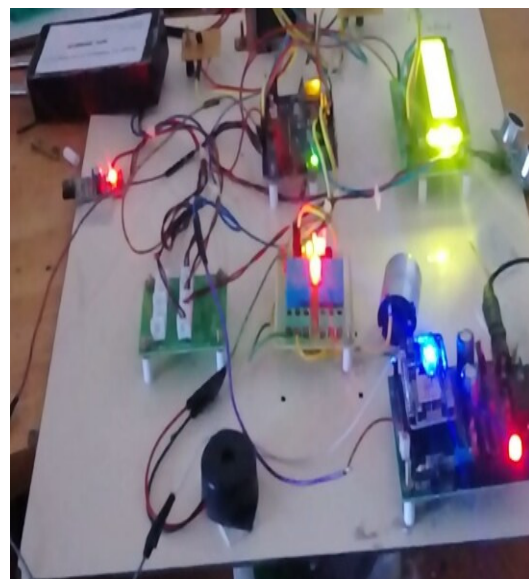
Fig 12: LCD

Most common LCDs connected to the microcontrollers are 16x2 and 20x2 display. This means 16 characters per line by 2 line and 20 characters per line by 2 line ,respectively. The standard is referred to as HD44780U , wich refers to the controller chip which receives data from an external source and communication directly with the LCD.

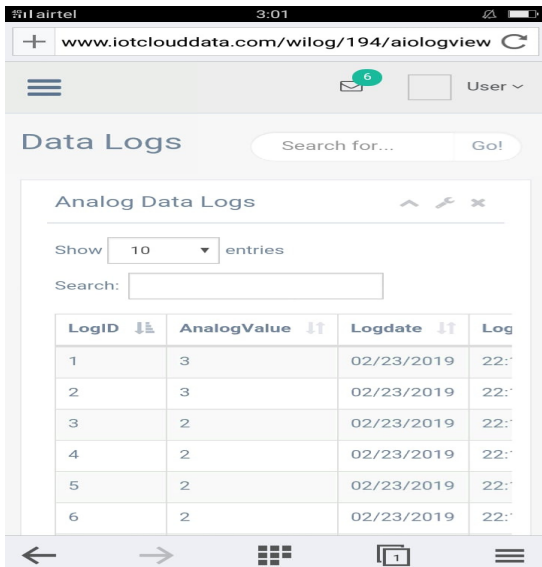
VII. CONCLUSION

It's improve the paper of agriculture and reduce the manual power and all status by field is given to user . if the any problems in the field are indicate received suddenly to the user.this modern agriculture are attract in the today youngsters."it's the upcoming future".

VIII. RESULT



Output



LogID	AnalogValue	Logdate	Log
1	3	02/23/2019	22:00
2	3	02/23/2019	22:00
3	2	02/23/2019	22:00
4	2	02/23/2019	22:00
5	2	02/23/2019	22:00
6	2	02/23/2019	22:00

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