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Experimental Study on IOT Based Smart Irrigation

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Abstract: ***India is mainly an agricultural country. Agriculture is the most important occupation for the most of the Indian families. It plays vital role in the development of agricultural country. In India, agriculture contributes about16% of total GDP and 10% of total exports. Water is main resource for Agriculture. Irrigation is one method to supply water but in some cases there will be lot of water wastage. So, in this regard to save water and time we have proposed project titled smart irrigation system using IoT. In this proposed system we are using various sensors like temperature, humidity, soil moisture sensors which senses the various parameters of the soil and based on soil moisture value land gets automatically irrigated by ON/OFF of the motor. These sensed parameters and motor status will be displayed on user android application.***
Keywords: Agriculture, IOT, Soil sensor

I. INTRODUCTION

With India's population crossing 1.3 billion in 2016, a balance between the optimum population growth and a healthy of nation is far to be achieved. The rising population, there is a need for increased agricultural production. Irrigated agriculture has been an extremely important source increased agricultural production. Now a days people wants to observe their work from anywhere on their digital devices such as Smartphone and tablet or laptop. Several things were made easy by using Internet of Thing (IoT). This seminar on "IOT base smart irrigation system" is for to create an IOT base automated irrigation mechanism which turns the pumping motor ON and OFF on detecting the moisture content and sufficient water level and pass data through IOT platform. It overcome labour intensive work and also controls water management system.

II. MATERIALS REQUIRED

A. System Component: Hardware & Software

1) Arduino

It is an open-source prototyping platform based on easy-to-use hardware and software:
Hardware :- Arduino –



Fig: 1

Arduino board designs use a variety of microprocessors and controllers Arduino boards are able:

a) To read inputs - light on a sensor.
b) To twitter message - and turn it into an output - activating a motor.
c) Turning on an LED.

Software :-Arduino (IDE= Integrated Development Environment)

- A toolbar with buttons for common functions.
- A series of menus.
- It connects to the Arduino hardware to upload programs and communicate with them.
- It runs on Mac, Windows, and Linux.

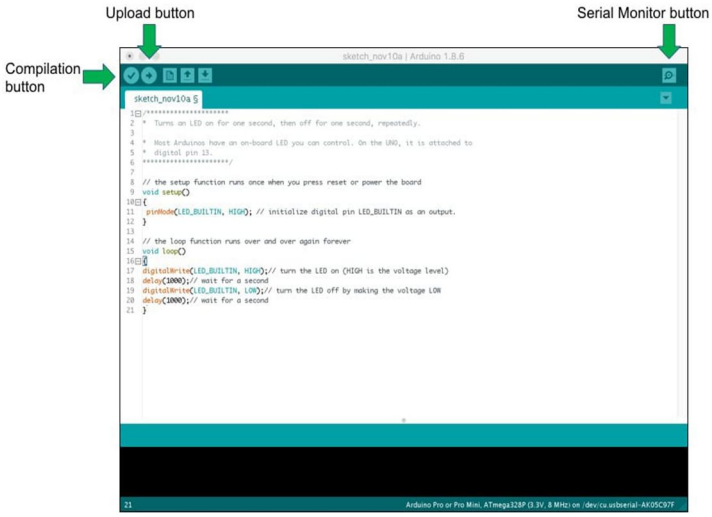


Fig: 2

Writing Sketches: Programs written using Arduino Software (IDE) are called sketches
Upload: Compiles your code and uploads it to the configured board
New: Creates a new sketch
Save: Saves your sketch
Serial Monitor: File, Edit, Sketch

2) Soil Moisture

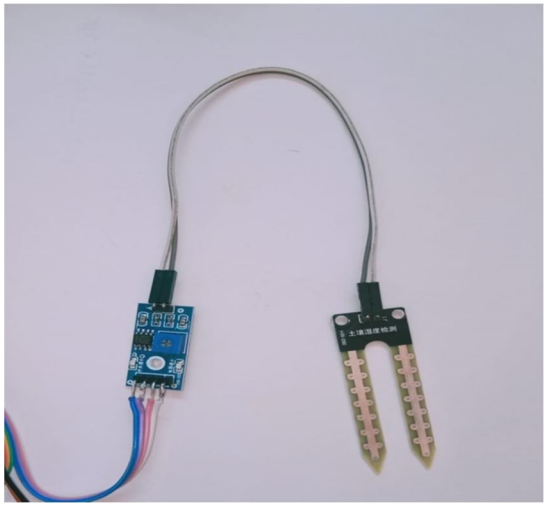


Fig: 3

The Soil Moisture Sensor (SMS) are the device which converts the physical parameter into the electric signal. The system consists of soil moisture sensor.
Use: To measure the moisture content of the soil. Copper electrodes are used to sense the moisture content of soil.

3) Temperature And Humidity Sensor

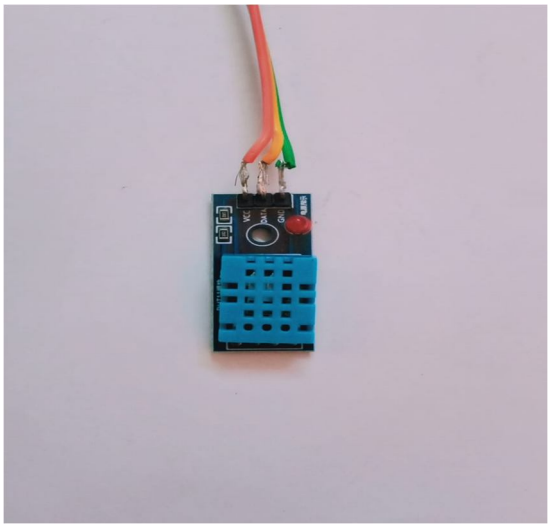


Fig: 4

a) Temperature Sensor

- Output voltage is linearly proportional to the Celsius(centigrade) temperature.
- Temperature range is -55 to 150 degree C.

b) humidity Sensor

- It measures both air temperature and moisture.
- Relative humidity expressed has a percentage.

4) Relay Switch

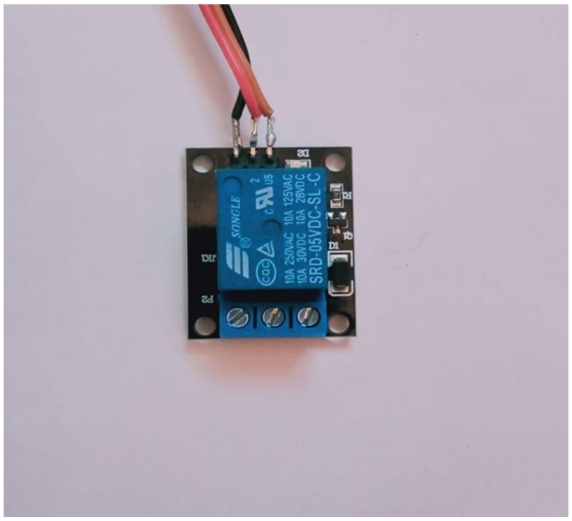


Fig: 5

Like motor drivers- - a relay circuit (which can be a motor driver in special cases) can pulse motors ON and OFF but without some complexity.
In a basic relay there are three contactors: normally open (NO), normally closed (NC) and common (COM). At ON input state, the COM is connected to NC.

5) Submersible Motor Pump

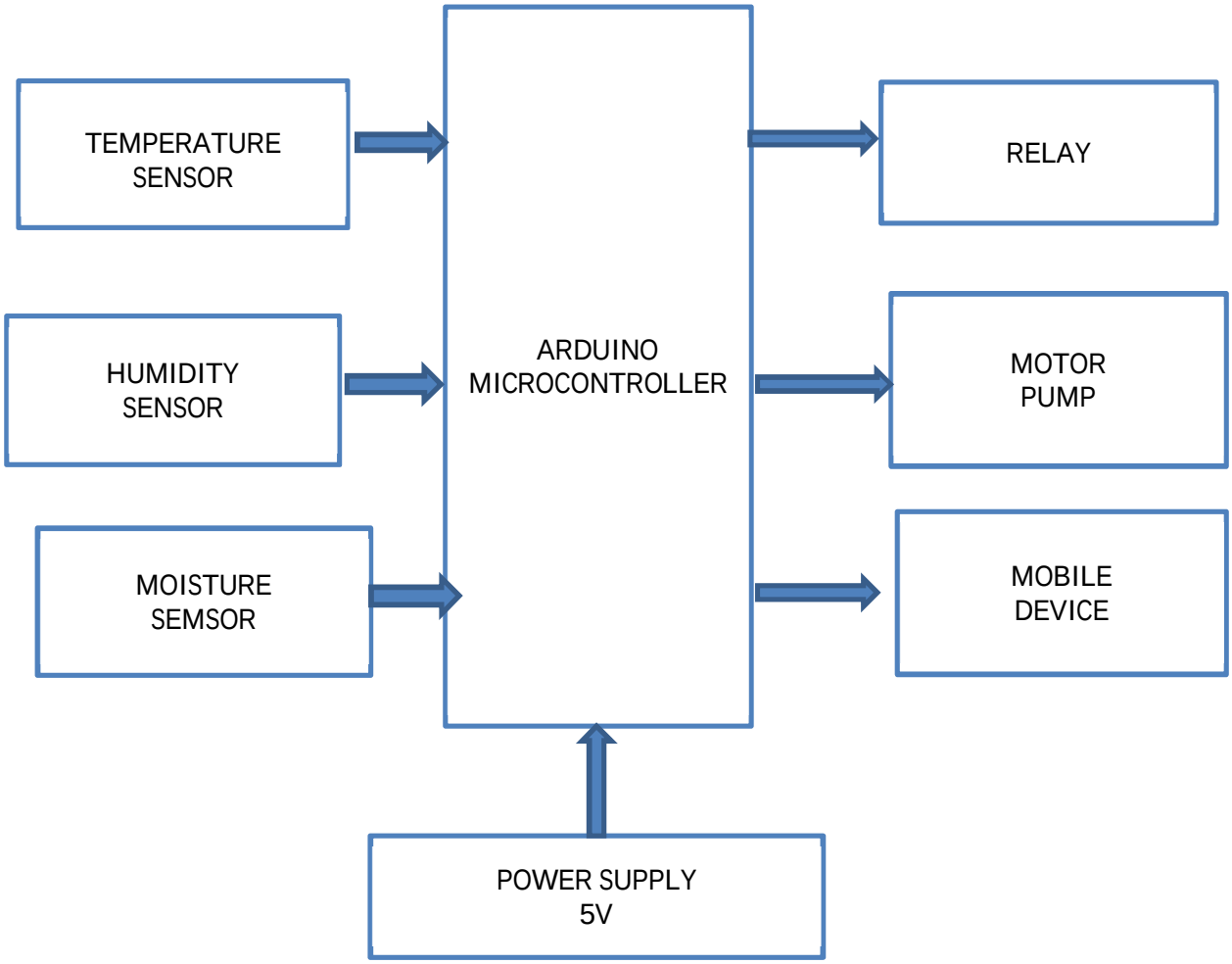


Fig : 6

A submersible pump (or sub pump, electric submersible pump) is a device which has a sealed motor close-coupled to the pump body. That is for water lifting. Motor is connected with via Arduino. This chapter describes the methodology and materials used to achieve the objectives. experimental methodology followed for characterization of these materials are discussed.

6) Proposed System

All the sensors i.e. moisture sensor, humidity sensor, temperature sensor, is connected to the microcontroller.5volts of power is supplied to the micro controller. From that microcontroller a relay gets the information about the percent of the moisture in the soil. If the moisture percent 15 is low then the motor gets automatically ON and the notification is sent to the user device. Block diagram of arduino based smart irrigation system which consist of three sensors which are connected to controller and sensed values from these sensors are send to the mobile application.



III. TEST RESULT

The Smart Irrigation System is integrated into the mobile application system to enable the user to easily monitor and control the irrigation of the farm field. On the mobile application system, there is an interface to view data collected directly from the sensors via the help of the Firebase, which is the cloud that creates a bridge between hardware and the cloud database. The main interface of the mobile application is the main menu that displays the login page of the system. This is to create a secured login for each user and to prevent others from knowing data owned by another client. Once the user successfully login to the app, there is another menu display the options control the irrigation system. The user has to select any of the options to go about the system. The control option leads the user to control the water pump to either force "ON" or "OFF", or just set it to the AUTO mode where it navigates the pump's control based on the sensor's value that set in the system. Then, the control system leads the user to access the BLYNK App. This process is to display percentage of all the sensors which display the report of the status of the farm field's soil. The flow of the Smart Irrigation System that integrated into the mobile application system.

IV. CONCLUSION

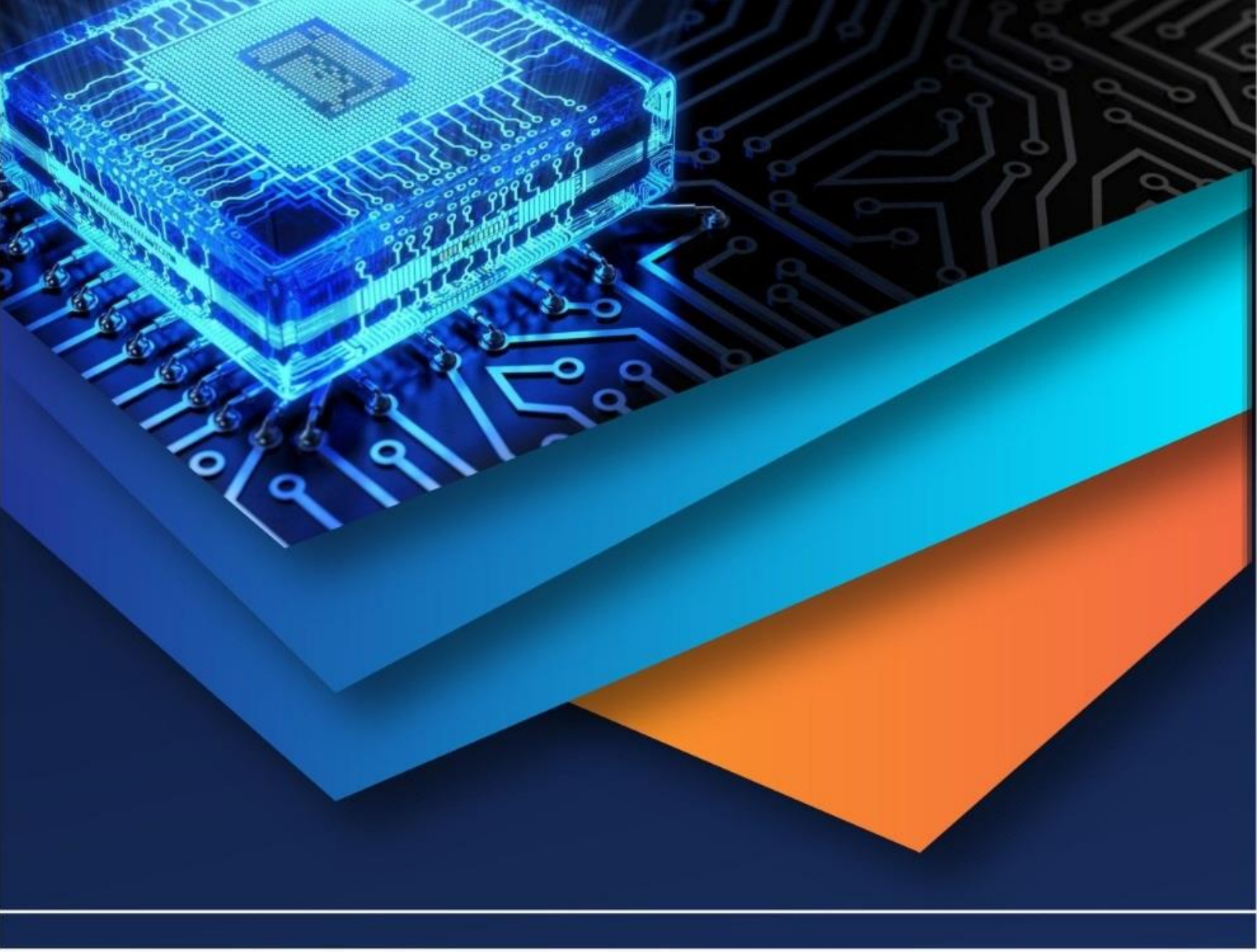
1) We conclude that this system is easy to implement and time, money and manpower saving solution for irrigating fields.
2) A farmer should visualize his agricultural land’s moisture content from time to time and water level of source is sufficient or not. IOT based smart irrigation system displays the values of the sensors continuously in smart phone or on computer’s web page and farmer can operate them anytime from and anywhere.

V. FUTURE SCOPE

Smart farming based on IoT technologies enables growers and farmers to reduce waste and enhance productivity ranging from the quantity of fertilizer utilized to the number of journeys the farm vehicles have made, and enabling efficient utilization of resources such as water, electricity, etc. IoT smart farming solutions is a system that is built for monitoring the crop field with the help of sensors (light, humidity, temperature, soil moisture, crop health, etc.) and automating the irrigation system. The farmers can monitor the field conditions from anywhere. They can also select between manual and automated options for taking necessary actions based on this data. For example, if the soil moisture level decreases, the farmer can deploy sensors to start the irrigation. Smart farming is highly efficient when compared with the conventional approach.

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