SMART IRRIGATION SYSTEM

VISHWAS P, VINAY S

Dept of ECE Eng, KSIT Bengaluru, India

Abstract— This project is for overall development of farming system in India bringing cheap technology in the hands of our farmers. For a very long-time farmers have been in problem for checking proper soil conditions to keep their crops safe and check to supply water every time and staying at their fields for whole day long in strong heat conditions, checking when to supply water to crops and when to stop the supply. Also, farmers have to take recommendation from agricultural experts paying extra price to them when they need proper directions but now with the help of this smart irrigation system farmers will have the benefit of staying back at home and looking for conditions of the soil through their mobile app and start/stop the irrigation as needed. Also the irrigation system will be automatic so the farmers can relax back after cropping the crops and start/stop the irrigation as needed. This will be one time investment for farmers as they will not have to concern agricultural experts every year while cropping their crops. Also, the moisture levels can be set by farmers based on the crop they are planting which they will get on their mobile app. So, economically there is one more profit in not investing on labour.

To handle the irrigation process. Hence, we are giving the complete control over the crop field to the concerned farmer who can control the field after cropping their crops over growing period till harvesting. This gives a lot of relief to the farmers family.

Keywords— Automation, thing speak, IOT, node MCU.

1.INTRODUCTION-

Irrigation is making use of water to the land artificially. The worldwide population will reaches 9.6 billion by 2050.This represents a major issue for the farming business. Regardless of fighting difficulties like extraordinary climate conditions, cultivating's ecological effect , and rising environmental change the interest for more food must be met. To meet this goal, farming needs to go to new invention. Water is one of the valuable useful resource and important factor for farming. Common problems in farming are excess watering problem they are nice explained with aid of answering the easy query that when the water cycle began and the way long watered...?? groundwatering is starting the water cycle too late and running it for no longer enough period due to this the crop may be damaged and it impacts the manufacturing. Overwatering is beginning the water cycle too early .what it is essential by using doing this exercise the crop can be broken and farmer losses his money. If human interference is greater than this under and over watering takes vicinity due to small human errors. The primary aim of this paper is to reduce human involvement and growth the irrigation performance by automating the irrigation system the use of sensors (moisture and dht11). India owns agricultural economy with 70% of population depending upon agriculture immediately or in – at once [1]. In this category of developing USA wherein digitization is given high priority, technology is showing its optimization in diverse fields while it even so calls for footprints into irrigation so present-day smart move inside the discipline is meaningfully promoted. The trouble with current-day irrigation system is (a)shortage in energy and water definitely required for plant boom (b)traditional methods of farming are accompanied requiring-a great deal man-electricity (c)non-remunerative for the farmer as the worth of manufacturing is improved. So, there is a need to make a few changes in current day device.

2. PROPOSED WORK

A. SMART IRRIGATION SYSTEM SOLUTION:

Clever irrigation answers are the evolving trend in each day lives. The generation has finished a full circle via giving lower back to irrigation the modernday developments and techniques which have been evolved. Connectivity the usage of present WIFI networks the use of the to be had hardware's is one important gain for clever agriculture. Smart irrigation answers and hence could cause the successful increase of net of factors implementation within the subject of agriculture. That evolution is that which overcomes the existing conventional cell computing situation of clever phones and their apps and innovate into connecting of the gadgets inside the surrounding to assist with an answer for the realistic problem that needed to be treated.

B. SENSOR MODULE:

Sensors are the real need of the arena that assist to experience their environment and consequently assist human beings to govern the surroundings without their presence. Given their utility, they're the most complex gadgets that are being used extra regularly everywhere. Agriculture sensors need to be more sensitive to weather modifications and also robust in nature of the exposure they're need to confront. Many business sensors are to be had within the marketplace and we simply need to pick out the appropriate one so one can fit the want of the day. Many factors affect the choice of sensors. Few of them that want to be noted are great, the environment in which they may be implemented, the measurability range of the sensor, readings which are determined through the sensor, sensitivity response time, identification of the studying that varies in static surroundings and ultimate but no longer the least the value of the detector. In this approach we used soil moisture and dht11 sensor. Dht11 sensor is used for temperature and humidity. Soil moisture sensor is used to experience the moisture content within the soil. Dht11 sensor is used for each the temperature and humidity sensing moisture sensor are analog and dht11 sensor is digital.
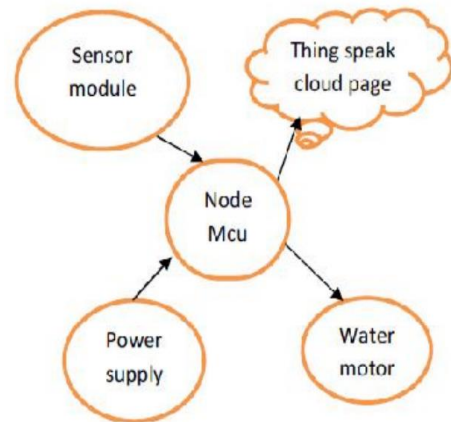
C. POWER SUPPLY MODULE:

We use 9v battery to run the motor, microcontroller in the circuit.

D. IOT:

Internet of things (iot) is extensively used in connecting gadgets and amassing records. Internet of things is used with iot frameworks to handle and engage with statistics and statistics. Within the device customers can register their sensors, create streams of data and process records. Iot are applicable in diverse methodologies of agriculture. Packages of iot are smart towns, smart environment, clever water, clever metering, security and emergency, business control, smart agriculture, home automation, e-fitness and so on. 'Net of factors' is based on device which is able to analysing the sensed records after which transmitting it to the person. In this approach we are using thingspeak cloud page for tracking the Sensors information. The data is amassed from the sensors and displayed graphically on the thingspeak cloud web page so that it is straightforward to reveal.

E. WATER MOTOR:

Water motor is used to pump the water mechanically to the plant which requires by means of the use of the sensors records.

F. WORKING:

• The microcontroller which has a built-in Wi-Fi module and is the heart of the project which takes in input from the soil sensor and gives output to the relay to switch on the irrigation pump. This also controls the time for which the irrigation needs to be done. This also sends data to the cloud which can be used for improving the crop production.
• The sensor is connected to the GPIO pin which continuously gives input to the controller about the moisture content.
• Once this value nears or becomes less than the threshold value given the code instructs the GPIO pin which is connected to the relay board to activate.
• The program will loop for given period of time and then sends a signal to deactivate the relay thereby switching of the supply.
• The nodemcu which is connected to the internet will update the moisture value and also receive command through cloud from the user sitting in any part of the world.
• The cloud services will ease the work of farmers and can be upgraded to control other components as well.
• The whole of project will work on a isolate power supply as these small modules will be place at different places on the agricultural ground.
• The design is made in such a way that it can be used for drip irrigation and indoor precision agriculture.

G. HARDWARE REQUIREMENTS:

NODE MCU

Pin functions

Pin numbers in the Arduino ide relate legitimately to the esp8266 GPIO pin numbers. Pin mode, digital read, and advanced write capacities function not surprisingly, so to peruse gpio2, call digital read (2) or its assumed name digital read (d10). At start-up, pins are designed as input. Computerized pins 0—15 can be input, output, or input pullup. Pin 16 can be input, output or input_pulldown_16 and is associated with the work in led. It very well may be tended to with digital read (d0), digital read (16) or digital read (led_buildin). Pins may also serve other functions, like serial, i2c, spi. These functions are normally activated by Reserved pins

The comparing library. The outline above shows the pin planning for the mainstream esp8266 nodemcu module. Pin hinders are upheld through append interrupt, capacities. Hinders might be joined to any GPIO pin, aside from gpio16. Standard Arduino interfere with types are upheld: change, rising, falling GPIO pins 6—11 is not shown on this diagram because they are used to connect flash memory chip on most modules. Trying to use these pins as iOS will likely cause the program to crash. Note that some boards and modules (ESP-12ED, NodeMCU 1.0) also break out pins 9 and 11. These may be used as IO if flash chip works in DIO mode (as opposed to QIO, which is the default one)

Vin,3V3, GND

Vin is the nodemcu' s voltage input that is associated with its inside voltage controller permitting an information voltage scope of 4.75V to10v. It will be controlled to 3.3V. Then again, an outer voltage wellspring of 3.3V can be legitimately associated with the nodemcu's 3V3 pins. The 3V3 pin can be additionally a voltage source to different segments, for example, leds. GND is the shared belief of the board.

H. SOFTWARE REQUIREMENT:

Blink app

The Blynk App, which is available for both Android and iOS, allows the user to create intuitive interfaces for their projects. The Blynk Server is responsible for the communication between your hardware like Node MCU and your application on the smartphone. At long last, the Blynk Libraries permits the equipment to speak with the server and procedure all the approaching and active orders.

I.IMPLEMENTATION:

The implementation is done using the hardware listed above and writing a program. To carry out specific task through the GPIO pins of the embedded system components. This also contains the iot execution through a prefabricated application explicitly intended for iot reconciliation. The code is composed utilizing the Arduino ide which can be tweaked to consume the code for an esp8266 nodemcu module. The product parts are structured concerning triggers from the information and enacting pin for the yields and speaking with cloud servers through web. A fascinating part with regards to the product is making a deferral for the water system siphon to be on for a specific measure of time.

3. RESULTS & DISCUSSION:
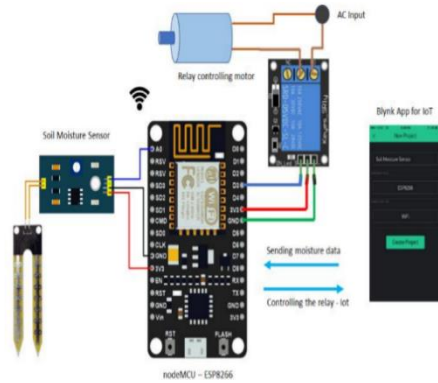
The goal of the project was to put into effect the modern technology in required fields like agriculture. Usage of iot idea makes the entire system of cropping clean. Right here a few degree of automation is performed in terms irrigating mechanically. The benefits as mentioned like water-saving and labour-saving are required the maximum in current agricultural state of affairs. Consequently, it's miles proved using the sensor networks again making clever irrigation. The information from iot is despatched to the client using cloud. Consequently, any versions inside the crop may be identified effortlessly and early analysis is achieved as such. The facts are in graphical shape so we will easily screen.

4. FUTURE WORK:

Large ability of our Indian agriculture is but untapped and we still have miles to tour in this arena(area) of studies as we've specific soil textures in different areas of our kingdom. Farmers may be benefitted through the real implementation of this projected software. Real demanding situations that had been faced and which can be but to be triumph over in fact are the inter-networking of the nodes in an agricultural area and in designing a user pleasant software this is without difficulty comprehensible for the farmers.

GRAPHICAL REPRESENTATIONS

5. CONCLUSION

Hence, the paper proposes a concept of mixing the state-of-the-art generation into the rural field to show the conventional methods of irrigation to modern methods for that reason making easy effective, and cost-effective cropping. Some extent of automation is brought permitting the idea of tracking the sphere and the crop situations within a few lengthy-distance

tiers using cloud offerings. The benefits like water saving and hard work-saving are initiated the usage of sensors that work automatically as they're programmed. This concept of modernization of agriculture is easy, low-cost and operable. For this reason, the paper proposes an idea of combining the modern generation into the agricultural subject to show the conventional strategies of irrigation to trendy strategies therefore making clean productive, and within your budget cropping. A few quantity of automation is added permitting the concept of tracking the sphere and the crop situations inside some lengthy-distance degrees using cloud offerings. The advantages like water saving and labour-saving are initiated the usage of sensors that paintings automatically as they're programmed. This concept of modernization of agriculture is easy, inexpensive and operable.

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