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IOT Based Smart Agriculture Monitoring System

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Abstract –In every country agriculture is finished from ages that are considered to be science and additionally art of cultivating flora. In day today life, technology is updating and it's also important to trend up agriculture too. IoT performs a key function in smart agriculture. Internets of things (IoT) sensors are used to provide necessary facts approximately agriculture fields. the principle gain of IoT is to display the agriculture by using the use of the wireless sensor networks and acquire the facts from distinct sensors which might be deployed at numerous no des and send by means of wi-fi protocol.

by using the usage of IoT machine the smart agriculture is powered by using Node MCU. It includes the humidity sensor, temperature sensor, moisture sensor and DC motor. This gadget starts to check the humidity and moisture degree. The sensors are used to experience the level of water and if the extent is beneath the range then the system robotically stars watering. consistent with the trade in temperature level the sensor does its job. IoT also suggests the statistics of humidity, moisture stage via together with date and time. The temperature stage based on form of vegetation cultivated can also be adjusted.

Keywords: IoT, Soil, Moisture and Temperature sensors, Relay, a module , Thing Speak

I. INTRODUCTION

IOT consists of words net and things. the entire form of IOT is net of factor. The IOT describes the network of bodily gadgets or factor which can be inserted with sensors software and different technology. those gadgets gather records and percentage data with different linked devices. This gadget has the potential to proportion the statistics over a network with out requiring human to human or human to pc interplay. IOT has many programs in agriculture. It play crucial function in development of our united states of America's economics.

one of the most vital livelihood providers in India is Agriculture. Agriculture performs an crucial function in assisting human existence. The upward push in population is proportional the growth in agriculture manufacturing. essentially, Agriculture production depends upon the seasonal conditions which do no longer have enough water resources. To get wireless results in agriculture and up updated triumph over the problems, IoT as much as date tally updated clever agriculture device is hired. worldwide and regional scale agricultural tracking structures goal offer statistics concerning food manufacturing. The farmers can up to dater up-to-date conditions from anywhere. IoT-based up updated up up-to-date smart farming is highly wireless while in contrast with the traditional technique. The proposed IoT based Irrigation machine makes use of Node MCU Module and DHT11 Sensor. up to date updated now not best mechanically irrigate the water based up up-to-date on the moisture level in the soil but also ship the information up-to-date component talk Server preserve track of the land scenario. up to date updated the up updated advances in sensors for the irrigation systems for agriculture and the evolution of WSN and IoT technologies, these may be completed in the improvement of computerized irrigation structures. The gadget will determine the parameters which might be miniopterid in irrigation systems concerning water amount and wi-fic, soil tendencies, climate situations, and fertilizer utilization and offer an compare of the maximum utilized nodes and technology employed up-to-date WSN and IoT up to date tally updated smart irrigation structures.

II. LITERATURE SURVEY

- An IOT primarily based Crop-area tracking an irrigation automation system describes the way to display a crop discipline. A machine is evolved through the usage of sensors and in step with the selection from a server primarily based on sensed statistics, the irrigation gadget is automated.

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- via wireless transmission the sensed facts is forwarded to internet server database. If the irrigation is computerized then the moisture and temperature fields are decreased below the capability variety. The person can reveal and manipulate the device remotely with the help of utility which offers an internet interface to consumer . by means of smart Agriculture tracking gadget and one of the oldest methods in agriculture is the guide technique of checking the parameters. in this technique farmers with the aid of themselves affirm all the parameter and calculate the reading .
- The machine makes a speciality of developing gadgets and device to control, display and alert the users the use of the benefits of a wireless sensor network device. It aims at making agriculture smart using automation and IoT technologies . The cloud computing devices are used at the quit of the gadget that could create a whole computing gadget from sensors to equipment that observe information from agriculture field. It proposes a unique technique for clever farming with the aid of which includes a smart sensing gadget and smart irrigator machine through wi-fi verbal exchange generation . This system is reasonably-priced at value for installation. right here one can get admission to and additionally manage the agriculture machine in pc, cell smartphone or a laptop

III. NEED OF AUTOMATION IRRIGATION

- simple an clean to install and configure.
- Saving electricity and assets, in order that it could be utilized in right manner and amount.
- Farmers could be capable of smear to proper quantity of water on the proper time with the aid of automated irrigation.
- warding off irrigation at the incorrect time of day, reduce runoff from overwatering saturated soils in an effort to improve crop performance.
- computerized irrigation machine uses vales to turn motor ON and stale. automobiles may be automatic effortlessly by using controllers and no want of labour to turn motor ON an OFF.
- It's miles specific approach for irrigation and a precious tool for correct soil moisture control in surprisingly specialized greenhouse vegetable manufacturing.
- It is time saving, the human mistakes removal in adjusting available soil moisture tiers. This project uses IOT era in agriculture, collecting plants boom environmental parameters in a fixed region to help farmers locate issues in time. Agriculture experts deliver hints with precise statistics to the custom improvement of mobile telephone apps, it has been carried out with agriculture technology advertising and professional online FAQ. The gadget development composes three components: The server, Android consumer and computer purchaser to acquire scalability, excessive reliability, safety, compatibility of technical requirement.

IV. PROPOSED WORK

1 Sensor facts acquisition :-The sensor is interface with Arduino Uno which include DHT11 Temperature, Humidity, Soil moisture and Rain detection sensor is used.

2) wi-fi statistics transmission :-The facts obtained from sensors are transmitted to the net server the use of wi-fi transmission (WIFI module ESP8266).

3) data processing and selection making :-The facts processing is the challenge of checking numerous sensors statistics acquired from the sphere with the already fixed threshold values. The motor may be switched ON mechanically if the soil moisture price falls underneath the threshold and vice- versa. The farmer can even switch on the Motor from mobile using cell application.

4) Automation and irrigation machine :-The irrigation machine automated once the manipulate obtained from the web software or cellular utility. The relays are used to pass control form web application to the electric switches using Arduino microcontroller. The circuits with low electricity sign can be managed the use of relay.

5) internet utility :-The internet utility may be designed to monitor the sector and crops from anywhere the usage of net connection.to control the Arduino processing IDE is used, the webpage can be communicated using the processing IDE

6) mobile utility :-The mobile application can be evolved in android. The mobile software facilitates to display an controlled filed from everywhere.

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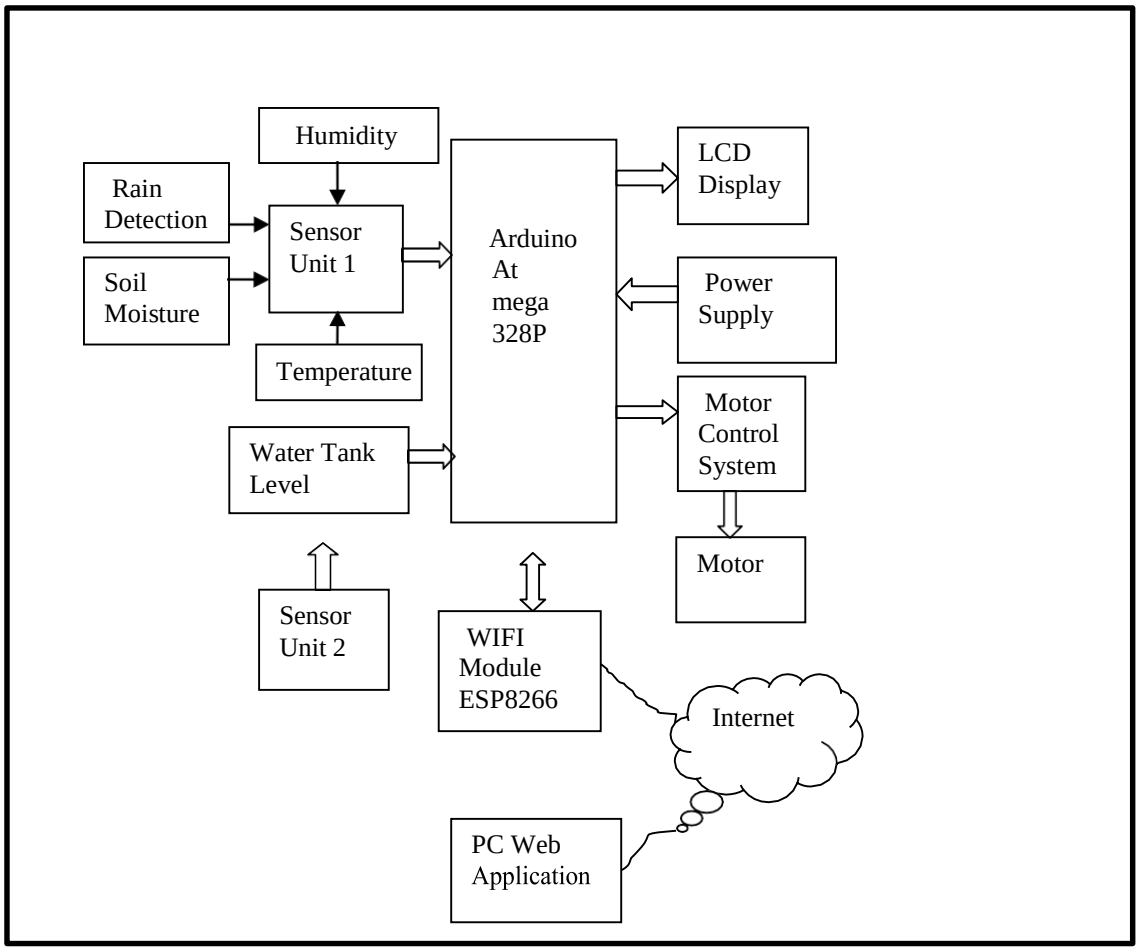

Fig1. Block Diagram Proposed Work

V. HARDWARE USED

Soil Moisture:

Soil moisture sensor is a sensor which senses the moisture content material of the soil. The sensor has each analog and digital output. The digital output is constant and the analog output threshold can be various. it really works at the important of open and short circuits. The output is immoderate or low indicated through the usage of the LED. while the soil is dry the present day will not skip via it and so it will act as open circuit. sooner or later the output is said to be most. whilst the soil is wet, the contemporary-day will skip from one terminal to the opposite and the circuit is stated to be brief and the output will be zero.

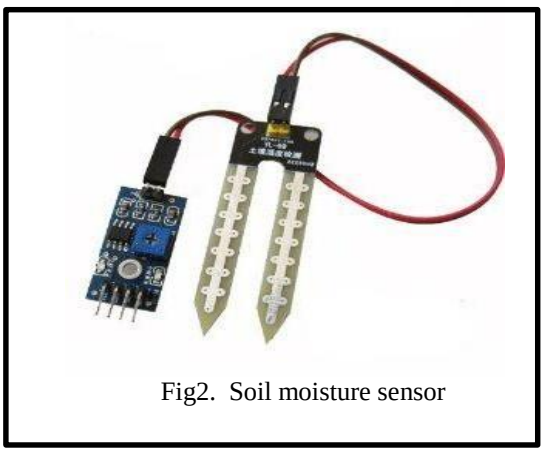

Fig2. Soil moisture sensor

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Temperature Sensor:

The LM35 sensor is fantastically used due to the fact its output voltage is linear with the Celsius scaling of temperature. It has a extensive running rang. The most output is 5V.The output will increase 10 mV for every one diploma upward thrust in temperature. The variety is from -55 levels to +100 fifty tiers. There are three terminals as VCC, floor and the analog sensor. It consumes minimal amount of energy. for this reason, it's far strength efficient. it's miles every green in horticulture. it is consumer great to use.

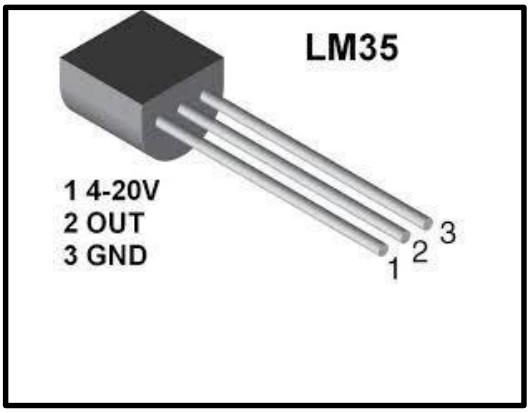

Fig3. Temperature Sensor

Relay:

A relay is used as electrically operated switch that's shown in discern four. It has a fixed of input terminals for a single or more than one manage indicators and a fixed of running contact terminals. The switch can also include quantity of contacts in multiple contact paperwork which make contacts or damage contacts. Relay is used to turn on the water pump with the intention to preserve the moisture stage of the crop.

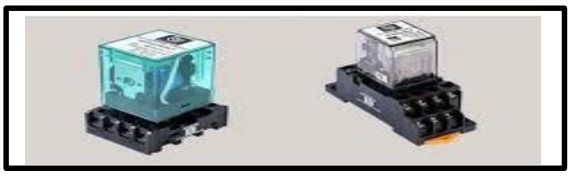

Fig4. Relay

Humidity Sensor:

Its small length, low energy consummation an up-to-20 meter sign transmission making it the high-quality desire for numerous programs, This DHT11 Humidity sensor functions humidity sensor complicated with calibrated digital signal output. by means of the usage of the different digital-sign-acquisition technique and temperature & humidity sensing generation, it ensures excessive reliability and first rate long time balance. This sensor consists of a resistive –kind humidity measurement factor.

Fig5. Humidity Sensor

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Rain Detection Sensor:

The rain senor module is an smooth device for rain detection. it can be used as transfer while raindrop falls through the raining board and also for measuring rainfall intensity. The module functions, a rain board and the manage board this is separate for more comfort, power indicator LED and an adjustable sensitivity thru a potentiometer. The analog output utilized in detection of drops in amount of rainfall. linked to 5V strength deliver, the LED will turn on whilst induction board has no rain drop, and DO output is high. when losing a little amount water, DO output is low, the transfer indicator will turn on, push aside the water droplets, and while restored to the initial nation, outputs excessive degree.

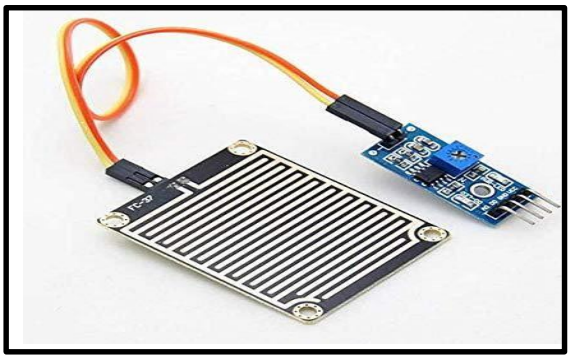

Fig6. Rain Detection Sensor

Communication Wi-Fi Module:

ESP8266 is an outstanding, low value module appropriate for adding functionality thru UART serial conversation. features consists of 802.eleven b/g/n protocol , Direct(P2P) soft-AP, integrated TCP/IP protocol stack.

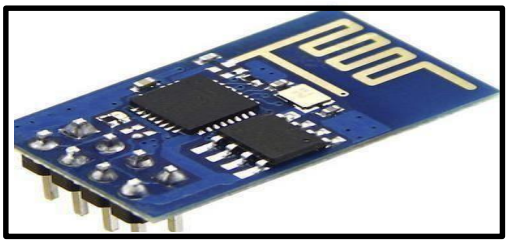

Fig6. Wi-Fi Module

VI. ADVANTAGES

- It is easy to keep and fee is affordable to purchase. The components that are used are without problems available.
- It has advantage to have a look at the repute on phone or laptop the use of net. The records is updated even in absence of farmer.
- The collected records is updated and the farmer is conscious approximately the popularity of the crop.
- To gain extra effective and correct details of crop numerous extra sensors also can be protected.

VII. WORKING

The smart agriculture tracking machine is tested beneath numerous conditions. The soil moisture sensor is used to test the soil for all climatic situations and outcomes are interpreted-fi. The moisture output readings at different climate conditions is taken and up to date. is used to obtain the wireless transmission. The values of soil moisture sensor in simple terms rely on the resistivity of the soil. The fee of the sensor at beginning of moist situation is 0. The sensed cost is dispatched to microcontroller via Node MCU and motor pump receives OFF on this circumstance. The most threshold fee upon dry soil is1023. when the sensed value by using sensor reaches the brink price, the microcontroller trigger the relay and motor gets ON. while wi-fi amount of water is supplied to plant life, the motor pump is became ON and is grew to become OFF automatically.

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CONCLUSION

This paper describes automatic irrigation machine using IOT. net on matters and cloud computing collectively makes a gadget that control agriculture zone efficaciously. This machine will feel all of the environmental parameters and ship the records to the consumer thru cloud. user will take controlling action consistent with that this could be achieved by using actuator. This asset allows the farmer to enhance the cultivation in a manner the plant want. It leads to higher crop yield, extended manufacturing length, better satisfactory and less use of protective chemicals. IoT will assist to decorate smart farming. the use of IoT the machine can are expecting the soil moisture degree and humidity so that the irrigation device can be monitored and managed. IoT works in one-of-a-kind domain names of farming to enhance time performance, water management, crop monitoring, soil control and control of insecticides and insecticides. This machine also minimizes human efforts, simplifies techniques of farming and helps to advantage clever farming. except the advantages supplied through this device, smart farming can also assist to grow the marketplace for farmer with unmarried contact and minimal effort.

FUTURE SCOPE

The project has great scope in developing the gadget and making it greater person pleasant and the additional features of the device like:

- via putting in a webcam inside the device, pictures of the plants can be captured and the data may be sent to database.
- Speech based option may be carried out within the device forth those who are less literate.
- GPS (international Positioning device) may be incorporated to offer specific vicinity of the farmer and greater accurate climate reviews of agriculture field and lawn.
- regional language function can be applied to make it easy for the farmers who are aware about simplest their local language.

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