SMART PLANT WATERING SYSTEM

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Abstract : Agriculture is critical economic backbone. It is one of the top five countries in the world for agricultural product production. About 1/2 of India's population relies for the agriculture sector to meet their daily needs and produce. Sprinkler water irrigation, tank water irrigation, inundation irrigation, and other irrigation systems are now used in India. These irrigation methods are inefficient because they do not scatter according to the needs of the plant. soil moisture levels are low, and water resources are not being used efficiently.

With increase in a population for food is required for feeding the vast amount of population. To grow this humugus amount of food we require more or large water resources. Currently, To address the demand for irrigation in India, technical advancement is required to develop futuristic irrigation system. To do this soil moisture is recorded by farmers and is checked and regular basis and crops and watered when required . With the help of a motor, the reading crop is irrigated. This is done by the use of Internet of Things (IoT) technologies.

The underlying philosophical goal of this initiative is to eliminate human intervention and make better use of water. This is achieved by transmitting data through various methods to send the received data to the Android handset via the Bluetooth module or other means . The project is mainly about Nodemcu, Blynk app and other hardwired components which are use full for the farmers to properly water crops.

IndexTerms – IOT**,** Nodemcu, Blynk

I. INTRODUCTION

1. Agricultural System In India

Agriculture is India's main source of revenue, with 70 percent of farmers and the general population relying on it. The majority of irrigation systems in are operated by humans physically. These methods are being phased out Techniques that are semi-automated and automated are being used to replace manual labor.

Ditch irrigation, for example, is a classic technique that is an available Sprinkler system, drip irrigation, water availability, to increase productivity and to improve resource usage and reduce water amount usage for agriculture.These issues can be resolved promptly If we employ an automatic irrigation system.

Irrigation system are moving fast but slow with moving world. Demonstrate the importance of agriculture over the world.

1. Realization In Indian Agricultural System

In India, for example, over 70% of the population is reliant on the critical agricultural sector .In the past without knowing the proper quantity of water required for crops farmers used to waste lots of water with knowing the requirement Traditionl methods of water usage wastes large amounts of water and some crops did not get enough water to survie in harsh contidions with time to time.

In todays world modern systems are ready to make farmer less to perform things manually and do the technology does everything.

2. Need For Automation

In india water scarcity is a big problem Due to the uneducated people who are farming modern methods cannot be implemented. So, we need to spread the importance of modern farming methods

The Importance of Automatic IrrigationSimple to install and configure; saves energy and resources so that they can be usedproperly and in the right amounts By automating agricultural or nursery irrigation, farmers would be able to smear the rightamount of water at the right moment.Reduce runoff from over watering saturated soils by avoiding irrigation at the wrong timeof day, which will boost crop production.

Water outlets can be made on or off by the farmer himself. Motors may be easily automated with the use of controllers, eliminating the need for labor to turn them onand off. By using these methods we can accurately know the moisture required for the crops and can be adjusted accordingly Our goal is to: Analyze sensor information and determine when the plant should be irrigated We employ a variety of sensors to evaluate soil and environmental variables and comparethem to a threshold to determine whether the plant wants it or not.

II. LITERATURE SURVEY

The moisture sensor collects the values and sendst the relates information through Nodemcu board and relay module and solenoid well is turned on by the farmer by blynk app at appropriate intervals as required Nikesh Gondchawar The sensors are placed at various loactions at field and data is collected parallely. The information from the sensors is gathered via the internet. Rajalakshmi., proposed the relevant location of different types of sensor to catch the data accurately The irrigation system was automated with the use of a humidity sensor, a light sensor, and a humidity sensor. If the moisture level is too high, the irrigation is turned off. If the temperature for crops drop suddenely then the amount of greenhouse gasses in the at that area can b increased to increase temperature . further to irrigation Farmers mobile phones receives notification when required.

Tanmay Baranwal this initiative deals with agricultural product securities and protection. Insect or rodent attacksin the fields or grain storage. This study by M. N. Umeh et al focuses on using microcontrollers to operate irrigation systems. The Arduino board is anexample of a microcontroller. This work by B. N. Getu et al.proposed how the DTMF technique may be utilized to govern agriculture. S.Gopinath, K.Govindaraju, T.Devika, N.Suthanthira R.suresh, S.Gopinath, K.Govindaraju,

T.Devika, N.Suthanthira Vanitha

Iversen technical system described in this study is set up as follows:The techenique is very efficirnt and can be deployed in large scale. that has created a Windows application to keep track of the field. Wireless communication is available in the field the sensors are spread in a wide range and cover enitir field and communicate between them properly create field sensors and the Internet: a detailed description and quick overview of the technology aregiven. The evidences collected are tested for their accuracy and can be used for developing more advanced systems in coming future.

This paper's main goal is to give automate plant receiving watering, which saves lots of money and time. water. The Node is used to run the entire system. The interrupt controller is a controller that has been programmed to give interrupts. The sprinkler will receive a signal. A wireless drip irrigation automation application with soil moisture sensors

In agricultural areas, irrigation with the help of freshwater resources is critical. Traditional instrumentation, which is centered on discrete and connected solutions, poses numerous challenges to measuring and controlling systems, particularly over broad geographic areas.
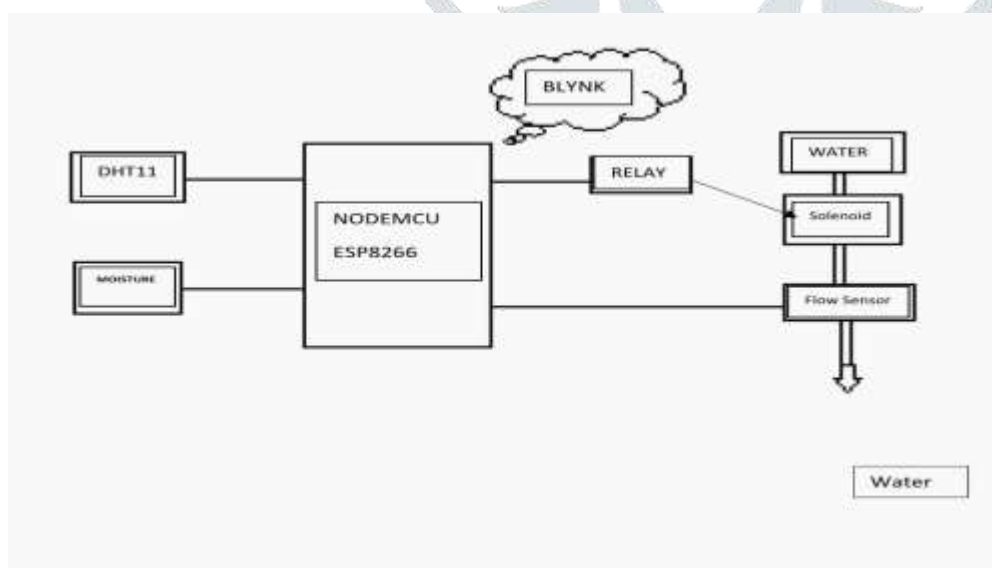
If Advances in Electronic with Electric Engineering, Solar Powered irrigation can be transformed into Smart Irrigation System.
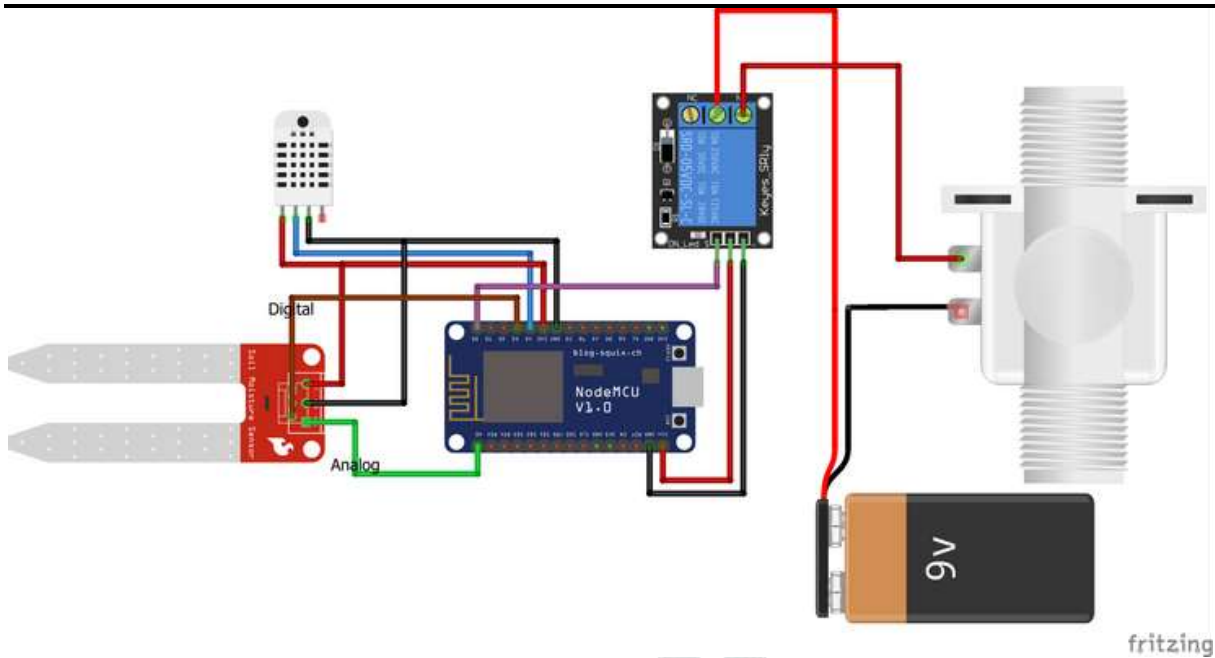
Solar power can be able provide a cost-effective solution to all of our energy needs. Water is conserved by reducing water losses and saving electricity by reducing grid power demand.

Advantages: Weeds are removed regulary for saving a lot of resources , statistical data to control l growth, and is the simplest way to use.

Disadvantages: It is a basic functionality and does not have more advanced features that are required for the future use.
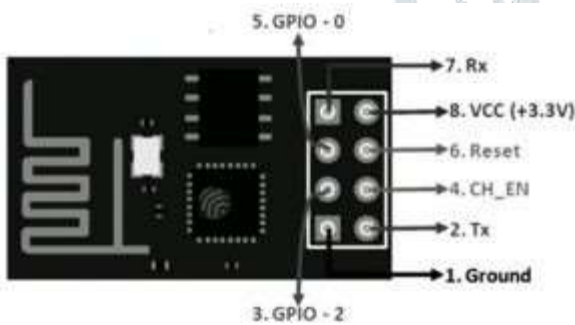
III. Block Diagram

IV . COMPONENTS USED

This components are manufactured by AI thinking mainly for the use of components for IOT deployment and embedded application development. Itcan take over certain Wi-Fi network functions from another application processor. It is a type of SOC type and can be connected with different micro controllers and devices having Wi-Fi support and Uses TCP/IP protocall for in communication.

. The pin configuration, specifications, circuit design, applications, and alternatives of the ESP8266 Wi-Fi module are all covered in this article.

ESP8266 Wi-Fi Module Specifications

The **ESP8266 Wi-Fi module specifications or features** are given below.

- It is a powerful Wi-Fi module available in a compact size at a very low price.

- It is based on the L106 RISC 32-bit microprocessor core and runs at 80 MHz

- It requires only 3.3 Volts power supply

- The current consumption is 100 m Amps

- The maximum Input/Output (I/O) voltage is 3.6 Volts.

- It consumes 100 mA of currentThe maximum Input/Output source current is 12 mA

- The frequency of the built-in low-power 32-bit MCU is 80 MHz

- The size of the flash memory is 513 kb

- It is used as either an access point or station or both

- It supports less than 10 microAmps deep sleep

- It supports serial communication to be compatible with several developmentalplatforms such as Arduino

- It is programmed using either AT commands, Arduino IDE, or Lua script

- It is a 2.4 GHz Wi-Fi module and supports WPA/WPA2, WEP authentication, andopen networks.

- It uses two serial communication protocols I2C (Inter-Integrated Circuit) and SPI (Serial Peripheral Interface).

- It provides 10- bit analog to digital conversion

- The type of modulation is PWM (Pulse Width Modulation)

- UART is enabled on dedicated pins and for only transmission, it can be enabled onGPIO2.

- It is an IEEE 802.11 b/g/n Wi-Fi module with LNA, power amplifier, balun,integrated TR switch, and matching networks.

- GPIO pins – 17

- Memory Size of instruction RAM – 32 KB

- The memory size of instruction cache RAM – 32 KB

- Size of User-data RAM- 80 KB

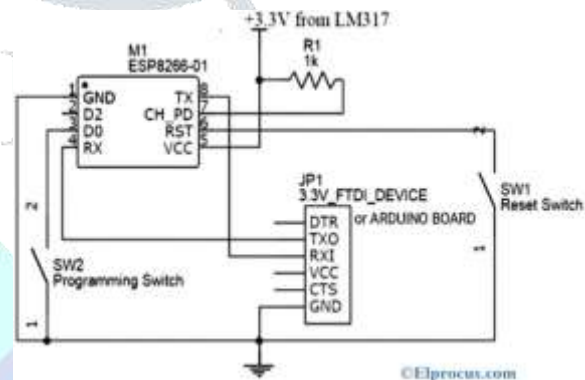- Size of ETS systems-data RAM – 16 KB

The **applications of the ESP8266 Wi-Fi module** are given below

- Access points portals

- IoT projects

- Wireless data logging

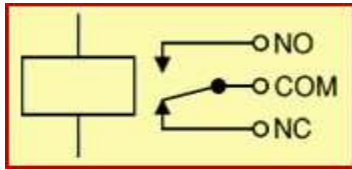- Used in learning the networking fundamentalsSockets and smart bulbs

    1. SOIL MOISTURE SENSOR

One type of sensor used to measure the volumetric content of water in the soil is the soil moisture sensor. Because the straight gravimetric dimension of soil moisture mustbe eliminated, drying and sample weighing is required. These sensors measure the volumetric water content indirectly, using other soil rules such as dielectric constant, electrical resistance, interaction with neutrons, and moisture content replacement.

The relationship between the computed property and soil moisture should be adjustedand may alter depending on ecological parameters such as temperature, soil type, andotherwise electric conductivity. The reflected microwave emission is influenced by soil moisture and is mostly employed in agricultural and hydrological remote sensing.It's all about the soil moisture sensor in this case. Finally, we may deduce from the preceding information that this sensor is used to measure the volumetric water content of the soil, making it ideal for investigations in agricultural science, soil science, horticulture, environmental science, biology, and botany

1. Relay Module

A relay is a different sort of switch that can be controlled by electricity. Relays are solid-staterelays when they are mechanically driven as switches utilizing an electromagnet. There are many different varieties of relays, which are classed according to many factors such as operating voltage, operational technology, and so on. Latching relays, mercury relays, reed relays, Buchholz relays, vacuum relays, solid state relays, and so on are examples of several types of relays. Before we go into the many sorts of relays, let's have a look at how they work.

To test how a relay works, we need to look at any type of relay, and in this article we will use solid state relays to illustrate how relays work. A solid state relay is a switching device that uses solid state semiconductor components to perform the switching action. By comparing electromagnetic and solid state relays, we can see that solid state relays have higher power gain. The operation of a solid state relay is the same as that of an electromechanical relay, except that a solid state relay has no moving parts. They therefore offer better long-term reliability than relays with moving contacts. In solid state relay operation, source MOSFET transistors are used as switching devices. An optocoupler can electrically isolate a low power input circuit and a high power output circuit.

Advantages of Solid State Relay

The solid state relay is completely silent, smaller, and enables more compact packing. SSRs have constant output resistance

regardless of how much power they are used. When compared tomechanical relays, the relay operation is clean and without

bounce.SSRs can be utilized in explosive settings since they do not create sparking even when therelay is in use.These SSRs

outlast mechanical relays since they don't have any moving parts.

Disadvantages of Solid State Relay

The separated bias supply is critical for the gate charge circuit.Voltagetransients may result in

erroneous switching.SSRs have a long transient reverse recovery time due to the body diode.
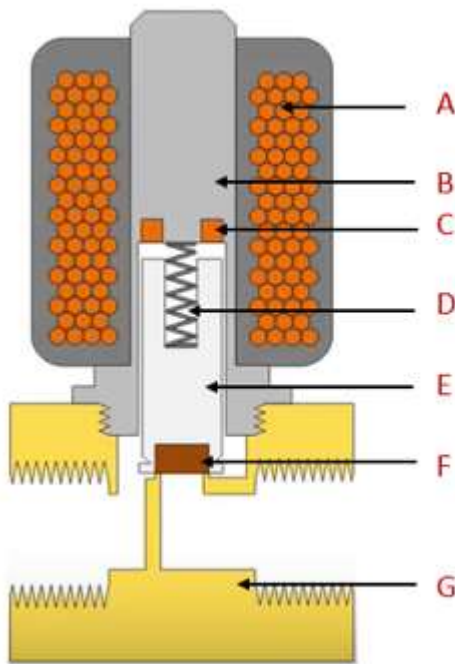
Solenoid Water Valve:

A solenoid valve uses electricity to manage its function. A solenoid, which is an electric coil with a moveable ferromagnetic core

(plunger) at its center, is used in the valve. The opening and closing of small aperture is done by using a plunger. A magnetic field

is created by passing an electric current through the coil. The plunger is pushed higher by the magnetic field, which opens the hole.

This is the essential principle that allows solenoid valves to open and close.

Quick solenoid valve notes:

1 Only clean liquids and gases should be used.
2 A pressure differential is required for indirect operated valves to function..
3 Manual overrides, ATEX, gas approval, media separation, and other features are available.
4 It can get hot since switching and staying in that position demands energy (depending on the type).
5 Used in various types of devices

How does a solenoid valve work?

spring (D); plunger (E); seal (F); valve body (G)

A solenoid valve is done by of two different parts: the solenoid and the valve body (G). The component is shown in Figure 2.The plunger (E) which is at the center of the solenoid which is surrounded by a coil (A) which is electromagnetic in nature. It can be open (NO) or closed (NC) at rest (NC). A usually open valve is open is in energized state and a normally closed valve is closed in the de-energized state. The coil is activated and creates a magnetic field when the current runs through the solenoid. This establishes a magnetic attraction between the plunger and the spring (D) force, causing it to move. The plunger is lifted if the valve is ordinarily closed, allowing the seal (F) to open the orifice and enable the media to flow through the valve. The plunger moves downwards blocks the valve when it is energized thus abstaining the flow of water when it is normally open type. In AC coils, the shade ring (C) prevents vibration and humming.The plunger is lifted if the valve is ordinarily closed, allowing the seal (F) to open the orifice and enable the media to flow through the valve.. The plunger moves upwards unblocks the valve when it is energized thus allowing the flow of water when it is normally closed type In AC coils, the shade ring (C) prevents vibration and humming.
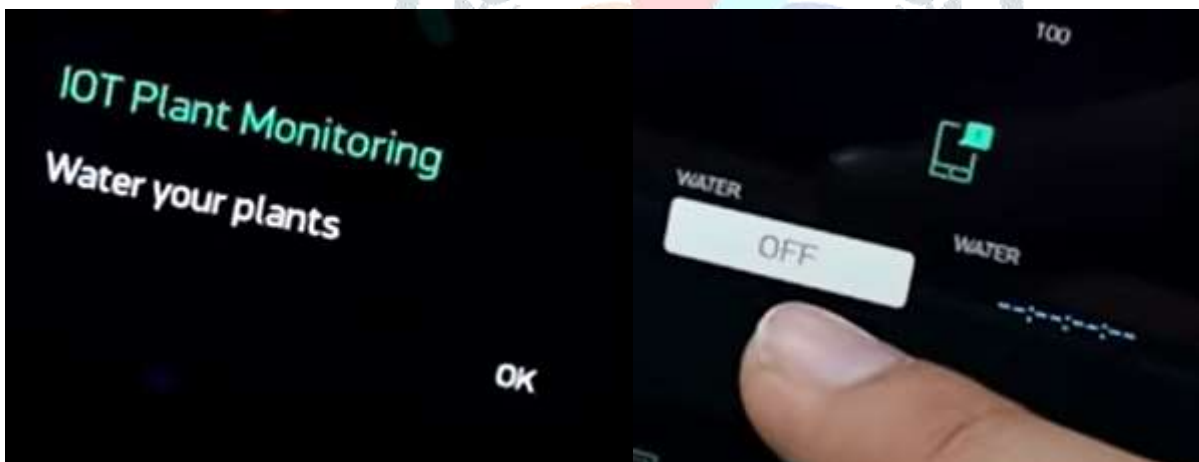
V PROPOSED METHOD

Actual Working:

Using mobile wifi and a password, the Nodemcu is connected to the farmer's phone.

Farmers can also determine the moisture, humidity, and temperature of the surrounding environment and soil, as depicted in the diagram below.

If the soil moisture content is low, the app on the phone instructs farmers to begin watering plants with the phone, as indicated in the diagram below.

When the moisture level reaches an acceptable level, the farmer can use a mobile device to switch off the water.

Internal working:

1) To begin, the Moisture, Temperature, and Humidity sensors collect data and transfer it to Nodemcu.

2) The Nodemcu Send the information to the farmer accordingly through Blynk App3) From the app that provides information to Nodemcu, the farmer can switch the water on or off as needed.

4) The Nodemcu then sends instructions to the Relay module, allowing the solenoid well to be turned on or off as needed.

VI CONCLUSION

This project detects the moisture content in the soil and makes sure that it is appropriate and measures the speed of the water. The technology measures the quantity of water within the soil victimisation sensors embedded within the soil. When achieving the wetness content, the system checks to ascertain if it's at intervals the scientifically prescribed vary. It regulates the water content supported whether or not it's at intervals the prescribed vary. There ia no chance of human error in this method.

The system's noteworthy options embody a closed-circle programmed water system structure, wetness observation, and water use. In keeping with the results of the checks completed, the planned model automates the opening and closing of the valve and leading to redused amount of human error while management.Following the check, a flag is transmitted to the Nodemcu board, that then triggers the pump via the Blynk app.

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