SMART IRRIGATION SYSTEM USING MACHINE LEARNING

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INTRODUCTION:

In an irrigation system for most of the plants moisture levels plays a major role in the growth of plants.Requirement of moisture varies from plant to plant.In this smart irrigation we have automated the watering o plants based on moisture levels without But a consumption in the agricultural field is responsible for 90% of the gross usage water in India, this huge volume of water usage in ever drying environment has driven to enhance irrigation water use efficiency, Where plants are intentionally placed beneath water significance to achieve a sustainable reduction in water use. Hence it is was a small need to have inundation system which will be efficient to soak the plants as per the needs and can converse the water. The machine learning technology will not be water allocation management, but instead, another aspect of "situation awareness" within the system. This will be compared to textural content of soils and their water plotting quantity across a field. Keeping the above predicament in the forefront, the recent trending technology-Embedded system, where many devices are getting integrated board by the advancement of this system. Introducing new techniques in the cropland of irrigation with smart machine learning concept is a great combination. Invoking machine learning in this embedded system and automation made this system to be unique.

Water content or moisture content is the quantity of water contained in a material,such as soil(called soil moisture),rock,fruit.Conser water is the worlds first artificial intelligence that can predict how much water is needed to give to crops.

IMPORTANCE OF IRRIGATION:

The rainfall of in our country depends on monsoons. Rainfall controls agriculture, but the agriculture is said to be "the gambling of the monsoon" as the monsoon rainfall are uncertain, irregular and uneven or unequal. So irrigation is essential for agriculture. In INDIA there are 80% of the total annual rainfall occurs in four months, i.e. from mid June to mid October. So it is very necessary to irrigation for farm field during the rest of the eight months [1].

METHODS OF IRRIGATION :

There are different types of method for irrigating farm field for different types crop field. Basically Indian farmer use these three methods channel system, sprinkler system, drip system. Channel system is a traditional method of irrigation. But a smart irrigation system is a new technology to irrigating farm field automatically.

SIMULATION TOOL:

1. Arduino Uno
2. Soil moisture sensor FC 28
3. Humidity sensor DHT-11
4. Submerged water pump 220V
5. Jumper Wires

6.4 Channel relay

7.WIFI module ESP 8266

DESCRIPTION:

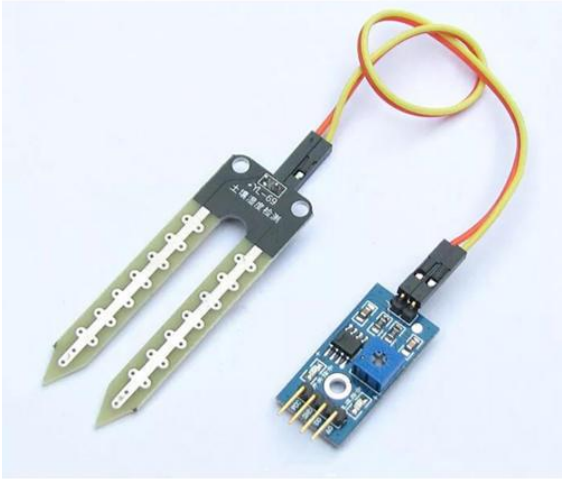
ARDUINO UNO:

The Arduino UNO is one of the most used microcontrollers in the industry. It is very easy to handle, convenient, and use. The coding of this microcontroller is very simple. The program of this microcontroller is considered as unstable due to the flash memory technology. The applications of this microcontroller involve a wide range of applications like security, home appliances, remote sensors, and industrial automation. This microcontroller has the ability to be joined on the internet and perform as a server too.

SOIL MOISTURE SENSOR:

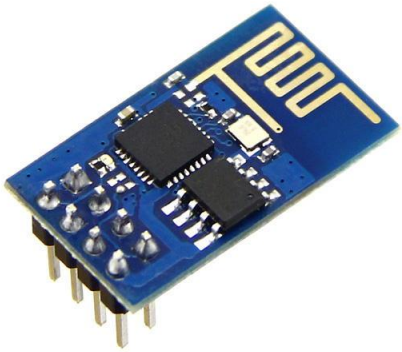
Soil moisture sensor is one kind of sensor used to detect the soil moisture content.This sensor has two outputs like the analog output as well as the digital output.

The digital o/p is permanent and the analog o/p threshold can be changed. The working principle of soil moisture sensor is open & short circuit concept. Here the LED gives an indication when the output is high or low. When the condition of the soil is dried up, the flow of current will not flow through it.so it works like an open circuit. Therefore the o/p will be maximized. When the soil condition is soaked, the flow of current pass from one terminal to the other. So it works like a closed circuit. Therefore the o/p will be zero.Here sensor is coated with platinum, and anti-rust to make higher efficiency as well as long life.



WIFI MODULE ESP8266

The Wi-Fi module ESP8266 is a low-cost module, used to interface the microprocessors. It has a 96 KB of data RAM as well as a 64KB of instruction RAM.



ESP8266 comes with capabilities of

- 2.4 GHz Wi-Fi (802.11 b/g/n, supporting WPA/WPA2),
- general-purpose input/output (16 GPIO),

- Inter-Integrated Circuit (I²C) serial communication protocol,
- analog-to-digital conversion (10-bit ADC)
- Serial Peripheral Interface (SPI) serial communication protocol,
- I²S (Inter-IC Sound) interfaces with DMA(Direct Memory Access) (sharing pins with GPIO),
- UART (on dedicated pins, plus a transmit-only UART can be enabled on GPIO2), and
- pulse-width modulation (PWM).

It employs a 32-bit RISC CPU based on the Tensilica Xtensa L106 running at 80 MHz (or overclocked to 160 MHz). It has a 64 KB boot ROM, 64 KB instruction RAM and 96 KB data RAM. External flash memory can be accessed through SPI.

ESP8266 module is low cost standalone wireless transceiver that can be used for end-point IoT developments.

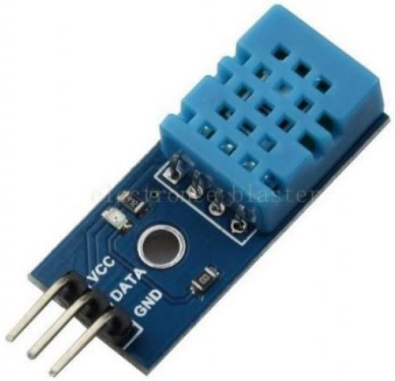
To communicate with the ESP8266 module, microcontroller needs to use set of ATcommands.

Microcontroller communicates with ESP8266-01 module using UART having specified Baud rate.

SENSOR ON ARDUINO

DHT11 is a humidity and temperature sensor,which generates calibrated digital output.DHT11 can be interface with any microcontroller like Arduino,raspberry Pi,etc.and get instantaneous results.DHT11 is a low cost humidity and temperature sensor which provides high reliability and long term stability.

The Arduino relay module allows a wide range of microcontroller such as Arduino,AVR,PIC,ARM with digital outputs to control larger loads and devices like DC Motors,electromagnets,solenoids and incandescent light bulbs.



Working with Smart Irrigation System using IoT

In the agriculture field, sensors are used like soil moisture. The information received from the sensors is sent to the Database folder through the Android device. Also, this system is automatically activated when the soil moisture is low, the pump is switched ON based on the moisture content.

The application has a feature like taking some time from the user and water the agriculture field when the time comes. In this system, there is a switch used to turn off the water supply if the system fails.

Further, this project can be enhanced by designing this system for large acres of soil. Also,this project can be incorporated to make sure the value of the soil and the expansion of harvest in each soil. The microcontroller and sensors are successfully interfaced and wireless communication is attained between a variety of nodes.Also, further this proposed system can be enhanced by adding up machine learning algorithms, which are

necessities of the crop, this would aid the inspections and outcomes tell us that this result can be executed for lessening of water loss and decrease the manpower necessary for a field.

CONCLUSION:

In present days especially farmers are facing major problems in watering their agriculture fields,It's because they have no proper idea about when the power is available so that they can pump water.even after then they need to wait until the field is properly watered,which makes them to stop doing other activities.

Here is an idea which helps not only farmers even for watering gardens also,which senses the soil moisture and switches the valve automatically when the

Power is on.Machine learning in smart irrigation system is beneficial and profitable way for minimizing water resources usage in agricultural yield.The system is worn to cultivate in places where there is water shortage thereby developing comfort.This system is conversant and economical.It doesn't need any individual on duty as it facile and reliable for cultivation process.

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