SMART IRRIGATION SYSTEM

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ABSTRACT:

The main objective of this project preparation is to enable the accessibility of the modern techniques to the farmers in order to make their work easier and in this smart irrigation project we use IoT and a few serial communication devices which allow the farmers to control the process of irrigating the fields by their mobile.

Through this process we can help the farmers to irrigate their fields whenever necessary irrespective of them being there which requires man power to look over and also it helps us to provide needed amount of water to the crops. We also provide suggestions to the farmers about the climatic conditions.

INTRODUCTION:

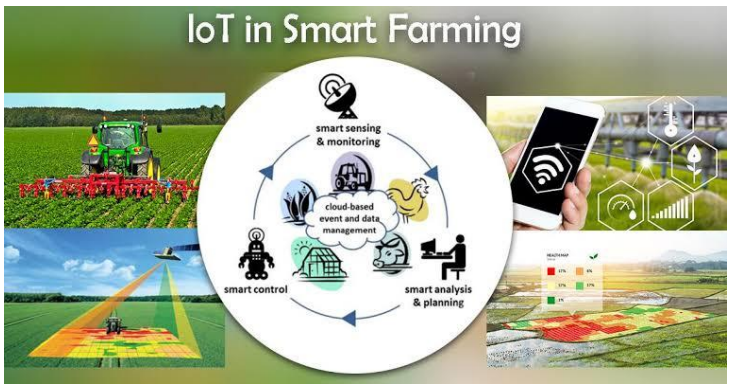
In this project We use intercommunicating devices such as Arduino, LoRa Shield and Node mcu which enables us to perform these processes. The main part is being played by the communication process between the app provided to the user and between the cloud, NodeMcu, LoRa module, Arduino and the motor

controller (which controls the flow of the water). The communication process takes place in respective manner The app -> cloud ->Node MCU. The Node MCU transfers the data to the Arduino fixed in the respected fields through the Lora Shield. According to the data received the Arduino gives the output information to the motor controller in the farm which releases the water.

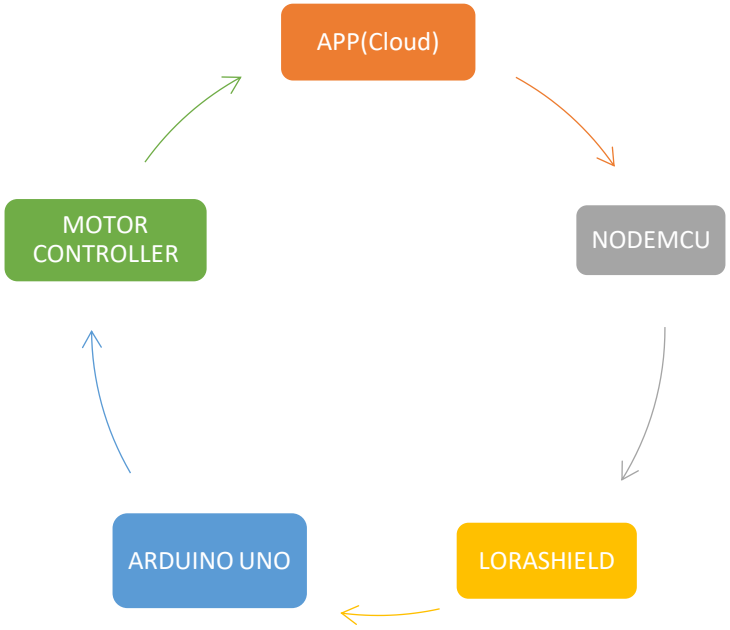
RELATED WORKS:

The Farmers use the Irrigation system (using motor) in the Field to deploy the water. But nowadays due to the less Manpower and Water Drought in some areas we can use the Technology to overcome those troubles. In this Smart Irrigation project we use some IOT based devices which are capable of automating the Irrigation process by Monitoring the amount of water flow and Analyzing the moisture control of the soil. Through this system the Farmers will be able to control the Irrigation system irrespective to the manpower and also consume needed amount of Water.

In the Smart Irrigation system we Some IOT devices and a App using Cloud which transfers Data from the Farmer to the motor. In Farmers mobile we install a App using cloud through this the Farmer will be able to release the needed or Certain amount of water for the particular field. In the App it will have certain options like Low Amount of Water, Medium Amount of Water, High Amount of Water. The Motor will also be disabled by the data given by the Moisture control sensor. The moisture sensor will give the data about the soil of particular field to the farmers Mobile phone accordingly the farmer will be able to deploy the needed amount of water to that particular Area. The Data given by the farmer is transmitted to the Node MCU which is fixed in the Field. The Node MCU Transfers the analyzed data to the ARDUINO UNO through the Lora Shield (wireless modulation device). The ARDUINO UNO is Situated near the Motor Controller and gives the output information to motor regarding the deploying amount of water. Accordingly deployed amount of water flows into the particular fields.

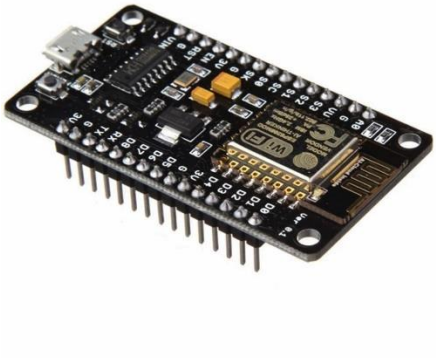


BLOCK DIAGRAM:



NODE MCU:

Node MCU is a low-cost open source IoT platform. Node MCU is an open source firmware for which open source prototyping board designs For operating any system is Available. Node MCU provides access to the GPIO (General Purpose Input/Output). We need to use few Lines of Code to establish Wifi Connection between the Cloud & Node MCU. The firmware uses the Lua scripting language

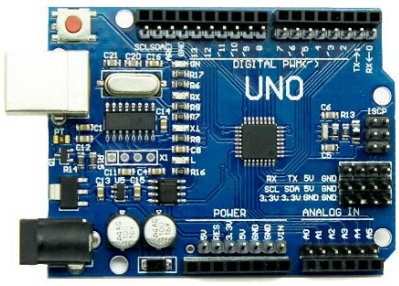


LORASHIELD:

LoRa Shield Technology is a wireless modulation for long-range, low-power, low-data-rate applications, achieving a range of more than 15 kilometers in a suburban environment. LoRa Shield is used as a longrange transceiver on a Arduino from a open source library such as Node MCU. LoRa Shield is based on Semtech SX1276/SX1278 chip, it targets professional wireless sensor network applications.

ARDUINO:

The Arduino Uno is an open source Microcontroller Board based on the Microchip ATmega328P microcontroller. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards. The board has 14 digital I/O pins, 6 analog I/O pins, and is programmable with the Arduino IDE. It can be powered by the USB cable or by an external 9-volt Battery.



PROPOSED WORK:

In this project the Main role is played by the Microcontrollers. It enables farmers to work easily. The Assembling and connectivity between the Microcontrollers has a lot of work to do but even it will be very easy for the Farmers to Handle it from their Mobile phones. Now let's see how the IOT devices work and are linked to each other. NODE MCU is a single board Microcontroller which helps in operating any open source firmware prototyping board designs. The firmware uses LUA scripting language. It receives Wireless data from the cloud app in Mobile phone. The Data is Forwarded to Lora shield device because this device enables the transmission of wireless modulation for Long range. This device is used because the NODE MCU is fixed at a far distance to the Arduino UNO. The Lora Shield forwards the Data to the ARDUINO UNO board which is situated near the motor. The ARDUINO UNO board is a open source microcontroller which has ATmega328p chip in it. The Board receives the input data through the UNO pin and gives data through the Digital Output pin which is connected to the motor controller. Based on this the water is deployed in the several farm lands. And also several Arduino uno boards are attached near separate pipelines to control separate water line and to collect the information about the Moisture of the Soil. The Moisture sensor is fixed in a adjacent manner cause even though the water gets stagnant or deficit the moisture sensor will be able to acquire accurate information about the soil and give the data to the Arduino accordingly the Arduino will release the amount of water according with the Threshold amount of the soil moisture.

CONCLUSION:

The Smart irrigation system has high efficiency of socio-economic Benefits. It helps the Farmers in conserving water by supplying needed amount of Water. It helps farmers to analyze the quality of crops and to reduce the Manpower by using sensors. The Initial fixing of the microcontrollers only may cost the farmers. From this we understand that this technology can be easily handled by the farmers even though they doesn't posses the knowledge of the Technology.

REFERENCE:

The Conference Paper says about the Smart Irrigation System using IOT. The above information about the IOT devices was gathered from many articles like Wikipedia, Circuit Digest .