# LORA BASED SMART IRRIGATION SYSTEM FOR REMOTE AREAS

## AIM:

Design and Development of LoRa based smart irrigation system for remote areas.

## PURPOSE:

LoRa is a long range low power consumption wireless technology that can be used in many of applications. There are lot of other wireless technologies like RF, Zigbee, WIFI and GSM. But every wireless technology has its own limitation and need daily maintenance. But LoRa is low maintenance and supports long distances. We can use LoRa for irrigation purpose. Formers houses and farm lands are in some distance and it is difficult to stay always in farms to maintain water supplies. Here we want to make farm land to autonomous water supply based on soil wet and dry conditions. Also monitoring parameters like temperature and humidity from his house. Here the project title is LoRa based smart irrigation system for remote areas using Arduino and ESP32 nodemcu.



## DESCRIPTION:

This project is divided into two parts. One is at farm land and receiver is at farmer house. Arduino uno placed at farm land which has DHT11, soil moisture sensor and water pump. All these IOs connected to Arduino Digital pins respectively. Also LoRa module (SX1278) connected to Arduino SPI port. On other side ESP32 (Nodemcu) has LCD and LoRa module (SX1278) and this was placed at farmer house.

## WORKING:

Based on soil wet and dry conditions water pump will be ON and OFF automatically. Also Arduino reads Temperature and humidity values through DHT11 sensor. These three sensors data will

transmitted to farmer house system through LoRa (SX1278) communication. ESP32 (Nodemcu) receives sensors data and displayed on 16x2 LCD. Also it will upload sensors data to Cloud IOT server, through its internal WIFI module. We can monitor irrigation system parameters from remote areas. Also Receiver LoRa system can be act as like LoRa WAN.

## TECHNICAL SPECIFICATIONS:

## HARDWARE:

| | | |
|---|---|---|
| Microcontrollers | : | Arduino Uno and ESP32 (Nodemcu) |
| Crystal | : | 16 MHz |
| LCD | : | 16X2 LCD |
| LoRa Module | : | SX1278 |
| Temp Sensor | : | DHT11 |
| Humidity Sensor | : | DHT11 |
| Soil Moisture | : | Resistive |
| Relay | : | 12V DC |
| Pump | : | 230v AC |
| Light | : | 230V AC |
| Power Source | : | 12v 1 amp DC Adaptor |



## SOFTWARE:

Arduino IDE

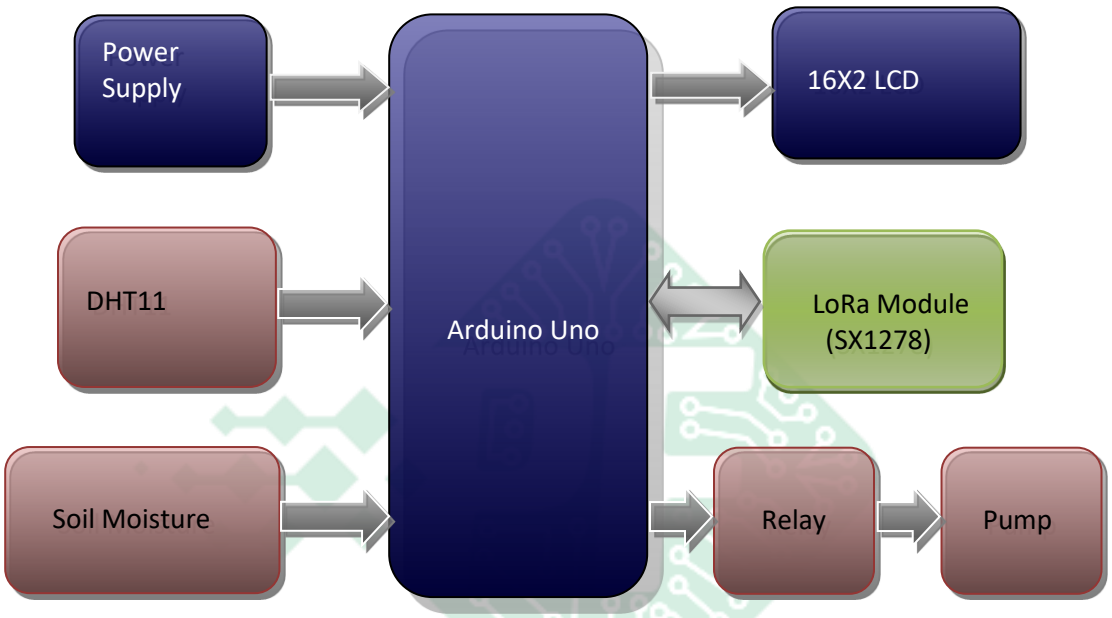
Proteus based circuit diagram

## APPLICATIONS:

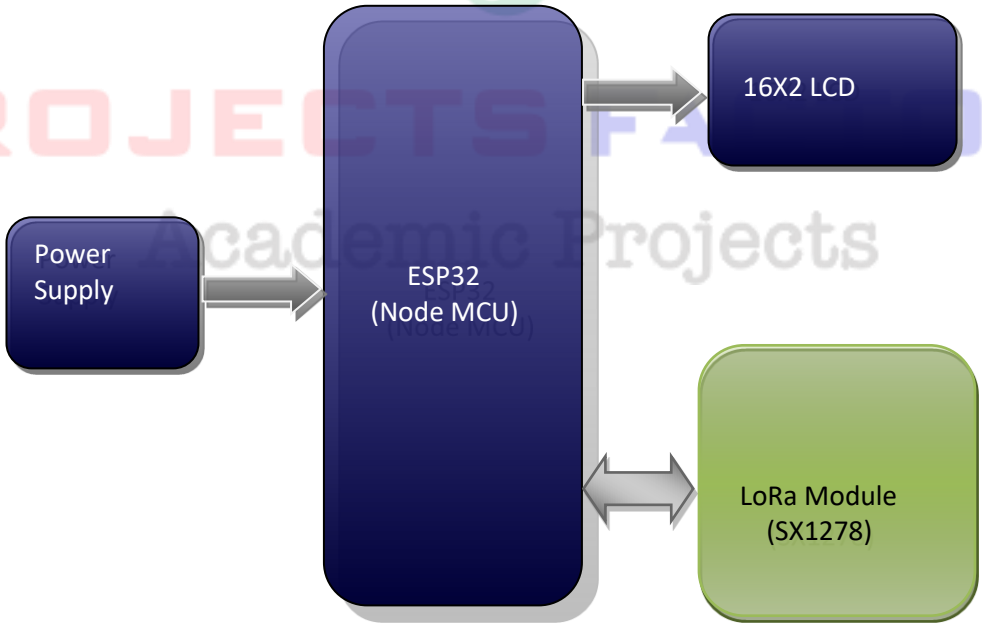
- Irrigation Applications
- Agri Sector
- Water Management Applications

## BLOCK DIAGRAM:

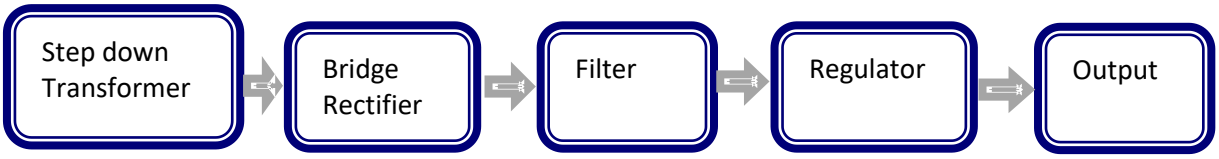
### Transmitter Section:




### Receiver Section:



## POWER SUPPLY BLOCKDIAGRAM:




## INTERFACES COVERD:

- We have covered LoRa module interface
- DHT11 and soil moisture sensors interface