LORA BASED WIRELESS WEATHER STATION MONITORING SYSTEM

AIM:

Design and Development of LoRa based wireless weather station monitoring system.

PURPOSE:

Now day's weather stations are widely used in all sectors like public, private and government. Knowing weather parameters like Temperature, humidity, rain, light luminous and atmospheric pressure is needed for weather station. Here we want to integrate weather station with LoRa and LoRa can transmit sensors data to receiver, from receiver it can upload data to cloud. This type of system is very useful for weather prediction applications. Here the project title is LoRa based wireless weather station monitoring system using Arduino and ESP32 nodemcu.

DESCRIPTION:

Weather station consists of Arduino uno and sensors like DHT11, LDR, Rain and BMP180/280. LoRa (SX1278) connected to Arduino SPI port. Arduino can read all sensors information and transmit to other side of LoRa (SX1278). At receiver side ESp32 (Nodemcu) interfaced with Lora (SX1278) along with LCD display.

WORKING:

Arduino reads all sensors data through corresponding protocols. DHT11 is one wire protocol and BMP180/280 is I2C protocol. LDR and Rain sensors interfaced with Arduino through digital pins. Arduino reads all sensors with fixed time interval (30 sec) and displaying on 16x2 LCD display. The same data will be transmitted to receiver through LoRa communication. At receiver side ESP32 receives data and upload to IOT cloud server. This cloud server is accessed from anywhere in the world. Also data will be stored in mysql Database and retrieved when we open account. Sensors data

will be visible in table format default and it has option in graphical view.

TECHNICAL SPECIFICATIONS:

HARDWARE:

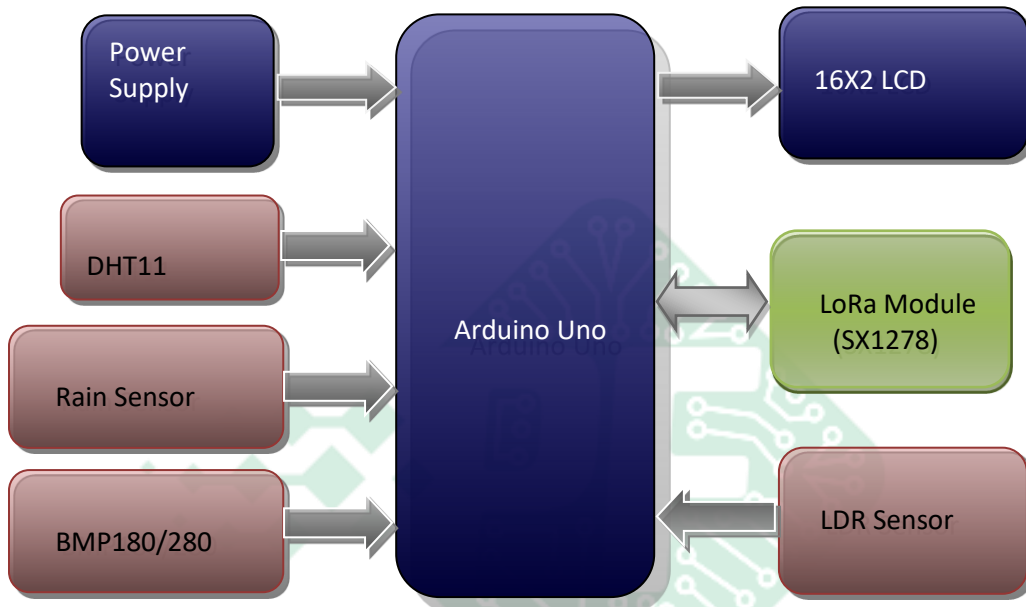|		
Microcontrollers	:	Arduino Uno and ESP32 (Nodemcu)
Crystal	:	16 MHz
LCD	:	16X2 LCD
LoRa Module	:	SX1278
Temp Sensor	:	DHT11
Humidity Sensor	:	DHT11
Soil Moisture	:	Resistive type
Rain Sensor	:	Resistive type
Light Sensor	:	LDR sensor
Atmospheric Pressure Sensor	:	BMP180/280
Power Source	:	12v 1 amp DC Adaptor

SOFTWARE:

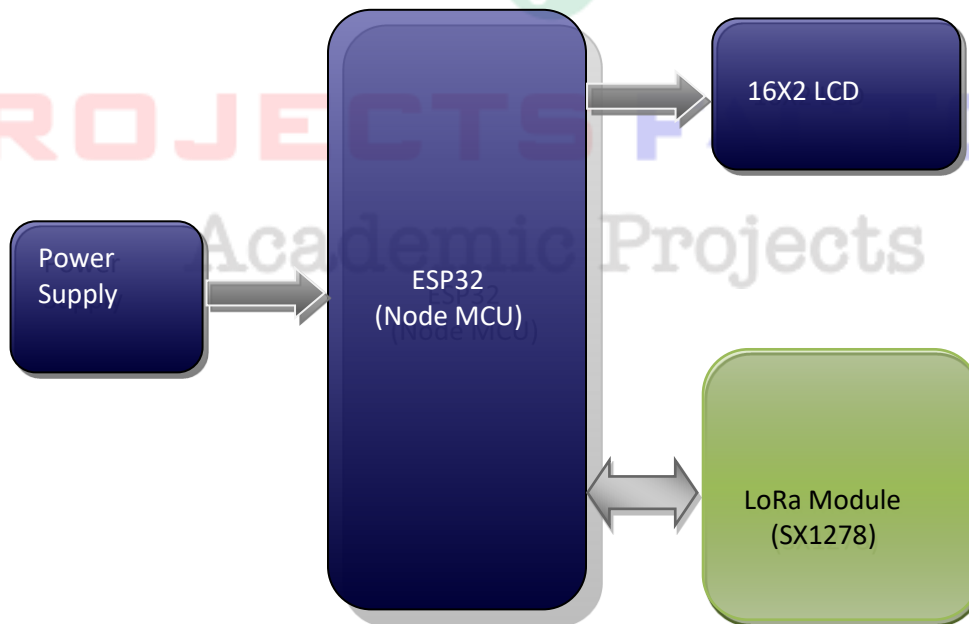Arduino IDE
Proteus based circuit diagram

APPLICATIONS:

➢ Weather Station
➢ Data Logger
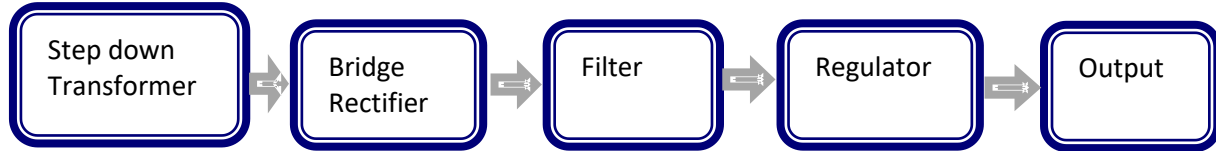➢ LoRa and Sensors data collector

BLOCK DIAGRAM:

Transmitter Section:

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Power Supply ──▶ Arduino Uno ──▶ 16X2 LCD
DHT11 ──▶ Arduino Uno
Rain Sensor ──▶ Arduino Uno
BMP180/280 ──▶ Arduino Uno
Arduino Uno ◀──▶ LoRa Module (SX1278)
Arduino Uno ◀── LDR Sensor
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Receiver Section:

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ESP32 (Node MCU) ──▶ 16X2 LCD
Power Supply ──▶ ESP32 (Node MCU)
ESP32 (Node MCU) ◀──▶ LoRa Module (SX1278)
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POWER SUPPLY BLOCKDIAGRAM:

Step down Transformer → Bridge Rectifier → Filter → Regulator → Output

INTERFACES COVERD:

- We have covered LoRa module interface
- DHT11, LDR, Rain sensor and BMP180/280 sensors interface