LORA BASED INTELLIGENT HOME AUTOMATION SYSTEM

AIM:

Design and Development of LoRa based intelligent home automation system.

PURPOSE:

There are several home automation systems available in market. Most of the systems have technologies like RF, GSM, WIFI and Zigbee. Among all these technologies some of them are internet based and some of them are not. The advantage of internet based systems is can be controlled from remote location. But these kinds of systems are not maintenance free. At least they should have internet through their mobile. Here we want to implement LoRa based home automation that can control home appliances from far distance. The main advantage of LoRa is low power and long range. The project title is LoRa based intelligent home automation using Arduino and ESP32 nodemcu.

DESCRIPTION:

This project is divided into two parts. One is transmitter and another one is receiver. At transmitter side – ESP32 Nodemcu interfaced with LoRa (SX1278) through SPI communication. At receiver side – Arduino uno interfaced with Lora (SX1278) SPI port. Also two relays connected to Arduino uno digital pins to control fan and light respectively.

WORKING:

At transmitter side ESP32 nodemcu has inbuilt WIFI and that can provide webserver with HTML page on local host. Webpage shows appliances control buttons. We can open web page in mobile or in laptop. By pressing buttons in html page ESP32 nodemcu sends commands to LORA (sx1278) receiver. At receiver side LoRa receives commands and control respective load. All this processing information will be displaying on 16x2 LCD display.

TECHNICAL SPECIFICATIONS:

HARDWARE:

Microcontrollers   :   Arduino Uno and ESP32 Nodemcu

Crystal   :   16 MHz

LCD   :   16X2 LCD

LoRa Module   :   SX1278

Relay   :   12V DC

Fan   :   12V DC

Light   :   230V AC
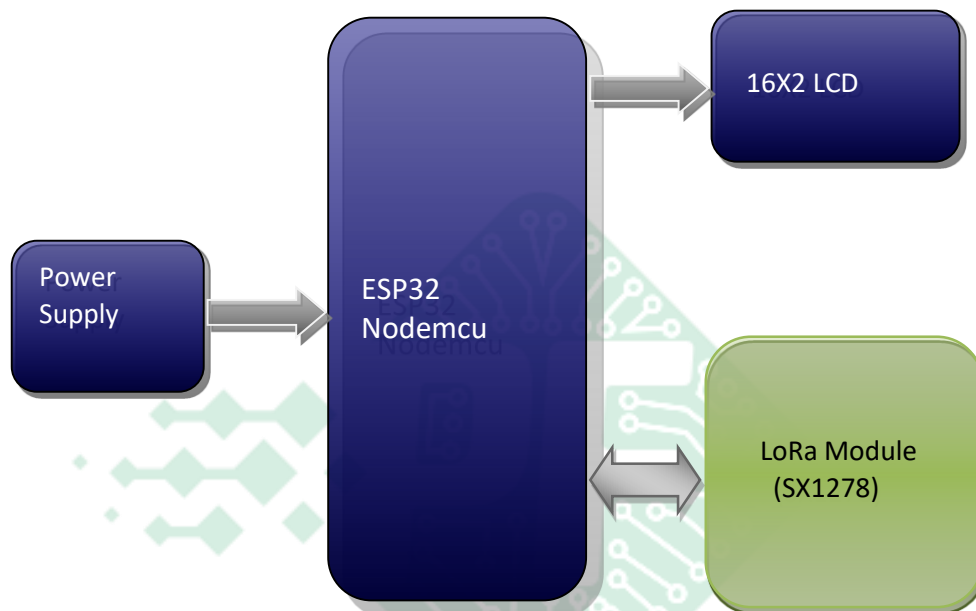
Power Source   :   12v 1 amp DC Adaptor

SOFTWARE:

Arduino IDE
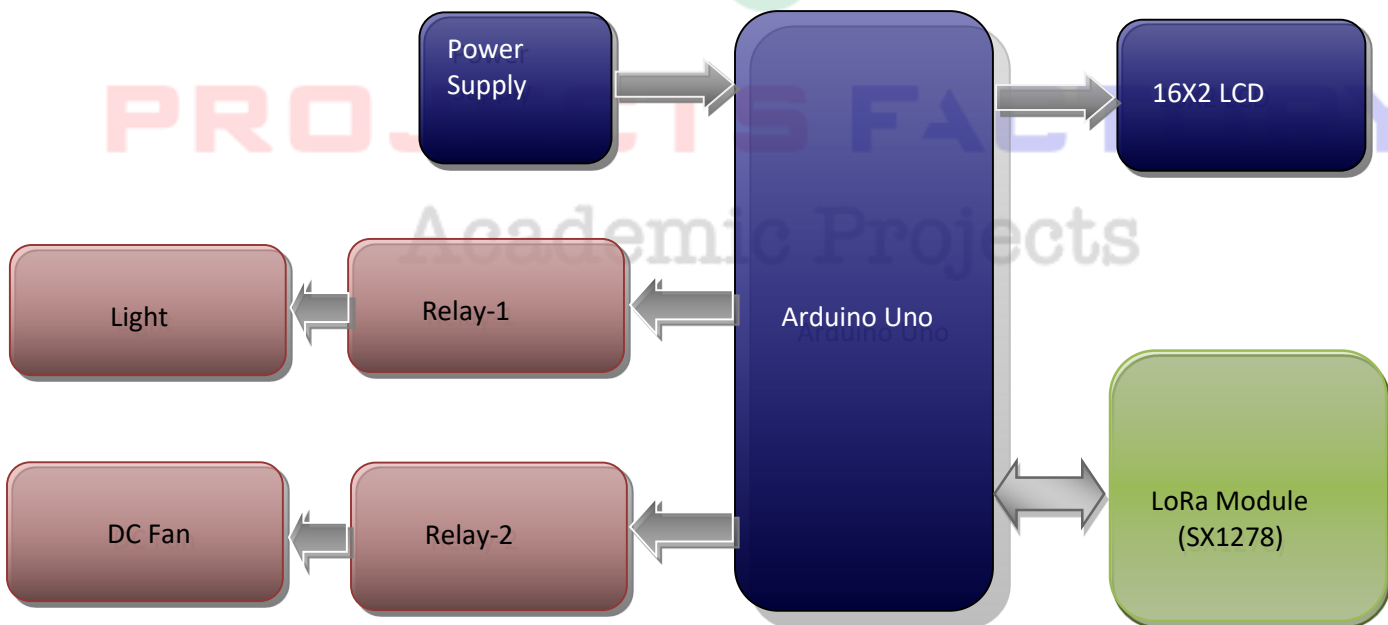
Proteus based circuit diagram

APPLICATIONS:

➢ Smart Home Automation
➢ Industrial Load Control
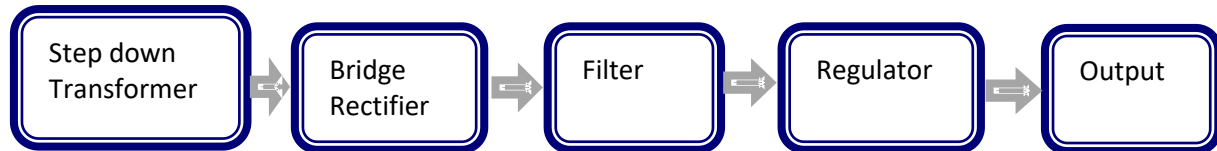➢ Long range Home appliances control

BLOCK DIAGRAM:

Transmitter Section:

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Power Supply → ESP32 Nodemcu → 16X2 LCD
                             ↔ LoRa Module (SX1278)
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Receiver Section:

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Power Supply → Arduino Uno → 16X2 LCD
Light ← Relay-1 ← Arduino Uno
DC Fan ← Relay-2 ← Arduino Uno
Arduino Uno ↔ 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
- Relay and load controls