LORA DRIVEN HOME SECURITY SYSTEM FOR A RESIDENTIAL COMMUNITY IN A RETIREMENT TOWNSHIP

AIM:

Design and Development of A LoRa driven home security system for a residential community in a retirement township.

PURPOSE:

Modern technology can change our live by bringing more advancement. Irrespective of field, every devices and gadgets connected to each other and with internet. For residential and commercial premises, emergency alerts need for alerting owners. Means security is primary concern for everyone in everywhere. LoRa is an advanced technology that can support more distance and less power consumption. In our proposed system LoRa will play major role and it can communicate with internet. The proposed project title is LoRa driven home security system for a residential community in a retirement township.

DESCRIPTION:

There are two parts in this project. One is transmitter and other one is receiver. At transmitter side – Arduino connected with LoRa module (Sx1278) through SPI communication. Door sensor, Panic sensor, smoke sensor and fire sensor connected to Arduino digital pins. At receiver side – ESP32 Nodemcu and LoRa connected each other as like at transmitter side. On both the sides LCD connected to controllers digital pins.

WORKING:

Limit switch act as like door sensor and door open, close status detected through limit switch. Normal button for panic alert. Mq2 sensor can detect smoke in air. IR type fire sensor can detect fire presence

surrounding of it. All these sensors data monitored by Arduino and Displaying on 16x2 LCD display. Also same data will transmit to receiver side LoRa module. ESP32 nodemcu receives sensors data through LoRa module and displaying on LCD display. At the same time data will upload to IOT cloud server. Home residents and owners can monitor data from remote areas. Receiver side LoRa section will act as like LoRa gateway.

TECHNICAL SPECIFICATIONS:

HARDWARE:

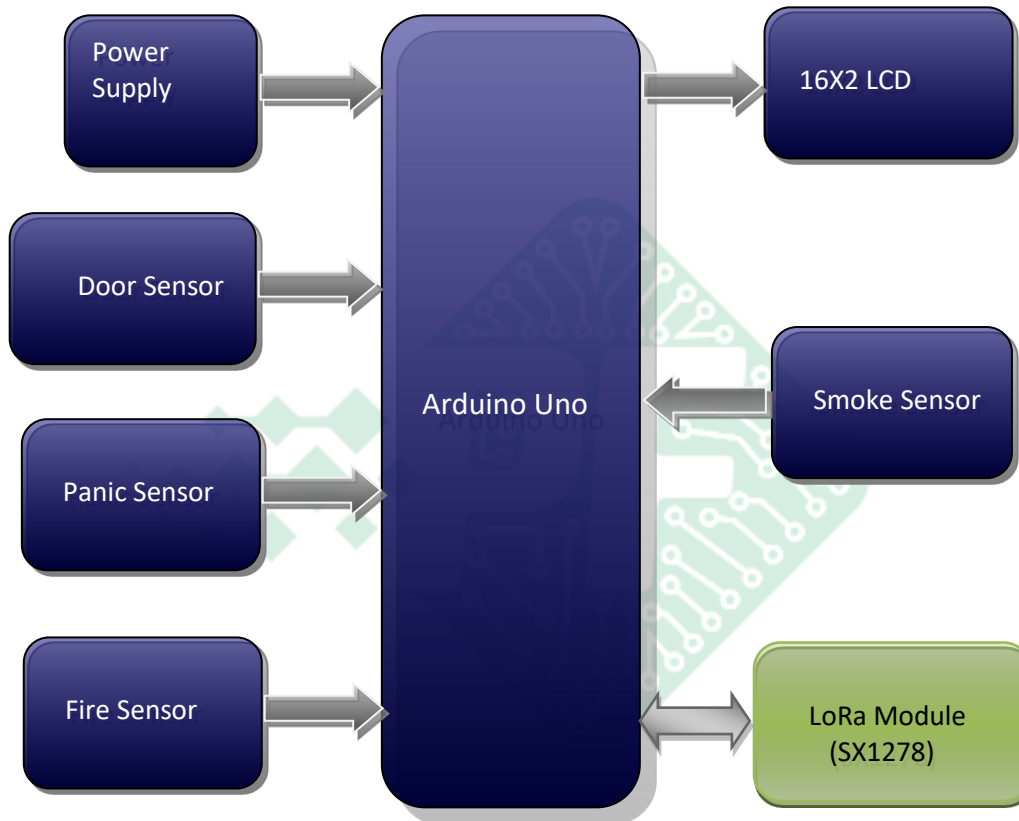|		
Microcontrollers	:	Arduino Uno and ESP32 Nodemcu
Crystal	:	16 MHz
LCD	:	16X2 LCD
LoRa Module	:	SX1278
Smoke Sensor	:	MQ2
Door Sensor	:	Limit Switch
Panic Sensor	:	Button
Fire Sensor	:	IR type
Power Source	:	12v 1 amp DC Adaptor

SOFTWARE:

Arduino IDE

Proteus based circuit diagram

APPLICATIONS:

- ➢ Security Systems
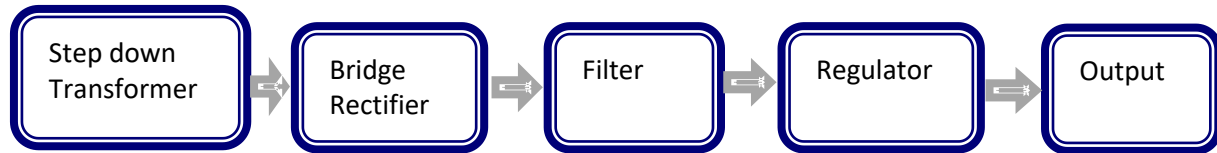- ➢ LoRa Gateway Applications

BLOCK DIAGRAM:

Transmitter Section:

```
Power Supply ──────▶ ┌──────────┐ ──────▶ 16X2 LCD
                     │          │
Door Sensor ───────▶ │          │ ◀────── Smoke Sensor
                     │ Arduino  │
Panic Sensor ──────▶ │   Uno    │
                     │          │ ◀────▶ LoRa Module
Fire Sensor ───────▶ │          │        (SX1278)
                     └──────────┘
```

Receiver Section:

```
                    ┌──────────┐ ──────▶ 16X2 LCD
Power Supply ─────▶ │  ESP32   │
                    │ Nodemcu  │ ◀────▶ LoRa Module
                    │          │        (SX1278)
                    └──────────┘
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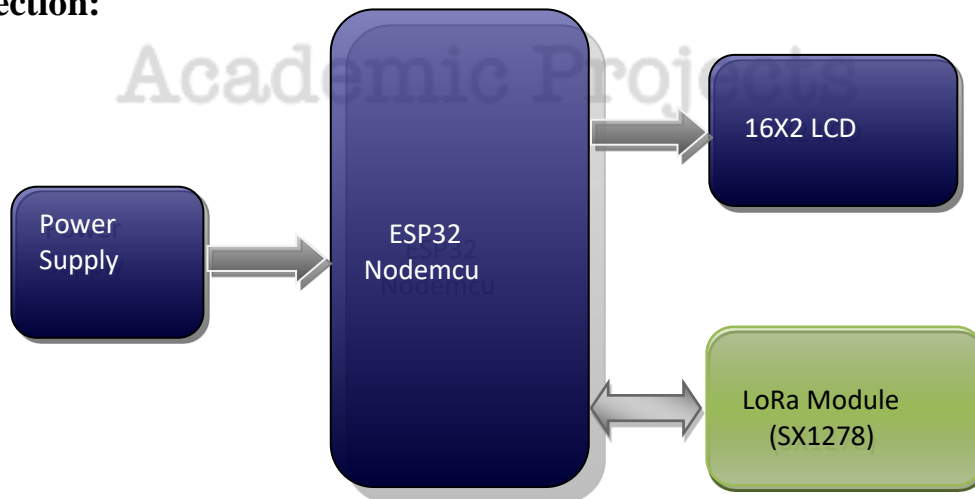
POWER SUPPLY BLOCKDIAGRAM:

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

INTERFACES COVERD:

- We have covered LoRa module interface
- Sensors like Smoke, fire, panic and limit switch interface
- Arduino and ESP32 nodemcu