

GARBAGE MONITORING SYSTEM USING LORA TECHNOLOGY

AIM:

Design and Development of Garbage Monitoring System Using LoRa Technology.

PURPOSE:

Maintenance of garbage and collection is very important for clean environment. Especially in large cities, it is difficult to know which dustbin is filled. Waiting two three days to collect dustbin will create lot of issues like garbage at outside of bin, unhygienic and causing pollution. To solve this problem we have solution with LoRa technology and some sensors interface. Here each garbage bin has ultrasonic sensor to identify level of garbage. Also GPS to send location of garbage. This will helps to identify garbage bin level with location. Each garbage bin has LoRa transmitter and sends data to LoRa gateway. This communication doesn't need internet connectivity so that it doesn't require maintenance. LoRa is a Long range wireless technology with packet type communication. Proposed project title is Garbage monitoring system using LoRa technology.

DESCRIPTION:

Ultrasonic sensor interface with Arduino digital pins. It has trig and echo pins to transmit ultrasonic waves and for receiving. GPS module interface with Arduino UART pins. LoRa transmitter connected to Arduino SPI port. ESP32 nodemcu connected to LoRa SPI port. This will act as LoRa gateway.

WORKING:

Arduino always reads ultrasonic distance. If distance is less that means garbage is going to fill. It will display this information on LCD and transmit to LoRa receiver with some time delay. At receiver side LoRa receives data and send to nodemcu. Nodemcu has inbuilt WIFI to connect with internet. Our

cloud serve is part of internet and receives data from LoRa gateway. We will get Garbage level status in IOT server along with GPS location. IOT server provides location of garbage bin on Google maps. Garbage collection department can easily identify which garbage bin is going to fill in which location.

TECHNICAL SPECIFICATIONS:

HARDWARE:

Microcontrollers	:	Arduino Uno and ESP32 Nodemcu
Crystal	:	16 MHz
LCD	:	16X2 LCD
LoRa Module	:	SX1278
Distance Sensor	:	HC-SR04 Ultrasonic Sensor
GPS Module	:	NE series module
Power Source	:	12VDC adaptor

SOFTWARE:

Arduino IDE

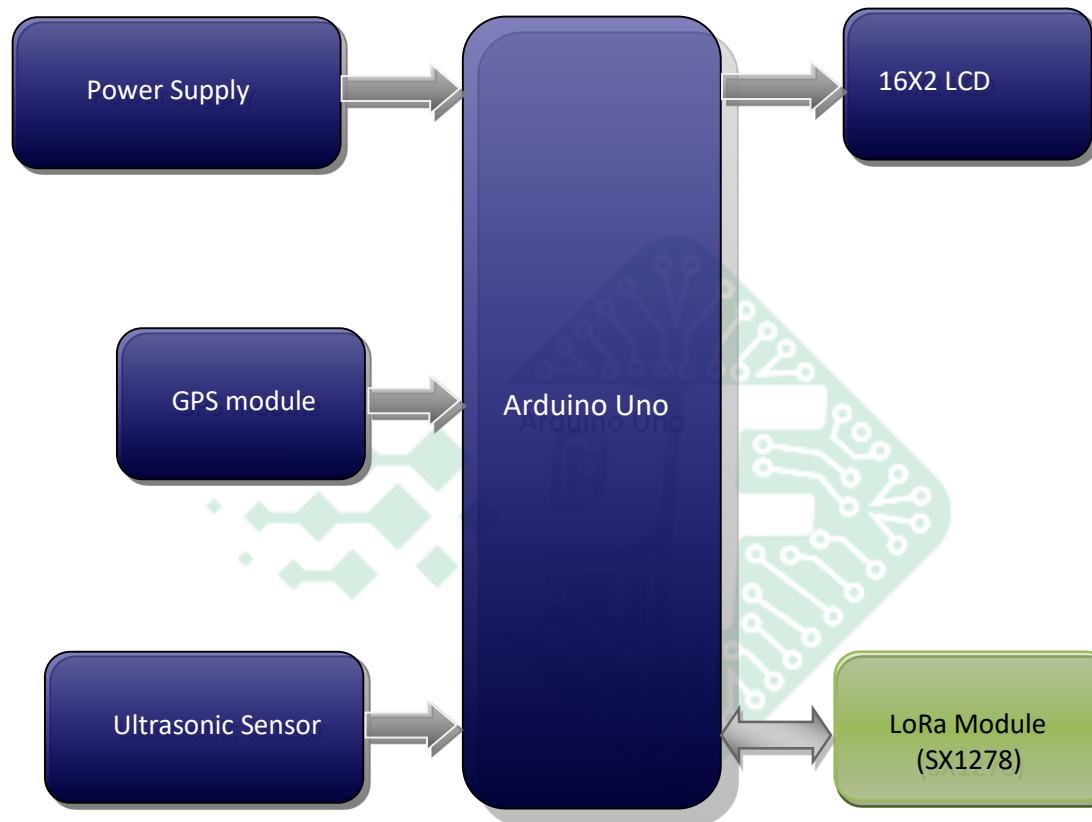
Proteus based circuit diagram

APPLICATIONS:

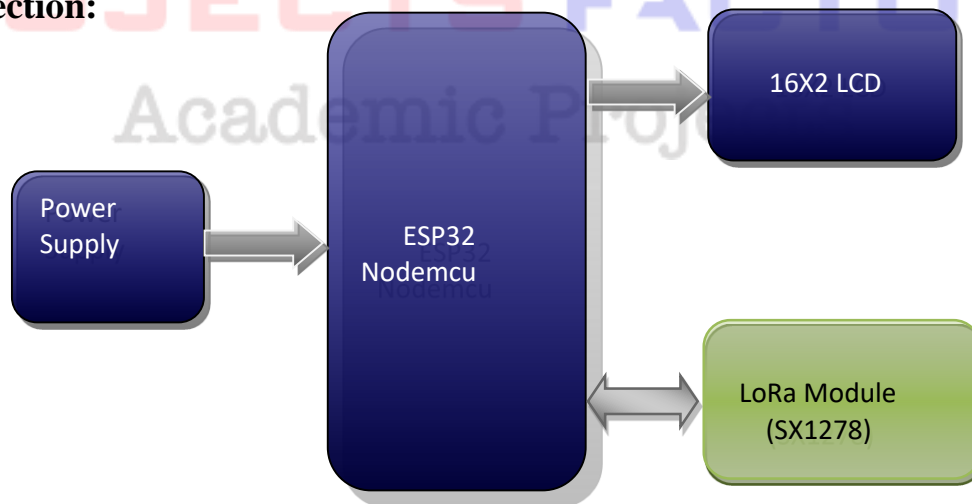
- Smart garbage applications
- Waste management applications

BLOCK DIAGRAM:

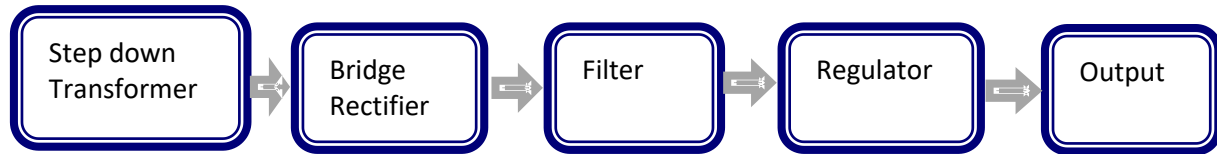
Transmitter Section:



Receiver Section:



POWER SUPPLY BLOCKDIAGRAM:



INTERFACES COVERED:

- We have covered LoRa module interface along with Arduino and ESP32 nodemcu
- Sensors like Ultrasonic (HC-SR04) and GPS module interface

PROJECTS FACTORY
Academic Projects