SMART DRAINAGE SYSTEM

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ABSTRACT

India has making the smart cities. Making the smart cities require smart things to full fill the requirement of smart drainage in smart cities. We all are known to make city clean we have to focus on our drainage system. Due to the smart drainage system we are able to make the city clean properly at time to time. Mostly at rainy season the problem are occur in drainage like many blockages, dangerous gases and high temperature etc. Due to the industrial Area dangerous gases and high temperature are created in the drainage which is harmful to the worker. Taking in the mind high temperature, bad gases and blockages are detected by our System to take care the safety of worker as well as clean the city well with underground drainage.

Keywords: Drainage, Gas Sensor, Arduino, Ultrasonic.

I.   INTRODUCTION

Many cities in India have an underground drainage system and Municipal Corporation manages the sewage system for clean and healthy climate. To make the city smart we have to clean it's drainage system. We all are know the importance of the drainage to clean at proper time to time. Drainage is disrupted over various seasons due to change in climate, and the environment is volatile and disturbs people and disturbs their daily lives. To solve these kind of problem of drainage system and to inform the respective municipal corporation office by sending text notification along with location of manhole, so that the officials can take the necessary steps to repair drainage system. The dangerous gas which is generated by chemicals are detected by the Gas sensor to prevent explosion by the pressure inside the drainage system. At the manhole water level is detected by the ultrasonic sensor and also if the high temperature is occur in drainage due to some reason then

it will detected by LM35 sensor . When the drainage is When the drainage is blocked at manhole and system is blocked then by using the sensors we take information of drainage and using sensor and information is transmitted via text message to the nearby municipal corporation official using GSM as well as provide the location of manhole using the GPS.

1.1 Necessity of Smart Drainage System:-Urban floods are entirely manmade with poorly maintained drains, plastic bags, shrinking open spaces and climate change contributing to accumulation of water on roads after a heavy downpour. In 2017 in Bellundur Lake(Bangalore) was back with dirt, foul-smelling froth due to heavy rainfall and lack of proper drainage system. Due to Bellandur lake tragedy 76 polluting Industries were shut. Heavy rainfall in Delhi had flooded roads and caused huge traffic snarls. Chennai has witnessed severe flooding in 2015 while floods in Mumbai had killed 500 people. This tragedy are result of lack of drainage system indulged with advanced technology.

1.2 NEED OF PROJECT/PROBLEMS
STATEMENT:

- We observe that in the underground drainage it quit difficult to find the blockages manually. The required time is more to find the exact blockages of drainage at manhole.

- To protect the workers from chemical gases like CO(carbon monoxide).

- In the project the exact point of blockages at manhole will be detected and the required time will be less for employs of municipal office.

- For good health of workers the dangerous gases and the high temperature detected.

II.   LITERATURE SURVEY

Smart Drainage Monitoring System using IOT which describes the need of the smart underground infrastructure to keep the city clean, safe and healthy. The system makes use of microcontroller which collects the information from all the sensors such as blockage, temperature, hazardous gas by using ultrasonic sensor, temperature sensor (LM35), gas sensor( ) respectively . which are interfaced to it and the obtained results are sent as early alerts to the municipal corporation persons through GSM and the location of the manhole is identified using GPS. Since GSM is sending the alerts along with which the location can also be sent, hence there is no need of using GPS as it requires power supply.

DEFINATION OF PROJECT

"THE SMART DRAINAGE SYSTEM**",** this project deals with the drainage cleaning and worker safety application. One ultrasonic sensor is connected to the closing end of manhole. Suppose that at the manhole if water level is increases then it sense the level. Along with Gas sensor and Temperature Sensor sense the dangerous gases and high temperature respectively in the drainage if available. All the collected data from these sensors are given to the respective corporative office by the text massage using GSM900A. The location of the manhole point is sent by GPS.

RELATED WORK

- Detecting the blockages of drainage system at manhole by using the ultrasonic sensor
- Threshold level of temperature and dangerous gas are sensed by LM35 temperature sensor and CO gas sensor respectively and information is send to controller.
- Controller collect data from the sensors and send it to GSM and GPS.
- GPS send the location of blockages.
- GSM send text massages to the municipal registered office.

A. HARDWARE REQUIREMENTS:

- Microcontroller board(ARDUINO)
- Power supply
- GSM
- GPS
- Gas sensor
- Temperature sensor
- Ultrasonic sensor

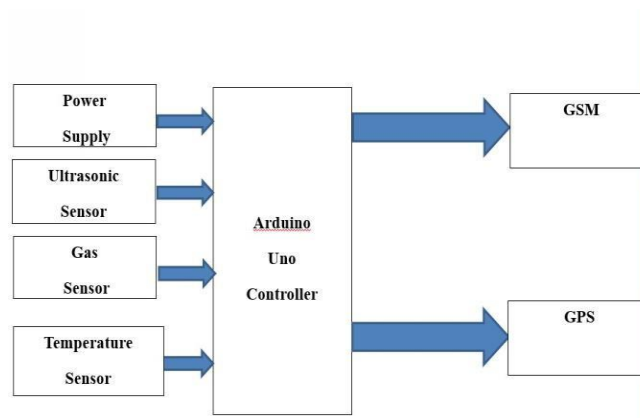**SOFTWARE REQUIREMENTS:**

- Arduino IDE

B. BLOCK DIAGRAM:

Fig. 1: Block diagram of proposed system

C. COMPONENT DESCRIPTION:

1. **Arduino Uno:**

- The Arduino Mega is a microcontroller board based on the ATmega328p.

- It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 Analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

- It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

2. **GSM:**

The Global System for Mobile Communications (GSM) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets.

3. **Ultrasonic sensor:-**

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work:

4. **Gas sensor:**

A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage.


5. **Temperature sensor(LM35) :**

A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or

signal temperature changes

6. GPS:

GPS, or the Global Positioning System, is a global navigation satellite system that provides location, velocity and time synchronization. GPS is everywhere. You can find GPS systems in your car, your smartphone and your watch.
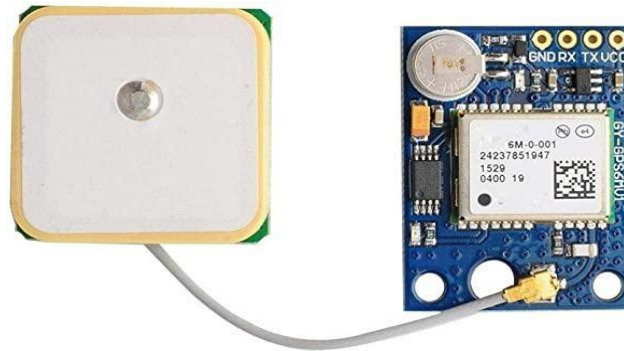
ADVANTAGES:-

1. Cleaning city
2. Work easy for municipal officer.
3. 3.Cost is Low
4. Power Saving

LIMITATIONS:-

1. It uses only at manhole
2. Blockage detected only at manhole point.

WORKING ALGORITHM:-

1. Start
2. Power up hardware.
3. Initialize hardware module
4. Ultrasonic sensor sense the blockage if find.
5. Controller receive information from sensors.
6. Temperature sensor sense threshold temperature.
7. Gas sensor sense the toxic co(carbon monoxide) gas.
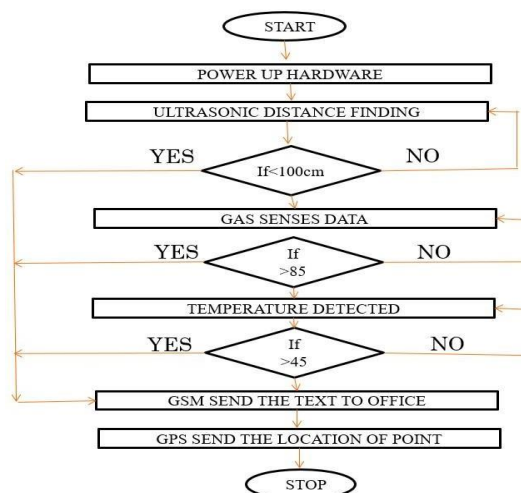8. By using gsm text message will send.
9. Stop

FLOW CHART:-

Fig. 2: Flow chart of proposed system

APPLICATION:-

1. Application for metropolitan cities and smart cities.

2. A real life, demanding application is selected as reference to platform structure, flexibility and reusability.

III. RESULTS

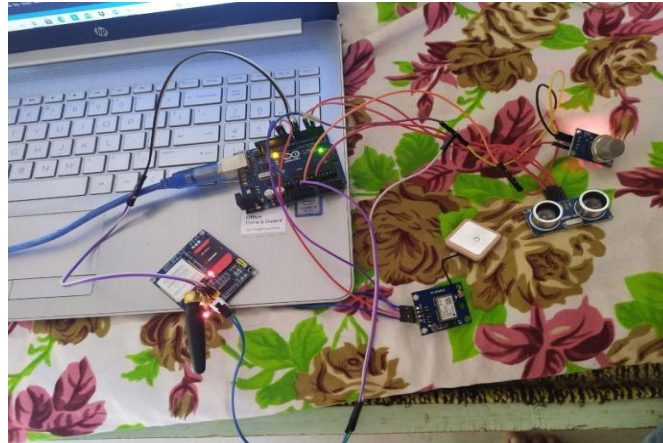Integrating all the hardware component with controller.
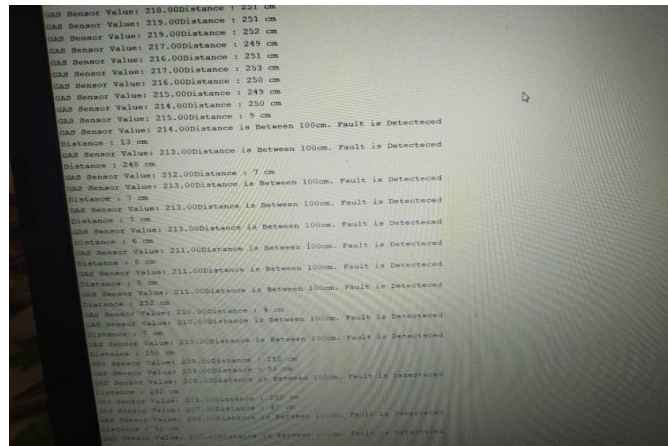

Fig. 3: Integration of hardware.

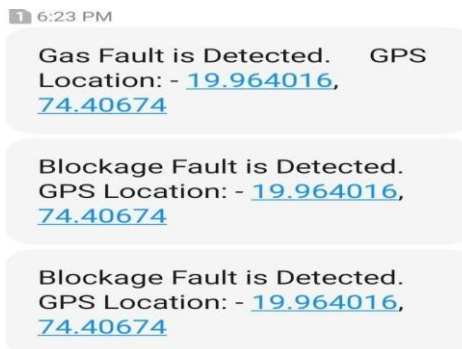**Fig. 4:** The Overall Data Of System.

Fig. 5: Generated result through system.

IV. CONCLUSIONS

1. By using various sensor such as gas detection , ultrasonic blockage detection we can monitor the real time scenario of the drainage system by detecting the problem the drainage system

2. Using this concept we can able to take a particular action on the problems as we will receive the early alert of blockage.

FUTURE SCOPE

3. Time saving and reliable concept.
4. Limitations of concept
5. Feasibility
6. Smart cities.

ACKNOWLEDGEMENT

V.   REFERENCES

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