SMART DRAINAGE MONITORING SYSTEM USING IOT

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Abstract: *The major problem in India is sewage system. Because the drainage system is poorly managed, the drainage water is overflowing on the streets and sometimes mixes in the drinking water that damages people's health conditions, to address this issue we are proposing the model called Smart Drainage Monitoring System. This proposed system would track the level of water, flow of water and harmful gas in the sewage system. The range of values will be stored in the cloud storage, then analyzed. The status of drainage is will be sent as SMS through the Blynk server to near the corporate office. Then the corporation people will take appropriate action.*

Keywords: Drainage, Internet of Things, GPS.

I Introduction

Many cities in India have an underground drainage system and Municipal Corporation manages the sewage system for clean and healthy climate. The water in the drainage system is sometimes mixed with pure water, due to poor maintenance. The drainage system can spread to the atmosphere and diseases that caused by pathogens. 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 all the problems of the drainage system and to inform the municipal corporation by sending Blynk notification of the state of the drainage system, so that the officials can take the necessary steps to repair drainage system.The gas itself formed inside the bio-waste drainage system was also detected using a gas sensor to prevent explosion by the pressure inside the drainage system. So our aim of this idea is to track the drainage system using the sensor. When the sewage system is blocked or water overflows or the drainage lid is removed, the drainage is monitored using sensor and sensed information is transmitted via Blynk to the nearby municipal corporation official using integrated Wi-Fi, and the water overflow and gas value is displayed live in the cloud for later analysis. And the particular drainage's GPS location is also sent via Blynk Server.

II. Related Work

1. **"Monitoring Smart City Applications using Raspberry PI Based on IOT"** This paper consists of the Smart City as the development target to track the quality of the resource in the city to improve good management and faster development of the city necessary requirement is to upgrade healthy and safe cities that provide real time services and the latest facility to implement the concept of smart city using IoT concept by which easy wireless communication is possible. The system consists of sensors, collects different types of data from the sensors and transfers to the Raspberry Pi3 controller. The output obtained from the controller is sent via e-mail to the control room and is also displayed on the personon the personal computer.

2. **"Automated Internet of Things for Underground Drainage and Manhole Monitoring System For Metropolitan Cities"** This paper consists of the IoT made up of real-life objects, communication devices linked to sensor networks to provide connectivity and automated action between the real world and the information system. IoT has come into existence since, without human interaction, Computers have been able to access data from objects and devices, but they have been programmed to resolve the limiting factors of human data entered and to achieve cost, accuracy and general factors. The Sensor Network is the main contributor to the IoT system. This is the implementation and design features of the Underground Drawing and Manhole Monitoring System (UDMS) for IoT applications. The key considerations of this design are low cost, low maintenance, quick deployment and a high number of sensors, long service life and good service quality.The proposed model provides a system for measuring water level and atmospheric temperature and pressure within the manhole and checking if the manhole lid is accessible. It also monitors the electrical power lines that are built underground. The UDMS will remotely track the current state of the manholes in the real time.

3. **"Internet of Things in Drainage Management System"** The paper discusses the Smart Waste water Treatment System. The drainage framework describes the design and mechanism used by IOT to identify and clear blockages in the drainage network. The manholes in the drainage network have a module that has a micro-controller interface with a gas sensor, a level indicator, and an RFID. Whenever the level sensor senses a blockage between the two manholes, the warning is activated. Whenever the level sensor senses a blockage between the two manholes, the warning is activated.

4. **"Drainage Overflow Monitoring System using IoT (DOMS)"** The proposed device would track the amount of water and gas in the sewage system and the calculated values will be recorded in the cloud storage unit and the state of the sewage system will be submitted as SMS to the corporate office utilizing the GSM module.

5. **"Underground Drainage Monitoring System"** The proposed system consists of an underground drainage monitoring system consisting of a range of sensors that detect the leakage of the sewage, the level of drainage, the concentration of hazardous gasses in the manhole. The flow rate and send the information to the authority via GSM module

III Methodology
a. Components

1. **Node MCU:** Node MCU is an IoT framework that is open source. A micro-controller device is a compact machine operating on an integrated circuit board with single MOS. A micro-controller has one or more central processing units, with memory peripherals for input / output.

2. **Gas Sensor:** A gas detector is a device that usually as part of a security system detects gas occurrence in a region. This type of equipment is used to notice gas leakage or other emissions, and can interface with a control system to automatically shut down a method. A gas detector may sound an alarm associated with operators in the region where leak occurs, allowing them to leave.

3. **Ultrasonic Sensor :** An ultrasonic detector is a device that tests the distance to an object by taking sound waves. This detects distance by allowing a sound wave to return at a specific frequency and by waiting for that sound wave.

4. **Liquid Crystal Display LCD:** Liquid crystal Display LCD is a blend of two solid and liquid states of matter. It is an electronic display module with a 16x2 LCD screen which says that it has 16 characters with respect to 2 rows. LCD uses a crystal liquid to produce a visible image. Such technique has been used to show an picture on a laptop or some other computer tool.
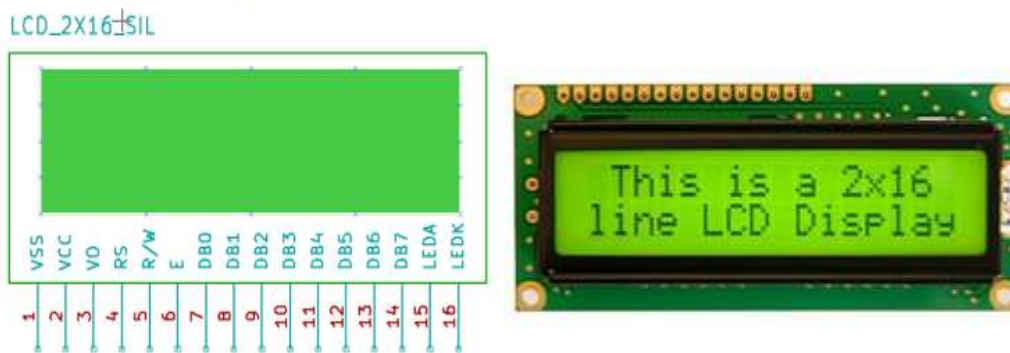
5. **Flow rate sensor:** Water flow sensors are mounted to determine the water flow rate and to calculate the amount of water flowing through the pipe. The rate of water flow shall be expressed as liters per hour or cubic meters.

6. **GPS module:** GPS utilizes satellites to detect the location of any GPS monitoring chip item, including cars, humans and pets. This functions independently of atmospheric factors and offers spatial details in real time.

7. **Blynk application for android:** Blynk was set up for the IOT. It can remotely track devices, display sensor data, store data, simulate and do a lot of other cool things. There are three major components on the platform: 1) **Blynk App** - Lets you to create stunning interfaces for your projects using the various widgets that we provide. 2) **Blynk Server** - Responsible for all interactions between smartphones and equipment. You may either use our Blynk Platform or operate your own Blynk server locally. It's open-source, can accommodate thousands of devices quickly, and can even be installed on   a   Raspberry Pi. 3) **Blynk Libraries** - All common hardware platforms-enable contact with the server and process both incoming and outcoming commands.

b. Proposed Methodology

Fig.1 shows the system block diagram of the proposed system, the network consists of GPS sensors nodes, network coordinator, and Cloud storage.A remote graphical user interface is further developed to examine the information and analysis results. Based on the proposed system architecture, sensor nodes response to sample the physical parameter to measurable voltage level through corresponding sensors; The Blynk server is then used to transfer these acquired data to the organizer via a wireless connection. Coordinator is focusing to constellation maintenance, collect data and transfer the reassemble information to the cloud

storage using the Wi-Fi through mobile internet. Open WSN Cloud data storage platform Blynk custom-made in this work. The Blynk platform offers versatile data assortment and visual image; therefore ease the support of enormous number of sensor data and GPS locations are streams and viewed.
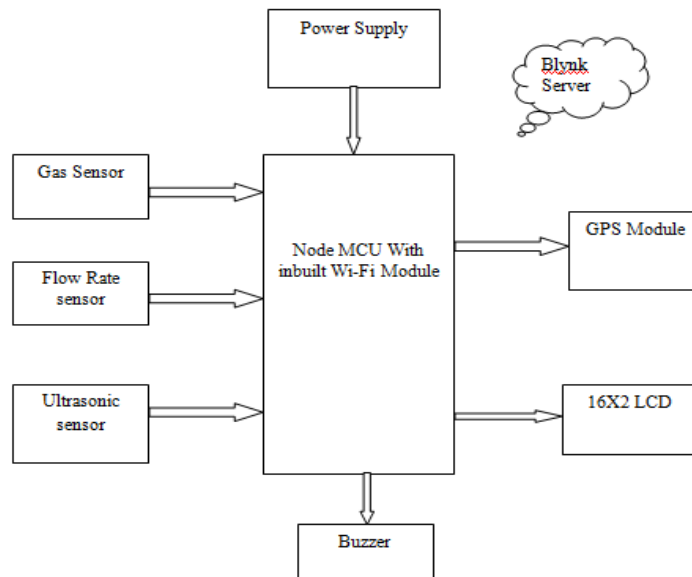

Fig.1 Block Diagram

As Shown in Fig.2 Link the device (Hardware) to the power supply. Initially, the LCD shows the flow rate and the system's environmental state, with or without dangerous gases. If the ultrasonic sensor is triggered, the buzzer will be activated and the sound and GPS position and the notification will be transmitted to the registry phone. If there is a wave, the wave sensor is sensed and the flow rate is reflected on the LCD.
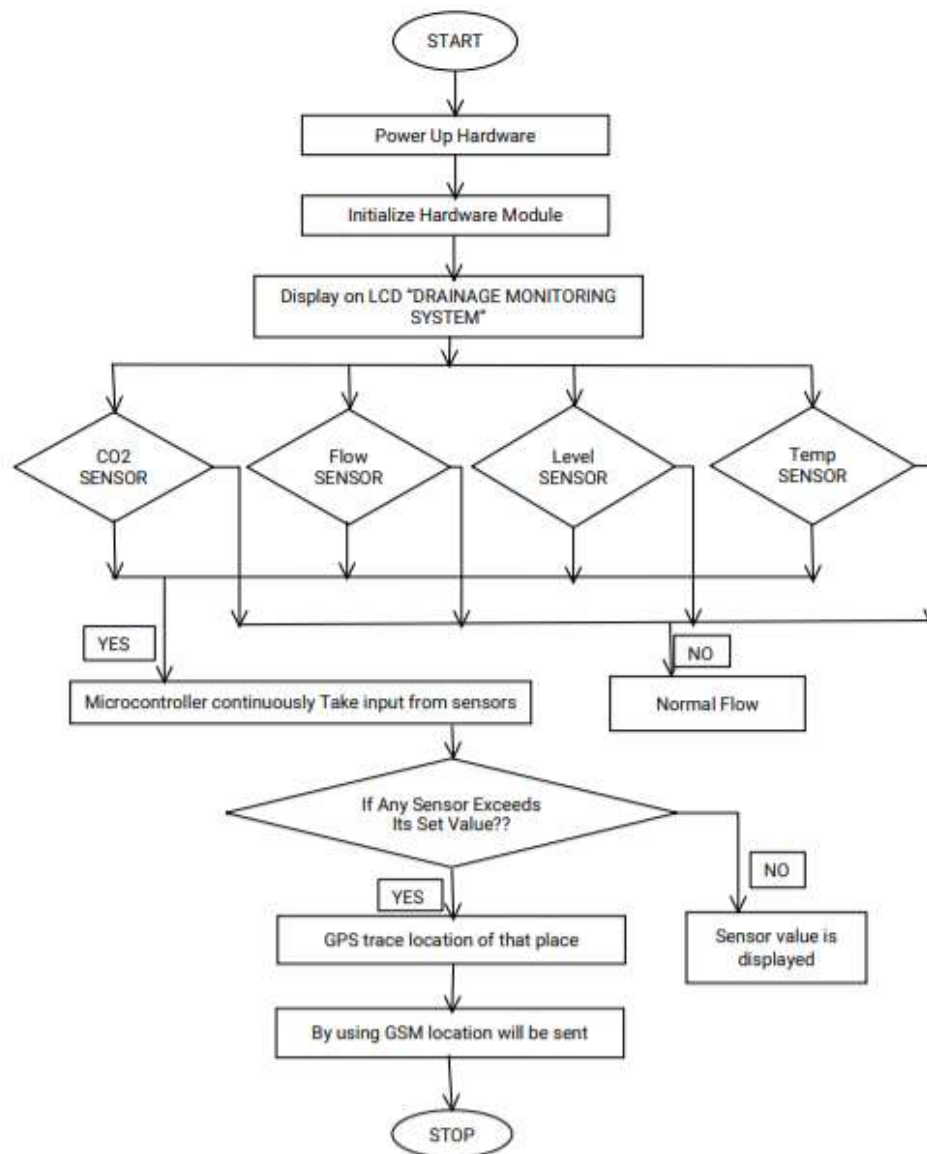
Fig.2. Flowchart of Smart Drainage System

c. RESULTS

When the system gets started by taking power supply externally all the sensors will start working. The gas sensor senses the harmful gases and reports to node MCU. The water flow rate sensor will check the flow of water and also check the level of water and sends the values to the node MCU. No de MCU which is having the in built wifi module will process

the information/values sent by the sensors and will be displayed in blink server app. The recorded values will be displayed in 16X2 LCD and if sensed values exceeds the threshold values then buzzer starts making sound.

Fig.3 Prototype of working model

IV CONCLUSION

Our project helps to reduce the problems of drinage system with the help of sensors like ultrasonic, gas and flow sensors. Our mechanism helps to notify the registered number, when the harmful gases are detected to gas sensor and level is detected by ultrasonic sensor, with help wi-fi module like NODE_MCU ardino which is connected with the blink server. By this project the underground drinage system can be easily organized.

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