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Smart Drainage Monitoring System

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Abstract: *Currently, the concept of a smart city is implemented through elements such as smart farming, smart emergency services, and smart traffic analysis, among others. A smart city should also have an automated system for smart drainage since the drainage system is one of society's necessities. The sewage system in India is one of the biggest problems. Poor upkeep causes sewage water to periodically mix with drinking water and overflow onto the streets, endangering the health of nearby residents. We suggest the Smart Drainage Monitoring System model to solve this issue. The subsurface drainage system's water level, water flow rate, and gas level will all be monitored by this planned system. The measured values will be evaluated, saved in the cloud, and used to update an app that tracks the health of the drainage system. A notification addressing the problem will be delivered to our mobile when the conditions turn critical (reach threshold values). The goal is to develop a solution utilising cutting-edge IOT technologies to obtain a thorough examination of the data gathered by various IOT sensor*

Keywords: NODE MCU, ARDUINO IDE, ULTRASONIC SENSOR,STEAM SENSOR

I. INTRODUCTION

The drainage system is crucial in a big metropolis where millions of people utilise water, rainwater, and waste water. Drainage cannot be manually observed. The drainage obstruction has been exacerbated by the inconsistent monitoring, which suggests that the neighbourhood flooding is also a result of ineffective manual monitoring. It takes a large number of committed people, each of whom is only able to precisely record a certain number of reports. The city's regular transportation routes may be significantly impacted by the problem with these drainage systems. If correct cleaning procedures are not periodically followed , issues like debris clogging the drain, an abrupt r ise in the water level, and various dangerous gases can develop. It is challenging to tell i f a blockage has occurred in a specific spot because the drainage system of today is not autom ated. Furthermore, methane and carbon m onoxide (CO) can occasionally be produced by the waste in those drainage channels (CH4). which are dangerous and can lead to fatalities i f inhaled by people in high numbers, as drainage workers have discovered. Also, neither the r ise in the water level nor the growth in the quantity of such gases are immediately communicated to us.

II. OBJECTIVE OF SYSTEM

More efficient and cleaner cities. City drainage control determining the blockages and water level in the drainage. The monitor shows the water flow rate and automatically delivers notifications if the water level deviates from the anticipated typical range. The main goal is to come up with a mechanism for managing the city's infrastructure and keeping an eye on its status that is affordable, flexible, and successful.

The Smart Drainage Monitoring System, which can identify gas leaks and update it in real-time using the Internet of Things, is made up of an open-source Wi-Fi module called NodeMCU and three sensors. The three types of sensors used are ultrasonic, flow, and gas sensors. These three sensors enable us to monitor the drainage system for indications of gas leaks or overflows by sending an alert message anytime the sensor output values surpass threshold values. We can monitor the amount of drainage water, the movement of water, and gases using the Blynk app.

III. MOTIVATION

The current drainage system is not very sophisticated. As a result, it can be difficult to locate any impediment with precision. Also, there are no early indications of the blockage. It takes longer to locate the obstruction and fix it as a

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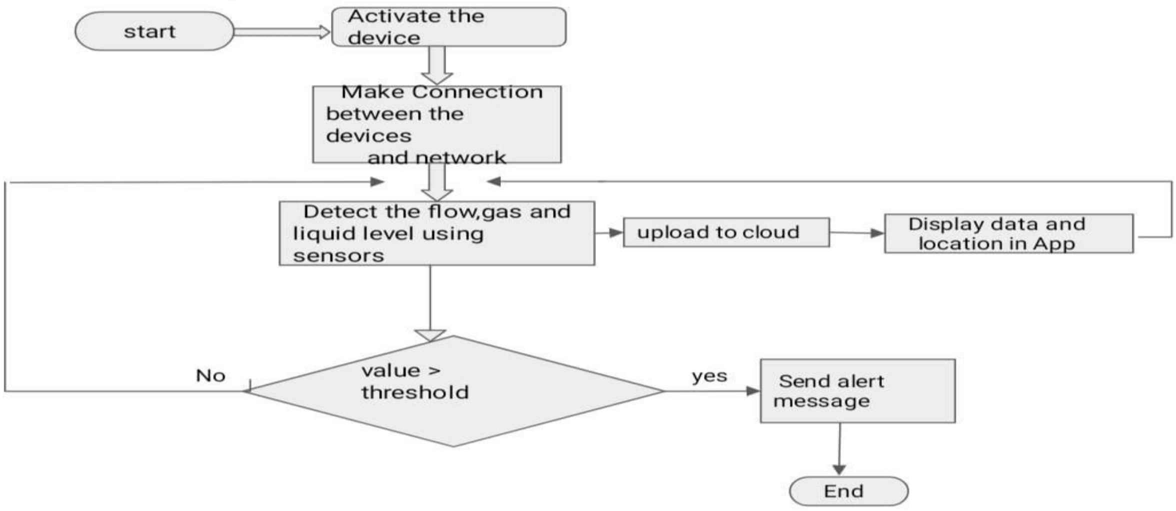
result. Handling the situation becomes exceedingly challenging when all of the pipes are blocked. The failure of such a drainage line presents people with many difficulties.

Hence using this technology we can improve our Drinage systems.

IV. WORKING

The NodeMcu ESP8266 Wi-Fi controller serves as the primary controlling device. We need three sensors to collect information in order to monitor the drainage. MQ3 Gas Sensor, an Ultrasonic Sensor, and a Flow Sensor are the sensors. Every sensor needs 5 volts DC, which comes from a regulated power supply. From the gas sensor, we get a digital output. If the digital output is 1, there is no gas that is harmful, and if it is 0, there is gas. We should trigger the ultrasonic sensor and provide Vcc; then, we can determine the water level based on the echo time period. The trigger in this sensor is an ultrasonic wave with a frequency above 20 kHz, which is too high for humans to hear. Flow Sensor can be used to measure the drainage water's flow. In addition to containing a Hall-effect sensor, this sensor has a rotor whose speed is determined by the water's flow. As its output, it emits pulses.

All of the sensors' data are gathered and stored in the cloud. We can keep track of the changes in the drainage. Additionally, threshold values exist for each sensor. We will receivean alert notification to our mobile device whenever the output values exceed the threshold values.



V. SYSTEM ARCHITECTURE

Hardware Description

Block Diagram

The main components of the project are:

a)Node MCU

b)Flow sensor

c)Regulated

Power Supply

d)Jumper wires

e)Steam sensor

f) Power supply

g)Stepdown Transformer

h)Voltage Regulator

I)Jumper wires

Software Description

This project is implemented using following software's:

a) Arduino IDE

b)0000ppCustomized APP(ANDROID STUDIO)

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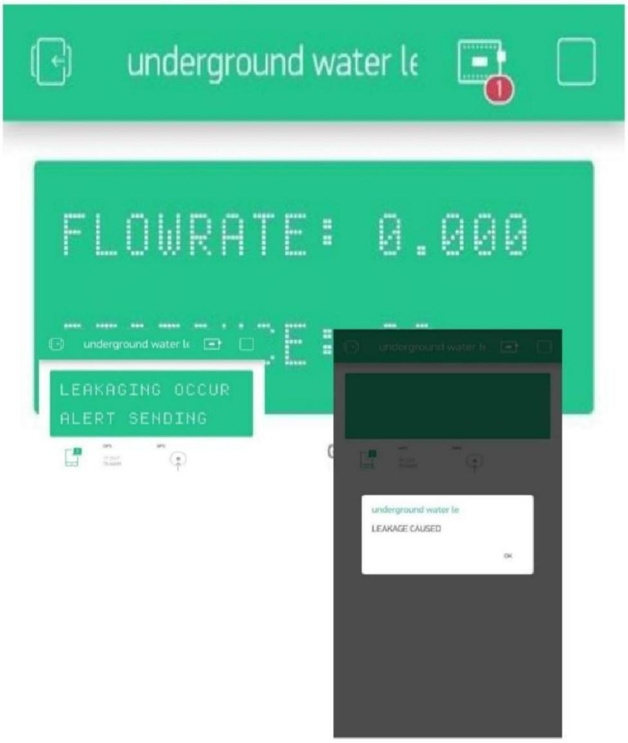

Fig 5.2 Alert sending when leakage caused

- Flow Rate can be monitored using Flow Sensor .We flow rate becomes greater than threshold(flow rate>9),an alert will be sent

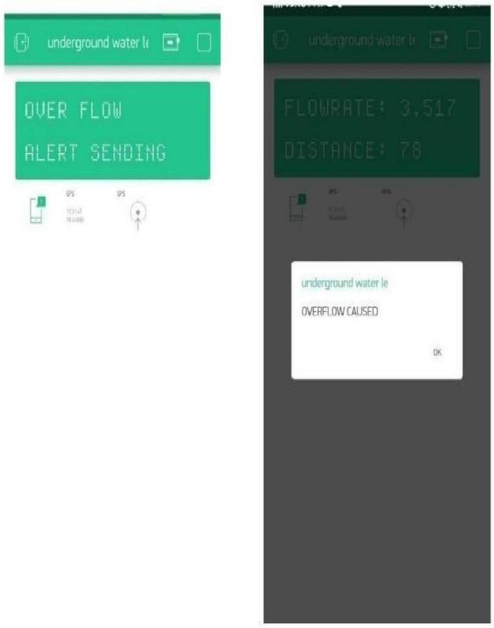

Fig 5.5 Alert sending when overflow caused

VI. SIMULATION AND RESULT IN SOFTWARE

DISPLAYING MESSAGE

The message Toast appears at the bottom of the screen. We may use the.show() function to display a Toast to the user after constructing it, giving it a context in which it will appear, giving it the output string, and choosing the time for its appearance.

community void button
Clicked(View view) (View view)
"Hello,""Toast.LENGTH SHORT," getApplicationContext(), Toast.makeText, show();

DISPLAYING IMAGE

The message Toast appears at the bottom of the screen. We may use the.show() function to display a Toast to the user after constructing it, giving it a context in which it will appear, giving it the output string, and choosing the time for its appearance.

When we click on an image, the image will change:
Set the proper method for the image's onClick event. visible void Clicked(View view) (View view) Img.setImageResource(R.drawable.newImage); ImageViewimg = (ImageView) findViewById(R.id.imageView)

VIII. CONCLUSION

The problem of monitoring subsurface drainage. The project puts forth a number of techniques for managing and monitoring subsurface drainage systems. Describe different applications, like underground drainage and real-time hatch identification. By completing this project, we can cut down on the labour and time needed to check for sewer blockages and underground drainage pipelines, as well as prevent dangers. If you are unable to check your email, use your smartphone to access the website. On a regular basis, we can send SMS notifications with the location where the issue occurs.

With the aid of sensors including ultrasonic, gas, and flow sensors, our project aids in the reduction of drainage system issues. With the aid of a Wi-Fi module like the NODE MCU Arduino, which is connected to the blink server, our system assists in notifying the registered number when the presence of toxic gases is identified by a gas sensor and their level is recognised by an ultrasonic sensor. The project will improve the subterranean drainage system.

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