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SMART DRAINAGEMONITORING 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 sensors*

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 rise in the water level, and various dangerous gases can develop.It is challenging to tell if a blockage has occurred in a specific spot because the drainage system of today is not automated. Furthermore, methane and carbon monoxide (CO) can occasionally be produced by the waste in those drainage channels (CH4),which are dangerous and can lead to fatalities if inhaled by people in high numbers, as drainage workers have discovered. Also, neither the rise in the water level nor the growth in the quantity of such gases are immediately communicated to us. It takes a lot of time and effort to locate the obstruction and remove it. Using examples from the present, we can examine the absence of a drainage system. Bangalore experienced flooding in several locations in 2019, creating a serious issue and causing a great deal of inconvenience to the city's extraordinary growth. The lack of the required infrastructure to support this expansion has exacerbated the issue.

The city's drainage system is made up of major drains, drains along roadsides, and shoulder drains, all of which get clogged up when it rains. Innovative solutions are needed to avoid problems like these. The phrase "smart city infrastructure" encompasses the concepts of "intelligent traffic automation,""military,""transportation logistics," and "environmental and surrounding monitoring." In order to support smart city infrastructure, we suggest in this study a sensor-based smart subterranean drainage monitoring system.

LITERATURE SURVEY

MURAGESH S. K. AND SANTHOSHA RAO

CONDUCTED A LITERATURE REVIEW AND CAME UP WITH A MODEL THAT OFFERS A SYSTEM FOR MONITORING THE WATER LEVEL, AIR TEMPERATURE, AND PRESSURE INSIDE A MANHOLE, AS WELL AS DETERMINING WHETHER THE MANHOLE LID IS OPEN.

It also keeps an eye on the underground electrical wires. The most important characteristics of this design are its affordability, low maintenance requirements, rapid deployment, plenty of sensors, extended lifespan, and excellent service quality. The Internet of Things, or IoT, is composed of tangible objects to enable autonomous actions and communication between the physical and digital worlds.and communication tools that are connected to sensor networks. Computers' ability to access data from objects and devices without requiring human contact has enabled the Internet of Things (IoT). Yet, its goals were to circumvent the limitations imposed by manually supplied data and achieve cost, accuracy, and generalizability. IoT is made possible by the sensor network's perspective. It addresses the execution and configuration capability of an Underground Waste and Sewer vent Checking Framework for IoT applications.

Prof.S A.Shaikh 1, Suvarna A. Sonawane

proposed the framework for the Shrewd urban areas for the advancement Designing sound and safe urban communities that provide consistent services and the most recent office to implement the idea of a savvy city using IoT, by which simple remote communication is possible, is necessary to screen the nature of assets in the city and work on great administration and quicker improvement of the city. Several types of data are collected from the sensors and transferred to the Raspberry Pi3 Regulator in the framework. The regulator's gained yield is sent to the control room through email and further displayed on the Computer.
The presentation was made .

Yash Narale, Apurva Jogal, Himani Chaudhari, and S.P.Bhosale

Given the underground waste monitoring system, which was developed by government employees and will help maintain the city's safety and security as well as reduce waste, a variety of sensors (stream, level, temperature, and gas sensors) are connected to an ARM7 microcontroller to make the system intelligent. The signal of each individual worth and sensor is sent off the microcontroller when the various sensors reach the edge level. Additionally, ARM7 then transmits the message and location of the sewer vent to the civic organisation via GSM and GPS, enabling the authorities to certainly identify the sewer vent that is experiencing a problem and take the **LITERATURE SURVEY** appropriate action.

PROBLEM STATEMENT

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 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.

CONS OF THE PRESENT SYSTEM

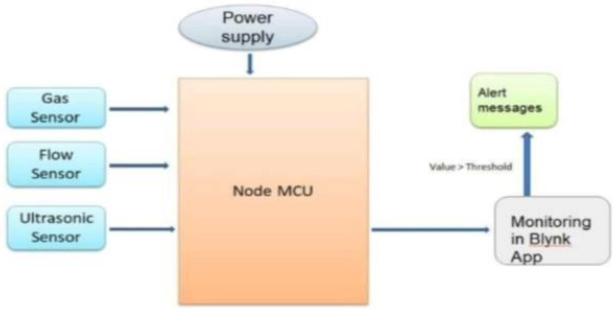
- Intel Galileo Gen2 Is not currently available.
- The detection of overflow (water level) is not implemented difficulty in Pin pointing the precise location.
- The drainage system's outcomes can only be viewed by a single individual.

III.SYSTEM ANALYSIS

When assessing performance, the program's output is taken into consideration. One of the most important stages in the study of a system is specifying the requirements. A system may only be developed to function in the defined environment when the relevant specifications are accurately provided. Since they are the ones who will really utilize the system, users of the current system should provide the necessary needs. This is due to the fact that without early knowledge of the requirements, the system cannot be developed to satisfy them. Once a system is designed, it is extremely difficult to change it; nevertheless, designing a system that does not meet the demands of the user is of little utility.
Each system's need definition can be broadly stated as follows:
The system ought to be able to communicate with the current system.
The system ought to be precise.
The system ought to outperform the current system.
The user is entirely responsible for all tasks in the current system.

HARDWARE REQUIREMENTS

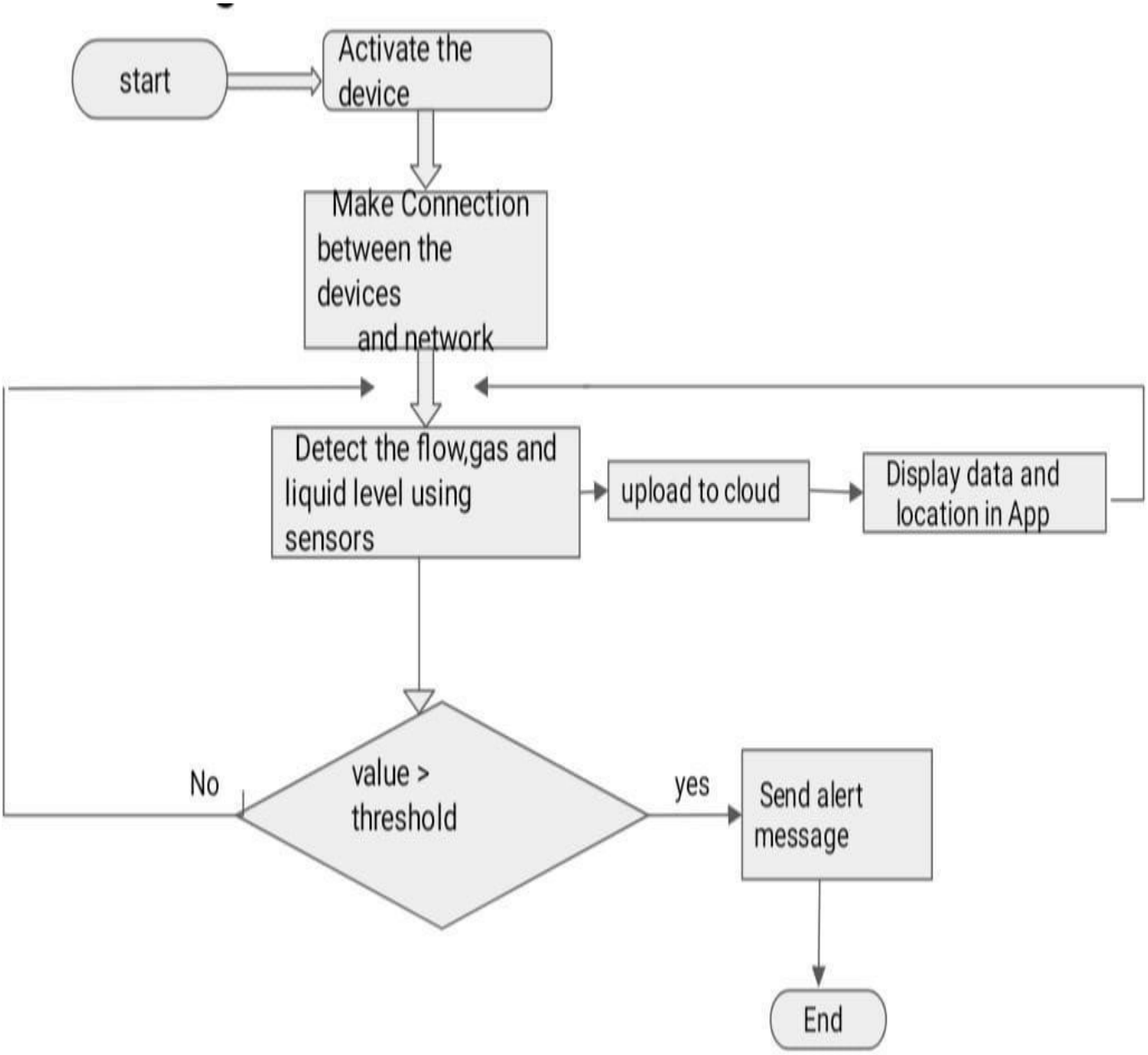
The main components of the project are:
a)Node MCU
b)Flow Sensor
c)Ultrasonic Sensor
d)Gas Sensor
e)Regulated Power Supply
f)Jumper wires



SOFTWARE REQUIREMNTS

This project is implemented using following software's:
1)Arduino IDE
2)Customized APP(ANDROID STUDIO)

FLOWCHART



WORKING

The Node Mcu 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 ,item its 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 receive an alert notification to our mobile device whenever the output values exceed the threshold values.

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 smart phone 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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