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DESIGN OF IOT BASED SMART DRAIN MONITORING SYSTEM USING ALERT MESSAGES

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Abstract- Since long, urban drainage systems have existed as a vital city infrastructure to collect and convey storm water and wastewater away from urban areas. Despite development over the years, it remains a significant challenge to design an effective functioning drainage system. As the blockage in the drainage system occurs the time required to find and resolve the issues related to it becomes a hard job. Currently the time and man power required to identify and to clear the blockage is more. The locals also face the problems such as water overflow diseases. Our motive is to find the blockage easily without wasting excess of time and man power. So the solution for identification of the blockage is tried to propose. Sensor technology will be used in the project as well as computer language for the programming will be used. The attempt to build a working model is in progress which will identify the blockage quickly and as soon as the blockage is identified ultimately the time and manpower is utilized less as compared to current scenario. The probable output is that it will be helpful in the cities like Mumbai, Pune, and Nagpur.

Index Terms - Drainage system, Blockage, Locator stick, Sensors modules, Time saving factors.

Introduction

In open access, water quality problems also arise due to urbanization that increases diversity and the amount of pollution and nutrients in the reception of water bodies. A conventional drainage system is a single-purpose design that focuses on water volume control. Recently, a number of measures have been projected to reduce construction costs. These strategies include general recommendations and proposed barriers to the design of several water resource design manuals. Many of these problems include minimum speed or low shear pressure to ensure cleaning conditions in the field systems. The traditional design of field networks has been considered a one-purpose strategy, that is, without incurring the cost of building a drainage system. Recently, a few authors have implemented a more ambitious approach, considering the appropriate design of field pipelines while calculating the cost of labor costs is reduced. Strategies such as dynamic planning, random programming, random search, LP-based empirical approach, genetic algorithms, genetic algorithm that associates hydraulic and hydrological replications, and DP-based optimization apparatus, among others, used for the complete design of sewage systems. Each of these tracks has

used a number of field systems, the mays and wenzel storm water drainage network, taking into account functioning costs of different costs and design parameters.

In spite of advances over the years, it remains a main task to design an effective drainage system. Monitoring the actual flow of water is not possible. Improper monitoring contributes to water leakage which means that the greeting that causes flooding in the area of manual monitoring is also inappropriate. Problems arising from drainage lines can cause major problems on the city's daily route. Problems such as pollution due to pollution, sudden increase in water level and various hazardous gases can be produced if proper cleaning practices are not taken from time to time. Today's Drainage program is not computer-generated because it is difficult to see that the blockade has occurred somewhere. For a long time, urban drainage schemes have been the main infrastructure of the city to collect and transfer stormwater and wastewater away from urban areas. Despite advances over the years, it remains a major challenge to design an effective drainage system. In particular, the effects of climate change and urbanization have been widely acknowledged, which may include significant increases in frequency and intensity of urban flooding in many regions of the world. .

Literature Review

A model that delivers a system to screen the water level air temperature and pressure inside the well and to check whether the shaft lid is open is proposed. It correspondingly checks the electrical wiring installed underneath.[1]

Important considerations of this design are low cost, low maintenance, rapid development, with high sensitivity, longevity and huge quality of service. [2]

The IOT contains real-life objects, communication tools connected to sensory networks to provide automatic communication between the real world and the information world. IoT came about because, without human interaction computers were able to access data from objects and devices, but it was intended, to overcome the limitations of man-made data, and to achieve cost, accuracy and common features. The Sensitive Network is the key to enabling the IoT model. [3]

It displays the program function and design of the Subversive Stream and manhole monitoring System for IoT applications. [4]

A different type of data is collected from the sensors and transmitted to the Raspberry Pi Controller device in the system. Output obtained from the device is transmitted to the control room by E-mail and is shown on a particular computer. [5]

We have introduced a groundwater monitoring system that will not only help maintain the health and safety of the city but also reduce the workload of public servants many types of sensors (flow, temperature, temperature and gas sensors) are connected to the ARM7 microcontroller. about making a smart plan. [6]

Once the various sensors have reached the limit, an indication of that value and sensor is sent to the sub-controller. [7]

In addition, ARM7 then sends a signal and a hole location to the municipal organization via GSM and GPS and officials can easily find out which hole is faulty and can take appropriate action. [8]

The proposed system is simply to monitor quality, generating alarm signals for complaints to the required departments by post and SMS about pre-overflow. [9]

We have introduced an intelligent water monitoring system using a wireless sensor network. The system consists of a sensory unit that detects and controls household appliances used for daily activities according to completely different prices. [10]
Properly envisaged services, when integrated with the city's substructure through successful ICT upgrades, will easily create life across the city. During this paper, we often create a style to monitor the misalignment of the timing system for draining various sensors such as water level, blockage and gas detector. [11]
The predicted flood monitoring system can be effectively managed IoT is forced into broadcasting as a Central American nation with various rivers. [12]
A proposed system with underwater aquifers and surface rivers, lakes, streams, wetlands, which comprise only 65% of the world's available water. [13]
Pre-sensory fluid can screen flow rate, transparency as well as the amount of harmful gases in the period based on the amount of information provided to the sensors in the system data related with the location ID sent to the gate and sent to the cloud (server) or relevant authority. [14]
Systems designed without regard to evolving conditions, resulting in huge construction costs and highly engineered networks in the field. [15]
Recently, a number of measures have been projected to decrease the construction costs. Some of these issues contain minimum speed or low shear pressure to ensure cleaning conditions in the field systems. [16]
Recently, a few authors have executed a more ambitious approach, considering the appropriate design of field pipelines while calculating the cost of labor costs is reduced. Strategies such as dynamic programs, indirect programs, random search, and a DP-based development engine among other methods have been used to build field systems. [17]

Need of research

The brand-new approach is brought for the betterment of the society. The identity of the blockages could be extra simple compared to latest times. There could be the less possibilities of flooding. The troubles confronted way of means of the locals will be solved as early as possible. The time required for the technique could be stored and the person strength required for the identical is being reduced.

Limitations

Implement sustainable water managing ideas in rural and urban areas in a variety of ways. Address the need to consider a number of factors like engineering, economics, management and culture in study to allow for effective use. To use Arduino UNO micro controller board, a transformer step down to step down a voltage slum to 20v AC – 50v AC this is the voltage. To use ultrasonic sensors to sense the blockage and to collect the information related to it.

Methodology

In this method, each graph is considered to be a mixture of nodes and arcs, representing the formation of an unconnected sewer pipe with a certain value and a mixture of the width and slope of all the pipes. In addition, each hole is shown in the form of a set height and width. In view of

this data, all the pipes inside the public side are shaped in such a way that they are part of a series of holes.

In the project the problem was identified first, after the problem identification the research papers was searched the gap was identified during the research the data was collected related the drainage systems and their blockages. The various site visits were done to survey the actual problems faced by the locals and the society after the survey proper problems was the technique used to identify the blockage was not so appropriate and feasible so the result the locator stick was invented to identify the blockage above the ground it's just like a bomb detector stick as it detect the radioactive signals and in such a way this locator will detect the blockage by using the ultra-sonic waves, then the GPS sensor will locate blockage and will the location will reflect on the screen.

In the recent times, the maintenance of drainage system is becoming of the greatest problems. Usually, nowadays drainage is not being taken care of as much as it should have been. Due to this, due to some obstacle in the drainage system for example plastic waste, mud etc... it can gets choked due to which blockage is created and it is also not taken care of , and even if it's given attention, it takes a lot of time and also takes more workers to identify and clear that blockage. Due to which there are various problems faced by the locals. And if the NMC tries to clear blockage / choke-up occurred they need to open up all the man holes to see where the exact blockage is and from where they have to start clearing. In this process a lot of time is consumed and the identification of blockage is slow and time consuming.

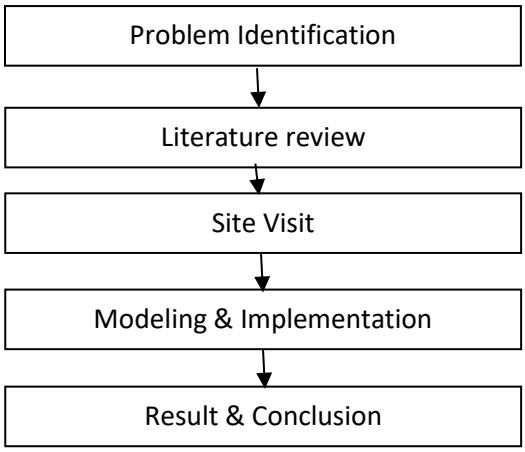
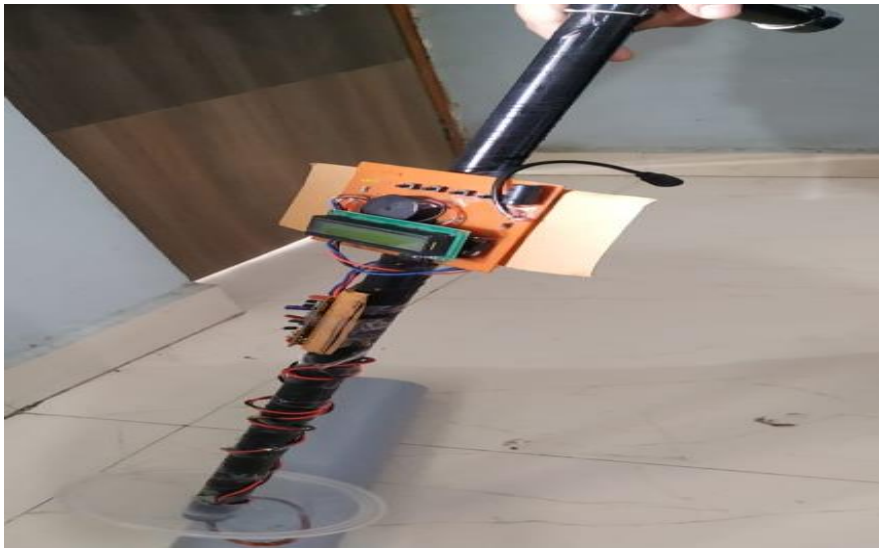


Fig 1 :- Methodology Adopted

Model



1. Locator Stick
2. Adapter Receiver
3. Buzzer
4. Display
5. Detection Coil

Fig.2 Blockage Tracing Device

A microcontroller circuit is used along with a buzzer that helps detect the blockage. The rod used in this project is a straight stick because as a circuit is easy to install and is easy to move while detection of blockage.

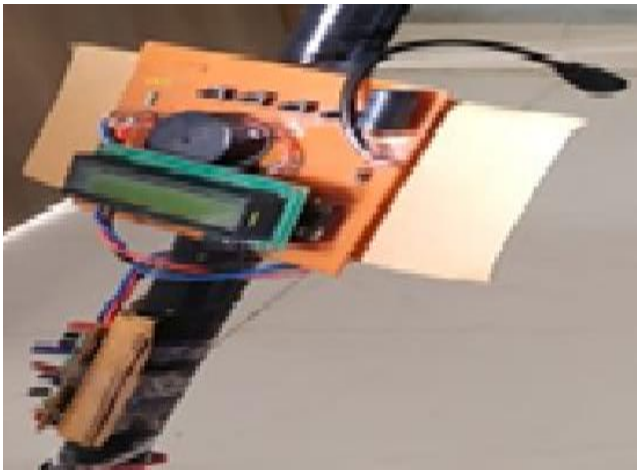


Fig.3 Circuit of Blockage Tracing Device

In the figure, a small control circuit is used to signal the detection of a liquid crystal display indicating the frequency of the block. The RF amplifier circuit is connected to a small controller and the coil is powered by 12 v power on a small controller. The diode is used to protect the circuit from excessive current supply. The diode is connected to the controller IC and the controller IC is connected to the small controller and the entire circuit. When the coil is moved

over the drainage system it shows a certain amount on the screen as shown in the fig 3. If the frequency is less than 100 there is no restriction. If the frequency is above 100 then there is a restriction. The team can therefore inform the NMC to remove the barriers.

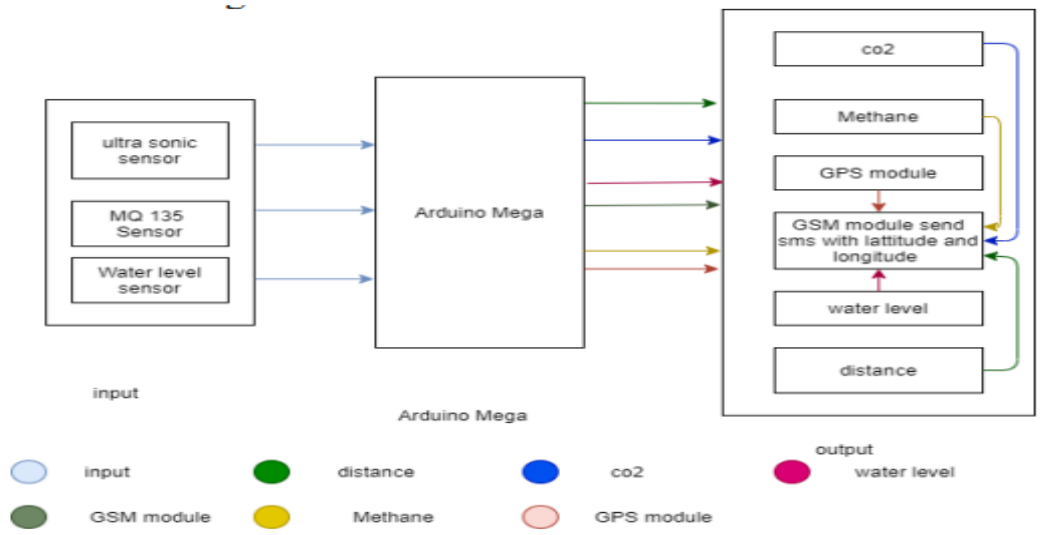


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Fig.4 Block Diagram of the model

Now, we have shown the input stage, microprocessor, and output phase in the block diagram shown in Figure 4. The input part of the plan includes the Ultrasonic Sensor. All the sensors here take the analog value and send the analog value for processing to the microprocessor. For our processing, we used two microprocessors the microcontroller is one and the Node MCU is another. Since Ultrasonic Sensors are used, processing requires a large amount of memory, so we use Arduino uno can be used for further storage. Since we need to send real-time data to the server, we have used Node MCU for IoT purposes. If the value reaches the threshold after receiving the value from Arduino, a message will be sent by GSM to the official looking for exact location. In the case of a water level sensor and sonar, the same is achieved, i.e. if the value is greater than the limit, a text by location will be sent. Alternatively, all details will be displayed in real time on the Display so that administration can see the drain situation.

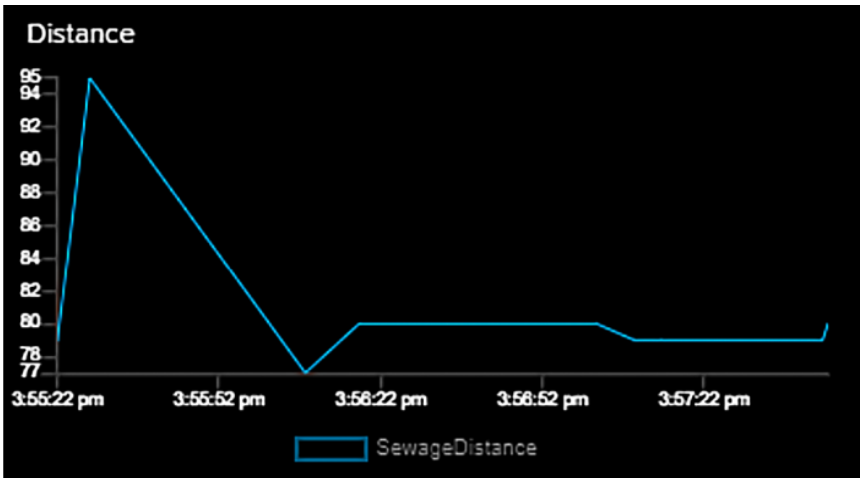

Fig.5 Graph of Sewage Distance

Working of Blockage Tracking Device

In this project, the micro controller circuit is used to expose the detections the liquid crystal display show which indicates the frequency of the blockages. RF amplifier circuit is hooked up to through the micro controller and the coil is given the 12 v energy supply to the micro controller. The diode is used to shield the circuit from the excess current supply. The diode linked to regulator IC and regulator IC is hooked up to the micro controller and the entire circuit. When the coil is moved over the drainage system it reflect the specific frequency on the display. If the frequency is less than 100 then there is no blockage. If the frequency is more than 100 then there are blockages. So the team can inform to NMC so they can clear the blockages.

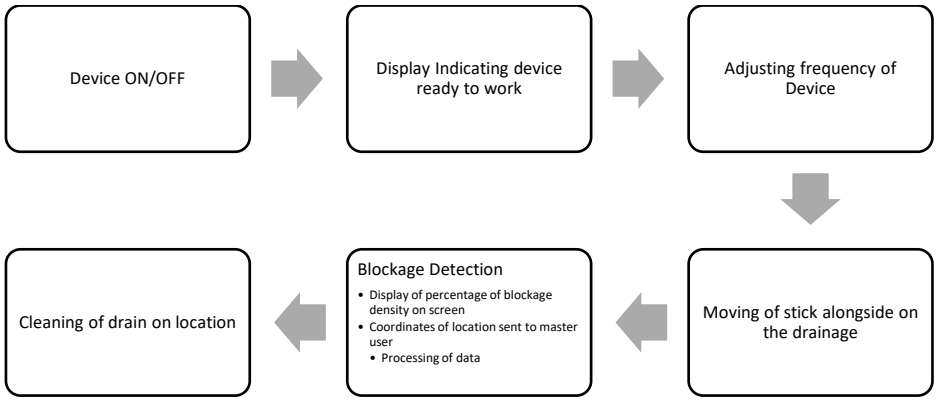

Fig. 3 : Schematic Diagram of Blockage Tracing Device model

Benefits / Advantages to society

The maintenance work of the drainage systems will be convenient. The time required to clean the blockage will be reduced and the quantity work done will more. The location of the blockage will be more accurately as compared to the conventional techniques. The problems faced by the peoples will be resolved soon. The amount of growing diseases will reduce. The government will able to save sufficient amount of money due to this and can utilize that in other good works.

Result & Conclusion

The proposed system reports all aspects of real-time monitoring and detection of system through metropolitan IoT applications. By using various sensors such as gas detectors, the ultrasonic inhibition detection can monitor the real-time state of the drain system by detecting problems in the drain system. A good water supply system and repair and maintenance processes often have a positive impact on road stability and life expectancy. The implementation of this plan will be of great help to the government to detect the closure. Due to early detection and immediate blocking immediate action can be taken to resolve the issue. Time will be spent less and more work can be done.

i. The system is responsible for monitoring and detection of water flow through IoT systems.
ii. By using different types of sensor blockage finding can be monitored in real-time drainage system.
iii. Quick detection provides fast action to resolve the issue.
iv. Often cleaning of drainage system saves time.
v. Regular maintenance saves energy and time as well.

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