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DRAINAGE CLOG AND OVERFLOW DETECTION USING IOT

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ABSTRACT

As we are living in the 21st century, every operation is based on information and communication technologies. As India is trying to build every city as smart city, we are coming with a new idea regarding the drainage problem. Now a days we see drainage overflow and blockage everywhere near manholes but we don't have time to inform the municipal corporation about it because we are very busy with our life. So we came up with the idea to inform the municipal corporation before the overflow occurs using sensors and Microcontroller. We can detect the overflow by placing the Ultrasonic sensor at the optimum level. So when the water reaches to the optimum level the information is sent through microcontroller to municipal corporation that the drainage is about to overflow. Similarly the blockage is detected using the water flow senor. It updates the information for every 15 sec through Wi-Fi module in microcontroller by displaying voltage vs. time graph on monitor used by the municipal corporation. So that we can detect the overflow before it occurs and also we can detect blockage in streets at various manholes simultaneously. Thus we can reduce the diseases caused by the drainage and we can keep the city clean.

Keywords: clog detection, float sensors and IoT (Internet of Things).

1.INTRODUCTION

Embedded Systems

The computer hardware and software both integrated together to perform a dedicated task is called as an embedded system. An Embedded Systems is similar to a computing machine which offers the functionality in Real-time. A combination of hardware, software, extra necessary elements constitutes an Embedded System. All the Real-Time devices that are present today are controlled by the embedded systems. The embedded systems are simple, but Offer the functionality similar to high end computing system. All the embedded systems are not dedicated to perform a single task, but are also employed to do sets of tasks.

Internet of Things

Internet of Things is visualized from three aspects: internet, things, semantic. The Internet of Things permits individuals and things to be associated anytime, anyplace, with anything and anyone, in a perfect world utilizing any way and any network. The enhancements made in the communication technologies, sensors and internet protocols made the IoT an enabling technology for all domains. The primary meaning of the IoT was from a things arranged point of view,

where sensors were considered as things. Internet of things facilitates sensor communicates without the interference or involvement of humans and leads to the implementation of advanced class of applications. In the prime phase of internet of Things there is a revolutionary act in the mobile, internet and machine to machine technologies. With the further enhancements the Internet of things is expected to provide physical objects the power of decision making. An ample of physical objects are correlated with the Internet at an extraordinary amount accomplishing thought of the Internet of Things. There are likewise different domains and circumstances in which the IoT can assume a noteworthy part and enhance the nature of our lives. These applications incorporate transportation, automation, health care and crisis response to common and man-made calamities where human decision making is troublesome. The Internet of Thing endorse physical objects to think, see, listen and accomplish occupations by making them talk together, share data and facilitate decisions.The Internet of Things commutes the physical objects from traditional to smart by employing the fundamental technologies such as embedded devices, ubiquitous, communication technologies, pervasive computing and sensor networks and applications. The smart objects intended with the specific tasks comprise the domain level applications. The independent domain services comprise the ubiquitous and analytical services. The prime goal of Internet of Things is to assist the sensors and

the actuators to correspond with each other. With a specific end goal to understand this potential development, rising advancements and benefit applications need to develop relatively to coordinate promote requests and client needs. The physical objects should be produced to fit user prerequisites regarding accessibility anyplace and at anytime. By the aid of new protocols the heterogeneous physical objects can communicate with each other. Moreover, management and monitoring of the Internet of Things ought to happen to guarantee the conveyance of high quality services to users at a low cost, the applications of IoT.

Fig: 1.1 Potential Applications of Internet of Things

2. PROPOSED SYSTEM

Block Diagram Description

The block diagram consists of two float sensors, Ultrasonic sensor, LCD display, Arduino uno, Wi-fi module and power supply . The float sensors are located at regular intervals in the drainage system. For

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example, let us consider a drainage system for 2kms.The float sensors are placed at half kilometer distance. When the drainage water flows through the pipe, the float sensor detects the flow of water inside the pipe. If there occurs a blockage due to clog, then the water does not flow at a normal rate. The level and flow of water reduce and thus the clog is identified in the drainage system. Similarly, we can detect the overflow by placing the Ultrasonic sensor at the optimum level. Once the clog is detected in the sensor, the data must be sent to the municipal corporation through wi-fi module and the data is updated in the system using an LCD display. The LCD display shows in which sensor the clog is detected. The status is updated at 30 minutes' interval and the continuous graph is obtained. Thus the clog is detected at an early stage and this avoids the overflow of sewage waste. Thus less human intervention takes place and the sewage system is monitored at regular intervals

CASES:

- Case 1: FLOW   (OFF) & LEVEL (OFF)   (Summer Season)
- Case 2: FLOW   (ON) & LEVEL(ON)   (Rainy Season)
- Case 3: FLOW   (ON) & LEVEL(OFF)   (Normal)
- Case 4: FLOW   (OFF) & LEVEL(ON)   (CLOG)
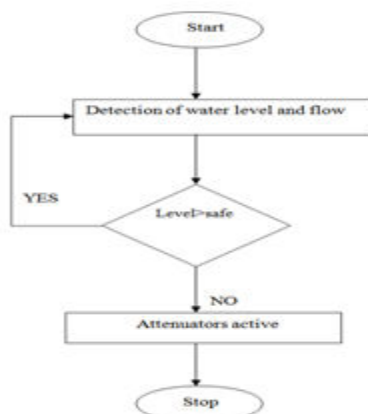
These are the four cases that are monitored by using Ultrasonic sensor and the Water flow sensor. The case 4 is detected whenever the water flow is beyond the optimum level of water and this distance is calculated by the Ultrasonic sonic sensor. The flow of water is calculated by calculating the difference between the water flow sensor 1 and the water flow sensor 2 and if the difference is greater than the reference then due to the flow of water is less than that of water at flow sensor 1 then the water between the flow sensor 1 and flow sensor 2 will reach the optimum level then this case is considered as the clog or the blockage state
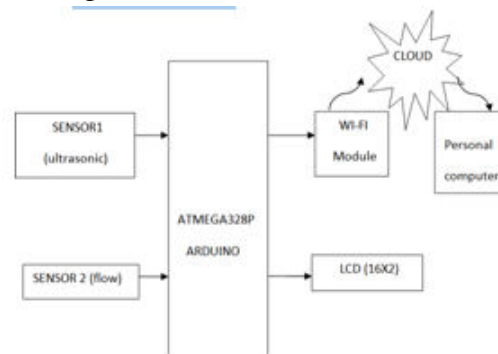
Fig: 3.1 Block diagram of Drainage clog detection

Algorithm
- Power Up hardware.
- Initialize hardware Module.
- Microcontroller sense Sensor value.
- Temperature sensor sense temperature display value on LCD
- Flow sensor sense the flow and display value on LCD.
- Ultrasonic sensor sense the level and display value on LCD
- When level increases than optimum level

and flow decreases at that time.

• GPS trace location of that place.

• By using GSM location will be send.

• If any sensor exceeds than its set value. Then GSM through message will be sent.

• IOT used for sensor related data will be updated on the web server.

• All information will be display on LCD.

• STOP

1.RESULT ANALYSYS

Normal condition Under normal condition, the presence of clog and overflow

doesn't occur. The water flow between the flow sensors will not be greater than the reference level and the water level is less than the optimum level. And this condition is displayed on LCD as difference is normal and distance is normal.

Fig: 6.1 Normal Condition displayed on LCD

Under normal condition, the values of both clog and overflow are zero and the values are ploted on the graph as shown in the figure.

Drainage clog and overflow detection

Under clog and overflow condition, the presence of clog and overflow will occur. The water flow between the flow sensors will be greater than the reference level and the water level is greater than the optimum level. And this condition is displayed on LCD as difference is blocked and distance is overflow condition.
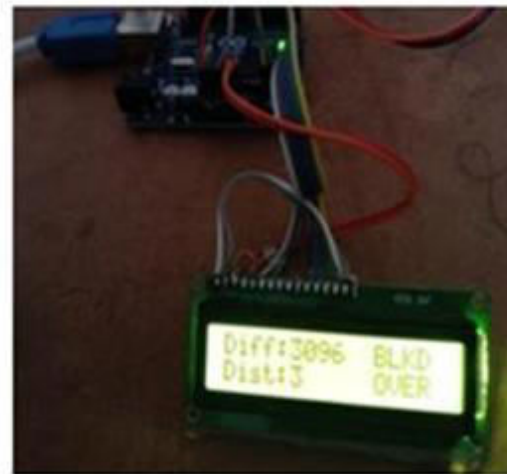

Fig: 6.3 Blocked and Overflow condition is displayed on LCD

Under blocked and overflow condition, the values of both clog and overflow are greater than zero and the values are ploted on the graph as shown in the figure.

5. CONCLUSION

This system provides a smart way of detecting the drainage clogs, which can be implemented in all the smart cities to reduce time, money and human intervention. This is one another initiative to maintain the city clean and safeguard the cleanliness that already prevails in the city.This one-time implementation will thus pave a way to forbid the repeated large process that is done every time the sewage water peeps out the roads causing deadly diseases. The proposed project identifies the flow of sewage water in the drainage system and provides immediate information about the appearance of a clog in the sewage network.

6. FUTURE SCOPE

After having implemented this sewage monitoring system, what remains is the scope for improvements. First, the clog can be removed by increasing the pressure of the sewage water once the development of clog is identified . In addition to this system, chemicals can be used inside the drainage pipes that release a strong effect on the clog so that the clog is split into small particles and thus releases the blockage in that place.

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