International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 03 | Mar 2020 www.irjet.net p-ISSN: 2395-0072

SMART DRAINAGE MANAGEMENT SYSTEM

G. Durvasi[1], G. Keerthi[2], V. Phani Sonika[3], T. Hepsiba Susan[4]

[1]Assistant Professor, Department of Information Technology and Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada-08, Andhra Pradesh, India
[2,3,4]Under Graduate Student, Department of Information Technology and Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada-08, Andhra Pradesh, India

---

Abstract - *As we are forming urban communities into brilliant urban communities subsequently there is a need for designing proper underground infrastructure which includes underground water pipelines, drainage monitoring for the purpose of keeping the city clean. If the system isn't monitored properly it's going to cause blockage and sewage overflow which successively results in contamination of pure water leading to spreading of infectious diseases. So different quite work has been done to detect, maintain and manage these underground systems. In like manner, leaks and bursts which are unavoidable aspects of water distribution system management and may account for significant water loss within a distribution network if left undetected for long period. This project represents the implementation for monitoring and managing underground system with different approaches. It gives a description of water flow system by giving water flow rate and detecting overflow and also it uses detection method to detect blockage defects in sewer pipeline based on Water flow.*

Key Words: IOT, WSN, Drainage System, Sensors.

1. INTRODUCTION

Sewage framework assumes a significant job in huge urban communities where a huge number of individuals live. Sewage framework is known as the base for land dryness from the overabundance and unused water. Downpour water and wastewater. Sewage conditions ought to be observed so as to keep up its appropriate capacity. Actually, not all zones have a sewage observing group. It prompts inconstant observing of the waste condition. The inconstant checking has added to the obstructing of the waste that suggests the welcome which triggers flooding in the area. Manual checking is additionally hard. It needs a ton of committed people who are just ready to record constrained reports with low exactness. The issue emerges in such waste lines can make difficult issues in the everyday schedule of the city. Issues, for example, blockage because of waste material, abrupt increment in the water level if the best possible cleaning moves are not made every once in a while. The present sewage framework isn't electronic because of which it is difficult to know whether blockage is happening specifically area. Likewise, we don't get early alarms of the blockage or the expansion in water level. Henceforth identification and fixing of the blockage becomes tedious and furious. NodeMCU combines features of WIFI access point and station + microcontroller. These are the features which makes the NodeMCU extremely powerful tool for Wi-Fi networking. It tends to be used as access point and/or station, host a webserver or connect to internet to fetch or upload data. By using this type of wireless sensor network, we can be notified the sensor data through internet.

1.1 PROBLEM STATEMENT

Overflow of sewage on roads is been a major problem in many developed and under developed cities as well. Existing drainage system is manual monitoring and all areas doesn't have proper monitoring teams. Manual monitoring is difficult and ineffective.

One of the major problems on the rainy days are overflow of manholes and drainage on a road. which is caused due to no information on manhole level of filling. Another problem in drainage system is difficulty of finding blockage in underground drainage pipes. Most of time drainage management team of municipality detects the problem in the drainage system when it is causes the trouble.

1.2 OBJECTIVE

This project is to keep the city clean, safety and healthy. And to replace the manual work of drainage monitoring for the safety of sewage workers.

The intelligence of sensors and predictive system identifies the drain is clogged and also give us information of level of manhole filled so, action can be taken by the authorities.

The sensors are communicated through Wi-Fi communication modules to share information.
This information can be viewed by authorized users at any time and any place in the internet.

2. LITERATURE SURVEY

1. Towards the implementation of IoT for environmental condition monitoring in homes

Authors: Sean Dieter Tebje Kelly, Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay,

Fellow, IEEE.

- In paper discusses an effective implementation for Internet of Things used for monitoring regular domestic conditions by means of low-cost global sensing system.
- The systems basic operations include remote management and control of domestic devices such as electric lamp; water heater etc.
- The framework of the monitoring system is based on a combination of widespread distributed sensing units, information system for the data collection, and reasoning and situation awareness.

2. On real-time performance evaluation of volcano-monitoring systems with wireless sensor networks

Authors: Roman Lara, Member, Diego Benitez, Senior Member, IEEE, Antonio Caamano, Marco Zennaro and Jose Luis Rojo- Alvarez

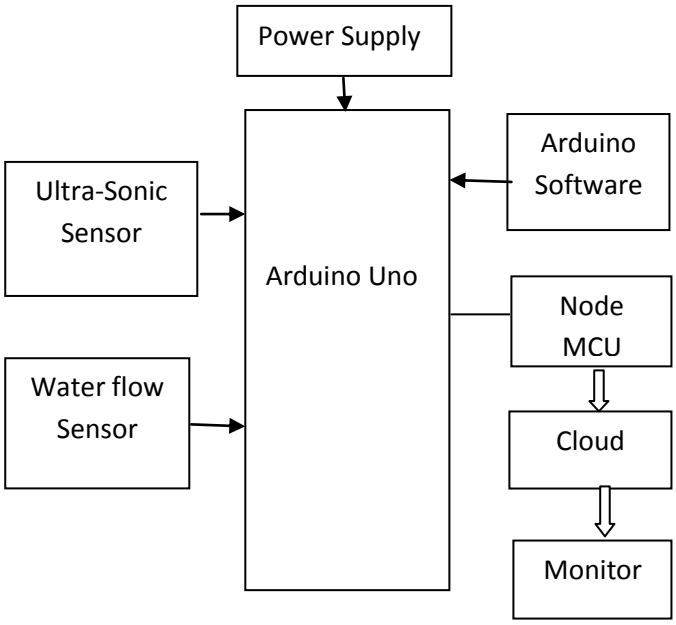
- This journal paper discusses about early warning of a volcanic eruption using real-time (RT) systems.
- In this wireless sensor networks (WSNs) may play a key role.
- To test the system in a real scenario, 10 sensors were deployed in a strategic area at Cotopaxi Volcano, and information was collected during three days of continuous monitoring.
- This information was sent to a remote surveillance laboratory located 45 km away from the station.

3. METHODOLOGY

The smart drainage system will have:

- Sensors to detect blockage, flood.
- The knowledge of sensors and framework will recognize the stopping up inside the seepage framework and will give the subtleties of the area and other data for additional activities.
- The Node MCU Wi-Fi module will be Wi-Fi organizing (can be utilized as passageway or potentially station, have a web server), interface with web to bring or transfer information.
- This whole information will be altogether sent by the Wi-Fi module hub to the server will be put away at the cloud every one of this information will be available progressively situation for consistent observing.

3.1 BLOCK DIAGRAM



4. SYSTEM SPECIFICATIONS

4.1 Arduino UNO

Arduino is a standard term for a software company, project, and user community that designs and produces computer open-source hardware, open-source software, and microcontroller-based kits for producing digital devices and interactive objects that can sense and monitor the physical devices.

The project is based on microcontroller board designs, produced by many vendors, using various microcontrollers. These systems provide sets of digital and analog I/O pins that can interconnect to various expansion boards (termed shields) and other systems. The board's features are serial communication interfaces, including universal serial bus (USB) on some designs, for loading programs from personal computers**.**

4.2 ULTRA AONIC SENSOR

The HC-SR04 Ultrasonic separation sensor comprises of two ultrasonic transducers. The one goes about as a transmitter which changes over electrical sign into 40 KHz ultrasonic sound heartbeats. The recipient tunes in for the transmitted heartbeats. On the off chance that it gets them it delivers a yield beat whose width can be utilized to decide the separation the beat voyaged.

4.3 WATER FLOW SENSOR

Water stream sensor comprises of a plastic valve from which water can pass. A water rotor along with a hall effect sensor is available to sense and measures the water stream.

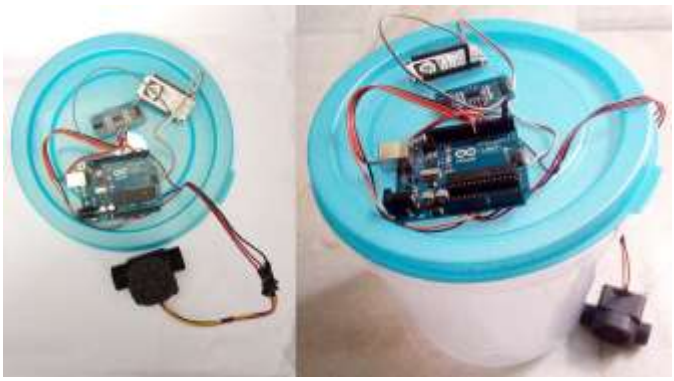
At the point when water moves through the valve it pivots the rotor. By this, the change can be seen in the speed of the engine. This change is determined as yield as a heartbeat signal by the corridor impact sensor. Consequently, the pace of stream of water can be estimated.

4.4 Node MCU

The All new NodeMCU ESP8266 V3 Lau CH340 Wi-Fi Dev. Board is a fast-leading edge low-cost Wife technology. Modern high-level mature LUA based technology. It is an integrated unit with all available resources on board. It is super simple to complement your existing Arduino projects or any development board that has I/O pins available.

Modern Internet development tools such as Node.js can take advantage the NodeMCU with the built-in API to put your idea on the fast track immediately. NodeMCU is built based on the mature ESP8266 technology to take advantage of the abundant resources available on the web.

5. Experiment Setup



Experimental Result

CONCLUSION

Sensor networks are considered as the key enablers for the IOT paradigm. This paper tends to about savvy and ongoing Drainage observing framework through IOT applications for metropolitan urban areas. By utilizing different sensors, for example, gas identification, water level just as blockage recognition we can screen the constant situation of waste framework by for recognizing the issues in sewage framework. By doing this we can able to take particular action on the problems as we will receive the early alerts of blockage as well as increase. This paper can be utilized to plan the savvy and constant sewage framework for checking just as investigating reason.

REFERENCES

[1] Brown, Eric (13 September 2016).” Who need the Internet of things”? Linux.com? Retrieved 23 October 2016.
[2] Wemer-Allen, G., Johnson, J., Ruize, M., Less, J., and Welsh, Matt “Monitoring Volcanic Eruptions with a Wireless sensor Network. (ISSN: 2321 – 5658) Volume 01– Issue 04, December 2013 Asian Online Journals
[3] Basha, D. and Rus, D. “Design of Early Warning Flood Detection System for developing countries. Proceeding of the conference on ICTD, Bonsalove, India. Pp 1- 10, 2007.
[4] Yuwat, C. and Kilaso, S. “A Wireless Sensor Network for Weather and Disaster Alarm System”, IPCSIT Vol. 6, Singapore. Pp 1 – 5, 2011
[5] Morias, R., Valente, A., Serodo, C. “A Wireless Sensor Network for Smart Irrigation and Environmental Monitoring. EFTA/WCCA Joint Congress on IT in Agriculture, Portugal, pp 845 – 850. 2005
[6] Windarto, J.” Flood Early Warning System develop at Garang River Semarang using Information Technology base on SMS and Web”. International Journal of Geomatics and Geosciences Vol. 1 No. 1, 2010