International Journal of Innovative Research in Information Security (IJIRIS) ISSN: 2349-7009(P)
Issue 05, Volume 04 (May 2017) SPECIAL ISSUE www.ijiris.com ISSN: 2349-7017(O)

Digital Drainage System Using IOT

Dhanya.GS[1],Soundarya.R[2],Tejaswini.A[3],Priyanka.N[4].
Department of Electronics and communication Engineering,
Sri Sairam College Of Engineering Anekal, Bangalore.

Abstract*-- The drainage system is the action of draining waste water and sticky liquid components towards the rivers using particular patterns, drainage channels and streams. Drainage system basically refers to all the piping within the private and public premises which conveys sewage, rainwater and other liquid waste to a point of disposal. The connected devices will make the drainage system more comfortable to operate, monitor, control with less resources and to take necessary actions.

INTRODUCTION

What is happening now???

Increased urbanization has caused problems with increased flash flooded after sudden rain. The idea behind smart drainage system is to replicate natural systems that use cost effective Solutions with low environmental impact to drain away dirty waste water before allowing it to back into the environment. This is to counter the conventional drainage system that is often allowed for flooding and pollution of environment. All successful civilizations throughout the history focused on developing efficient drainage system, diverting both waste water away from drinking water and rain water towards crops in agricultural use. The main changes come into materials and technologies used in drainage system monitoring from past ancient areas to present day. Where once drainage channels are crafted from clay, lead, wood, stone or even from bamboo, now they are constructed from durable materials, PVC, copper, brass etc. Again after analysis and realization lining the inside of drainage channels with smooth materials would aid the flow of waste water, and many drain clearance companies today specialize in upkeep and maintenance of these drains to ensure that these drains will stay in a good working order.

Why smart drainage system is essentially needed???

Most of the cities adopted the underground drainage system and it is the duty of Municipal Corporation to maintain cleanliness, healthy and safety of cities. If the drainage system is not properly managed then pure water gets contaminate with drainage water and infectious diseases may get spread. The drainage gets blocked during rainy season and it will create the problems to routine life like traffic may get jammed, environment will become dirty and totally it will upsets the public. In many cases blocked drains can cause sewage and waste water to back up and potentially come up onto your property. Suppose if there is a facility that officials or concerned persons come to know immediately the blockage or clogging insidethe drainage channels in which area and exact place where it gets blocked. So our main focus is to monitor the manholes using sensors. If drainage gets blocked or water overflows, the sensor senses the activity and sends the information via transmitter to the concern persons. Manhole maintenance by human is very difficult because environment is very poor and it is difficult to go inside of manhole for inspecting the states of manholes all the time. Immediately it is not possible to confirm if the person intrudes the manhole or an accident happens inside of the manhole. The drainage system is essential for the people who live in urban areas as this system reduces flood effect by carrying water away (a facility to dispose liquid waste).Improper maintenance of existing drainage system leaving many people suffer. The major areas effecting in many urban areas because of faulty, improper drainage monitoring system are roads. Roads are built up to support human and vehicular traffic. Currently urbanization has negative impact on drainage system in many cities and towns across the globe.Irregular monitoring of drainage system leads to contamination of water and leads to water borne diseases. Stagnation of water on roads will causes roads to damage. More importantly flooding of roads lead to traffic jams and causes loss of valuable human hours, loss of revenue and employment. Ground water contamination is also possible, if once it is contaminated it's very difficult to clean up. A good and efficient drainage system is badly required for the developing countries like India. In creation of many smart cities the architecture of drainage system plays an important role. To maintain a good and proper drainage system it takes more human resource.

Fig 1. Underground pipeline

Even though investing cores of rupees in drainage department when it rains the scenario will be the same. To overcome all these problems we need a remote monitoring the states of drainage inside drainage channels. Smart drainage system can contribute to sustainable development and improve the places and spaces where we live, work and play by balancing the different opportunitiesand challenges that influence the urban design and development of communities. The present existing drainage system has to integrate with technology to wipe out the problems us facing.

PROPOSED SYSTEM

The smart drainage system has

1. Predictive drainage clogging system:
The intelligence of sensors and predictive system identifies the drain clogged spot and gives us the details for further actions to take.

2. Drainagecloggingalertsystem: If there is any clogging in any area sensors will gives us the necessary details about the location.

3. Completelyconnected: The sensors are communicated through communication modules to share information.

Using our smart drainage system we can easily monitor, modify and rectify the problems in real time. No drainage system is an effective without human interaction.

Operation

WORKING PRINCIPLE

The drainage channels are covered with manholes to operate and to clear the clogging present inside the channel. By placing the sensors inside of the manhole will detects and transfers the appropriate information about the water, sticky contents, to detect elevated flow levels of drainage and clogging. Using the communication modules it will communicates with the sensors places at nearby manholes.

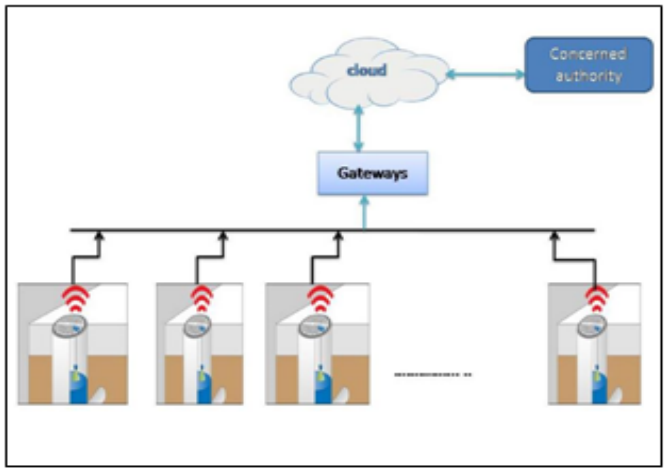

Fig 3. Proposed System

A wireless sensor network consists of hundreds or thousands of sensors having the capability to communicate among them or to send the data. Sensors will just monitor the water levels. Based upon the values given by the sensors drainage water levels and location ID will send to the Gateway and that sends to cloud (server) or concerned authority.

How it will be Useful???

Countries like UK, US, Australia are adopting sensory drains. **New York City department of environmental protection** (DEP) commissioner already announced the installation of manholes throughout the city that will alert the DEP the elevated flow levels inside drainage channels and allow staff to perform inspections and preventative maintenance. Monitoring technology will alert us the areas that are most in need of attention. When elevated flow levels are detected our staff will be able to inspect and if necessary perform maintenance of drainage channels before they get worse. When the monitoring sensors sends the data regarding the flow levels inside the drainage channels to concerned authority, they will dispatch the crew to represented areas. Preventative maintenance will improve the system capacity; improve the flow of water inside of drainage channels and helping the system from being overwhelmed during heavy rains.

Main Features and safety of the proposed system

The vital consideration of this design is **low cost**, **low maintenance** and **fastdeployment** and **high number of sensors, long life time and high quality of service**. By keeping the sensor inside of manhole it will monitor the condition of manhole lid, if it is opened will sends information to concerned persons from there necessary actions they will perform.

How our idea can be benefited??

- Roads and safety management
- Water quality management
- Flood threat management
- Empower development and growth
- Peaceful traffic
- Development of Better Nation
- Tourism
- Health and wellbeing

CONCLUSION

Many cities across the world are facing drainage system problems. Heavy Rain falls causing damaged roads and loss of valuable human hours affecting in one or other ways the country economy. There is a concern situation coming to scene frequently these days.The present existing technologies for drainage systems are Smart drain and CCTV drain surveys etc. Smart drainage system development and testing of emphasis (sensory drains) is currently carried out and expected to go on a trail in the real drains in coming next years.

REFERENCES

[1]. Google.com
[2]. Wikipedia
[3]. Modeling of Irrigation and Drainage Canals for Controller Design.J. Schuurmans; A. J. Clemmens; S. Dijkstra; A. Hof.
[4]. Characterisation of flood inundated areas and delineation of poor drainage soil using ERS-1 SAR imagery,Moussa Badji,SylviaDautrebande Automatic Measurement of Drainage Networks, Roger M. McCoy University of Kentucky, Lexington, Ky.
[5]. Improved genetic algorithms for optimal design of drainage systems, Wen-xiang PengInst. of Image Process. & Pattern Recognition, Shanghai Jiao Tong Univ., China
[6]. Smart grid challenges, issues and solutions, C. P. Vineetha,Electrical Engineering, Cochin University of Science and Technology, Kochi, Kerala, India
[7]. Study of popularization policy of clean energy vehicles using life cycle assessment, Tomomi Nonaka Graduate School of System Design and Management, Keio University, Yokohama, 4-1-1, Hiyoshi, Kohoku-ku, JAPAN
[8]. Clean Development Mechanism (CDM) implementation with secondary energy resources in domestic sector: An Indian
[9]. Scenario,K. J. Sreekanth Department of Mechanical Engineering, Mar Baselios College of Engineering and Technology, Trivandrum, Kerala, INDIA
[10]. Wireless Sensor Network application for water quality monitoring in India, S.Verma, Dept. of Electron., Banasthali Univ., Tonk, India

