

A Review on Smart City Solutions Based Drainage, Unused Well and Garbage Alerting System for Human Safety

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Abstract : With the emerging industrialization and development in various fields, men have ease his living but in doing so, he has also opened up various hazards and pollutions. The industries releases hazardous chemicals into water reservoir and makes the environment prone to hazards. The environmental issues and diseases that arises are disastrous. Similarly the drainage system ,garbage bins, sewage and manholes in our cities also need to be monitored and maintained. The irregular maintenance of these has caused huge catastrophes in the city claiming many human lives. Sometimes the life of sewage or drainage cleaners are also affected due to unknown gases and explosions in the same. The era is to develop the city as “smart city” and for that cleanliness is the important aspect to consider. The previous developed systems lack the proper safety measures and also does not properly monitor and alert the drainage and garbage overflow. The proposed system will not only monitor the drainage level, garbage overflow but also will alert the municipal corporation or concerned person regarding the presence of harmful or hazardous gases and explosion if any in the manholes or sewage by IOT platform and thus providing safety alert for the sewage cleaner. The system will have several advantages making it efficient and cost effective as well.

Keywords: Smart City, IoT, Sensors, Human Safety.

I. INTRODUCTION

The concept of Internet of things(IOT) is on the urge in today’s world. The IoT applications are enabling Smart City initiatives worldwide. It provides the ability to remotely monitor, manage and control devices, and to create new insights and actionable information from massive streams of real-time data. Sensors are making already smart cities even smarter.

The environment is still the main and important pillar in our life. We have stepped well ahead in the technology but we have inducted ourselves in the hazardous and pollution prone environment. In our daily routines, we are well familiar with the garbage overflow in the container bins of our area. The wells in our town have water level which are still not monitored and hence becomes unused. Similarly the drainage and sewage of our city gets overflow or even blocked sometimes. Municipal corporation or concerned authority does not have any prior knowledge that what is happening inside the sewage or drainage and what kind of Harmful gases have been developed inside. Due to this, the life of sewage cleaner will also be in danger because of unknown information. Toxic gases are one that causes serious health impacts, but are also used in industries in large quantities. These gases have to be monitored such that increase in the normal level of them could be known and proper precaution measures can be taken. The safety measures will be hampered. Hence the proper system is still needed which is cost effective and should provide proper monitoring , alerting and should also ensure the safety.

The existing systems available are not so portable and are costly and difficult to implement. Our proposed system makes the use of different gas sensors , a node MCU controller and is based on effective IOT platform that will alert the concerned authority through the cloud server. The system will assure safety of the citizens as well as sewage cleaner.

II. LITERATURE REVIEW

With the aim to present a smart drainage or garbage management ,various effective systems were developed with the available resources and suitable technology. Some literature works are as follows:

Akshay Bhalerao et al.[1], Mrs. D. Anuradha et al .[2], Prakash Prabhu V. [3] proposed the systems to monitor fill level of garbage bins as well as manholes using sensors and informing authorities in time. This systems does not give the indication of the hazardous gases or explosive gases that might be present in the sewage and hence lack the safety of the sewage cleaner.

Gaurang Sonawane et al.[4] ,S. Ravichandran[5] proposed the smart drainage systems that locates the blockage and remove the same using IOT. The manholes of certain locations are monitored by the systems. The systems lacks the garbage indication and also uses the resources which may get costly and will be lacking enough power to operate.

Dhanalakshmi.G et al. [6] proposed a system that helps in predicting the dangerous situations in Drainage system.The gas explosion in the drainage can be indicated by this system .The system does not give the details regarding the types of gases present in the manhole or drainage.

S.S Navghane et al .[7], A.Papalambrou et al.[8] proposed the systems interfaced with sensors which shows the status of garbage on mobile web browser.Systems generates the alert via wireless medium.This proposed systems reduces human resources but does not guarantee human safety.

V.S.Velladurai et al.[9]presented the system designing microcontroller based toxic gas detecting, alerting and gas purification. The advantage of this automated detection and alerting system over the manual method is that it offers quick response time and accurate detection of an emergency and in turn leading faster diffusion of the critical situation using gas purification process convert a toxic gases into pure air.The system requires additional circuitry.The system also cannot detect the explosion in the manholes.

Jalpa Shah [10] presented a customised design of an IoT enabled environment monitoring system to monitor temperature, humidity and CO₂. In developed system, data is sent from the transmitter node to the receiver node. The data received at the receiver node is monitored and recorded in an excel sheet in a personal computer (PC) through a Graphical User Interface (GUI), made in LabVIEW. An Android application has also been developed through which data is transferred from LabVIEW to a smartphone, for monitoring data remotely.

Yontao Yu et al.[11] presented the system a novel framework for automated detection of urban road manhole covers using mobile laser scanning (MLS) data. Urban road manhole covers are detected from geo referenced intensity images based on the multilayer feature generation model and random forest model.

Retno Tri Wahyun et al. [12] presented the system of drainage that is intended to monitor conditions at several points in drainage system using wireless sensor networks. Some sensor nodes are deployed at several determined points to be connected each other. The recorded data was stored into a database that was visualized by Geographical Information System (GIS). The monitoring parameters were water levels in drainage, water discharge and rainfall conditions around the drainage area.The system lacks explosion detection and gases detection in the sewage and does not guarantee safety for sewage cleaner.

Vincenzo Catania and Daniela Ventura [13] proposed an approach to smart waste collection that is able to improve and optimize the handling of solid urban waste through monitoring ,data elaboration and using Smart-M3 Platform.The system lacks user authentication and system lock.The system also needs decision making improvements.

Muragesh S.K and Santhosha Rao [14] presented a system for implementation and design function of an Underground Drainage and Manhole Monitoring System (UDMS) for IoT applications. The model provides a system of monitoring the water level and atmospheric temperature and pressure inside a manhole and to check whether a manhole lid is open. It also monitors underground installed electric power lines.The system is based for metropolian cities and it incorporates the idea of sensor networks. The system mainly indicates the overflow and monitors the open lid of the drainage. The system lacks the safety of sewage cleaner regarding the explosive contents and gases in the underground manhole or drainage.

So, from the above literature surveys ,it is clear that the previously developed systems are not that much efficient and cost effective.Although the developed systems monitors and detect the respective or concerned things but still does not guarantee a proper safety measures for sewage or manhole cleaners and people in nearby surrounding or sewage.

III. CONCLUSION

The proposed system will be efficient in both commercial as well as industrial applications. This system will increase the safety for each concerned person as well as the cleaning person. Presence of various harmful gases will be monitored and viewed by the people via IOT Platform. Hence the people will be able to have the prior knowledge of what is happening around the environment thus making them aware that "Prevention is better than cure."

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