IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 2, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, April 2024 ||

International Conference on Recent Development in Engineering and Technology – ICRDET 24

Organized by

Dhaanish Ahmed Institute of Technology, KG Chavadi, Coimbatore, Tamilnadu, India

Advanced Underground DrainageMonitoring System

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ABSTRACT: This project represents the implementation and design functions for monitoring and managing underground drainage with different approaches and also protect the worker. In some cases, the worker will be affected by some issues like gas, abnormal condition, then the worker to be saved by using rope through the motor. The Drainage is the system or process by which water, sewage or other liquids are drained from a placeand to maintain the proper function of drainage, its condition should be monitored regularly. But manually it isvery difficult to monitor all area where a human cannot reach. To mitigate all these issues here we are developed and implemented the system using sensor network. The proposed system is low cost, less maintenance, long life and web-based real time system, which update the information to LCD Display and update to the server. This system directly impacts on the health issues of citizens and worker who cleans the underground drainage. It also avoids spreading of infection due to mosquitoes and gives clean and healthy environment as well as controls the diseases such as malaria, dengue, diarrhoea, etc. The system reduces the accident caused by an exposed manhole. The main aim of this project is to monitor the parameter like Temperature and Gas through the Server. If some issues are occurred in Drainage the worker will be saved and protected.

KEYWORDS: IoT, LCD display, Co2 sensor, Gas sensor, Temperature sensor, humidity sensor.

I. INTRODUCTION

Drainage Monitoring System: - Drainage may consists of the wastes left over from City, Public area, Society, College, home etc. Leakage of the drainage water can cause severe effects on environment. This project is related to the “Smart City” and based on Internet of Things” (IOT). So, for smart lifestyle, cleanliness is needed, and cleanliness is beginning with Drainage maintenance. It will help to reduce road traffics, toxic gas leakage. The Internet of Things (IoT) is a recent communication paradigm that envisions near future, in which the objects of everyday life will be equipped with micro controllers, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users becoming an integral part of the Internet. It is a very innovative system which will help to keep the cities clean. This system monitors the Manhole and informs about the level of Drainage water level and gas and humidity level. For this the system uses ultrasonic sensors placed over the manhole cover to detect the water and gas level and compare it with the drainage depth. The system makes use of Arduino family microcontroller, LCD screen, Wi-Fi modem for sending data and a buzzer. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level of water, humidity and gas. Whereas a web page is built to show the status to the user monitoring it. The web page gives a graphical view of the drainage. The LCD screen shows the status of the drainage water level, gas and humidity level. The system puts on the buzzer when the level of water crosses the set limit. Thus, this system helps to keep the city clean by informing about the drainage water levels by providing graphical image of the drainage via a web page.

II. RELATED WORK

When exploring related work for an advanced underground drainage monitoring and automatic rescue system using IoT (Internet of Things), you'll want to examine research papers, patents, and commercial products that address similar or complementary aspects of the proposed system. Some key areas and examples of related work to consider: IoT-based Environmental Monitoring Systems: Look for studies or products that utilize IoT devices for environmental monitoring, particularly in underground or remote locations. These could include monitoring systems for water quality, air quality, or soil conditions. Underground Infrastructure Monitoring: Research projects focusing on

monitoring underground infrastructure such as pipelines, tunnels, or sewage systems can provide insights into the challenges and solutions for deploying sensors in such environments. Automated Rescue Systems: Investigate existing automated rescue systems used in various industries such as mining, construction, or disaster response. These systems may include sensors for detecting hazards, robotic rescue vehicles, or automated alerting mechanisms. Data Fusion and Analysis Techniques: Explore techniques for fusing data from multiple sensors and sources to extract meaningful insights. This could involve machine learning algorithms for anomaly detection, predictive maintenance, or risk assessment. Communication Protocols and Network Infrastructure: Consider studies or standards related to communication protocols and network infrastructure suitable for underground environments. This could include wireless sensor networks, mesh networks, or protocols optimized for low-power and high-reliability communication. Case Studies and Real-World Deployments: Look for case studies or reports on real-world deployments of IoT systems in underground environments. These can provide valuable lessons learned, best practices, and challenges encountered during implementation. Regulatory Compliance and Safety Standards: Investigate regulatory requirements and safety standards relevant to underground monitoring and rescue systems. Understanding compliance requirements can help ensure the proposed system meets industry standards and safety guidelines. Integration with Geospatial Information Systems (GIS): Explore how IoT data from underground monitoring systems can be integrated with GIS for spatial analysis, visualization, and decision-making. This could include techniques for mapping underground infrastructure, tracking environmental changes, or modelling potential hazards.

III. PROPOSED ALGORITHM

1. Initialize the system and sensors.
2. Read temperature and gas levels.
3. Check if temperature exceeds threshold or gas levels are abnormal.
4. If anomalies detected, trigger alert/notification.
5. Transmit data and alerts to monitoring station.
6. Log sensor readings and events.
7. Implement response actions based on alerts.
8. Continuously monitor and update system.
9. Conduct periodic maintenance and calibration.
10. Analyze data for trends and optimizations.

IV. PSEUDO CODE

1. Define pin numbers for sensors
2. Define threshold values
3. Initialize sensors and communication
4. Code to read temperature sensor value
5. Code to read gas sensor value
6. Assuming temperature sensor output range
7. Assuming gas sensor output range
8. Dummy value for testing
9. Code to send alert/notification

V. SIMULATION RESULTS

Regarding the verbal exchange channel, the statistics transmission changed into examined with the sensornodes powered via way of means of a not unusual place battery, and the ten ft statistics transmission varietychanged into absolutely achieved, confirming the feasibility of the entire community architecture. For the trying out of the sensor node, the aid shape has been located near the duct of the manholes and plenty of water drainage systems. The peak of the water degree has been cautiously regulated and obtains the coolest check results. Nevertheless, it must be underlined, that with exclusive intensity values of the water degree sensor the variant of the ranges is achieved .This truth indicates that the node could be capable of function additionally with variable water ranges. The fueloline sensors also are discovered operating in risky circumstance wherein better awareness of gases is present. All the sensors hit

upon the values and router node sends the statistics to cloud and stay depth ranges are displayed at the website. And while the depth ranges exceed the edge thealarm is given and displayed with place and depth information. As we're the use of WIFI module therefore it's far secured via way of means of protection protocols which includes WPA, WPS and WPA2

VI. CONCLUSION AND FUTURE WORK

Underground monitoring is challenging problem. This project proposes different methods for monitoring and managing underground drainage system. It explains various applications like underground drainage and identification in real time. The gases level are being monitored and updated on the internet using the Internet of Things. This enables the person in-charge to take necessary actions regarding the same. In this way, the unnecessary trips on the manholes are saved and can only be conducted as and when required. Also, real time update on the internet helps in maintaining the regularity in drainage check thus avoid the hazards. Our projecthelps to reduce the problems of drainage system with the help of sensors gas sensors.

REFERENCES

[1] Yash Narale, Apurva Jogal, Himani Chaudhary, and S.P Bhosale, "Underground Drainage Monitoring System using IOT", International Journal of Advance Research, Ideas and Innovations in Technology, volume 4, Issue 1 pp. 188-192, 2018.

[2] Gaurang Sonawane, Chetan Mahajan, Anuja Nikale, Yogita Dalvi , "Smart Real-Time Drainage Monitoring System Using Internet of Things", Iconic Research And Engineering Journals, volume 1 Issue 11 May2018.

[3] Prof. S A.Shaikh , Suvarna A. Sonawane, "Monitoring Smart City Applications using Raspberry PI Based on IOT", International Journal for Research in Applied Science & Engineering Technology, Volume 5 Issue VII, pp. 925-929, July 2017 .

[4] Muragesh SK and Santhosha Rao, "Automated Internet of Things for Underground Drainage and Manhole Monitoring System for Metropolitan Cities", International Journal of Information & Computation Technology, Volume 4, Number 12, pp. 1211-1220, 2014.

[5] Mihai T. Lazarescu, "Design of a WSN Platform for Long-Term Environmental Monitoring for IoT Applications", Ieee Journal On Emerging And Selected Topics In Circuits And Systems, Vol. 3, No. 1, March 2013. vol.11, no.6, pp.54,61, Dec

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

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