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Smart Sawerage Monitoring System Using GPS

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Abstract: *The underground sewerage Pipeline systems are responsible for transporting vital materials . Any leakage in the pipe can cause major financial losses and possible environmental damages. Currently, buried pipelines are only monitored at key points, which can be spaced several kilometers apart. A system with a higher spatial resolution would provide operators with a better understanding of their network. In buried pipeline monitoring, sensor nodes are deployed in soil. The underground environment imposes major limitations on sensor nodes, as poor RF transmission and lack of maintainability. The prior alerts of blockages and locate them using IOT. Trace location using GPS and send SMS through GSM.*
Keywords: *RF, GPS, SMS, GSM, IOT .*

I. Introduction

The smart sewerage system is an important component of urban infrastructure. It is considered to be city's lifeline. Most management on underground sewerage is manual therefore it is not efficient to have clean and working underground system also in such big cities, it is difficult for the government personnel to locate the exact manhole which is facing the problem. Therefore, it is essential to develop a system which can handle underground sewerage without human intervention. Underground sewerage involves sewerage system, gas pipeline network, water pipeline, and manholes. This project describes various functions used for maintenance and monitoring of underground sewerage system. It provides a system which is able to monitor the water level, atmospheric temperature, water flow and toxic gasses. If sewerage system gets blocked and water overflows it can be identified by the sensor system. And that sensor sends information the transmitter which is located in that area to the corresponding magnetic station . Today's sewerage system is not high-tech. So whenever there is blockage it is difficult to figure out the exact location of the blockage. Also, early alerts of the blockage are not received. Hence detection and repairing of the blockage become time consuming. It becomes very inconvenient to handle the situation when pipes are blocked completely. Due to such failure of sewerage line people face a lot of problems.

II. Problem Statement

Today's drainage system is not high-tech. So whenever there is blockage it is difficult to figure out the exact location of the blockage. Also, early alerts of the blockage are not received. Hence detection and repairing of the blockage become time consuming. It becomes very inconvenient to handle the situation when pipes are blocked completely. Due to such failure of drainage line people face a lot of problems. Narale Yash et al, International Journal of Advance Research, Ideas and Innovations in Technology. So this system proposes:

- Detect the location
- The system governing the flow of sewage from the pipes

.□ Use of flow sensors to detect the variations in theflow.

- Get the prior alerts of blockages and locate them using IOT. Trace location using GPS and send SMS through GSM.

III. Implementation

Mostly smart cities are implemented in every field of the life by automating real environment using smart nodes.there exists some work on smart sewerage which is described by traditional Iot concept.we have proposed sewerage system. A sensor unit is basically consists of several sensors used to detect the predetermined parameters that indicate the quality of water. In this work, three types of sensor; pH sensor that senses the acidity of basicity of the water, temperature sensor and turbidity sensor based on phototransistor are used. All the sensors use battery for its operation. The information being sensed by the sensors are then converted into electrical signal and go through the signal conditioning circuit that functions to make sure the voltage or current produced by the sensors is proportional to the actual values of parameters being sensed. Then it is passed to a microcontroller or microprocessorthat pr ocesses it to the value understandable by human.

Wireless Sensor Node :-

The wireless sensor node in this work is consist of sensor unit as mentioned in section A; a microcontroller or microprocessor with a task of signal digitizing, data transmission, networking managementetc; and radio frequency transceiver for communications at the physical layer. All of them share a single battery as a power source.Relative pressure sensing method based on force sensitive resistors (FSR) is used for pressure measurements in the proposed UWSN for pipeline monitoring. This system operates based on the principle of a changing diameter of the pipe caused by an internal pressure change. Underground Wireless Sensor Network (UWSN) for a Pipeline Systeme.

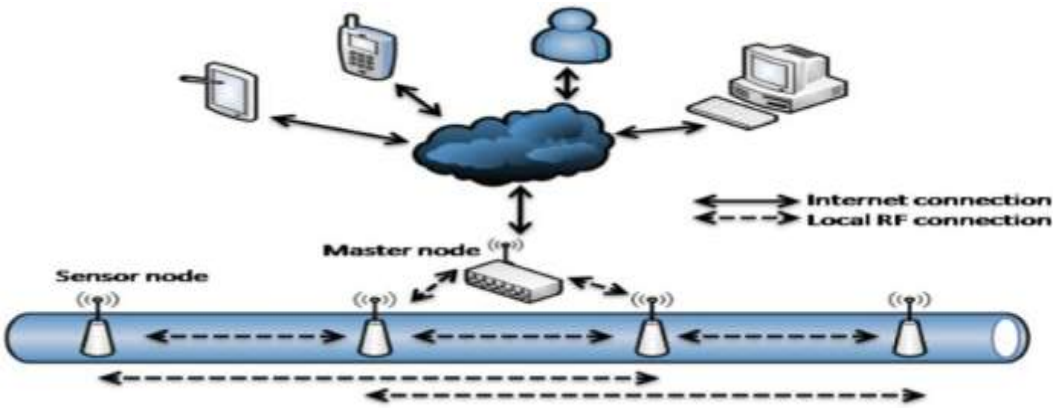

Fig-1: Underground Wireless Sensor Network .

Smart monitoring is challenging problem. This project proposes different methods for monitoring and managing smart sewerage system. It explains various applications like underground sewerage and manhole identification in real time.Various parameters like temperature, toxic gases, flow and level of water are being monitored and updated on the internet using theInternet of Things. This enables the person in-charge to take the necessary actions regarding the same. In this way the unnecessarytrips 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 sewerage check thus avoiding the hazards.

An unsmart sewerage monitoring system will not only help in maintaining the proper health and safety of the city but also in reducing the work of government personnel. Various types of sensors (flow, level, temperature and gas sensors) are interfaced with microcontroller ARM7 in order to make the system smart. When the respective sensors reach the threshold level, the indication of that respective value and sensor is being sent to the microcontroller. Furthermore, ARM7 then sends the signal and location of the manhole to the municipal corporation through GSM and GPS and the officials could easily locate which manhole is having the problem and could take appropriate steps. Also, ARM7 updates the live values of all the sensors in the manholes falling under the respective area using IoT. A message will also be displayed on the 16*2 LCD.

1 ARM 7

ARM7 is widely used processor family in embedded system applications. It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as a high end application developer.

2 LM35 (TEMPERATURE SENSOR)

The LM35 series are a precision integrated-circuit temperature sensor, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade-scaling.

3 LCD (LIQUID CRYSTAL DISPLAY)

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons: 1. The declining prices of LCDs. 2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.

4 CO2 SENSOR

This is a simple-to-use Carbon Monoxide (CO) sensor, suitable for sensing CO concentrations in the air. The MQ-7 can detect COgas concentrations anywhere from 20 to 2000ppm. This sensor has a high sensitivity and fast response time. The sensor's output is an analog resistance. It has good sensitivity to carbon monoxide in a wide range and has advantages such as long lifespan, low cost, and simple drive circuit &etc.

5 LEVEL SENSOR

Level sensors detect the level of liquids and other fluids and fluidized solids, including slurries, granular materials, and powder that exhibit an upper free surface. Substances that flow become essentially horizontal in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak.

6 GPS

The Global Positioning System (GPS) is a space-based navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

7 GSM

Fig GSM SIM900 GSM Module is the module that supports communication in 900MHz band. We are from India and most of the mobile network providers in this country operate in the 900 MHz band. If you are from another country, you have to check the mobile network band in your area. A majority of United States mobile networks operate in 850 MHz bands (the band is either 850 MHz or 1900 MHz). Canada operates primarily in 1900 MHz band.

Fig 2.GSM

8 FLOW SENSOR/METER

Water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with a different rate of flow. The hall-effect sensor outputs the corresponding pulse signal. This one is suitable to detect flow in water dispenser or coffee machine. Features: Compact, Easy to Instal

l High Sealing Performance

- High Quality Hall Effect Sensor
- RoHS Compliant

IV. Flowchart

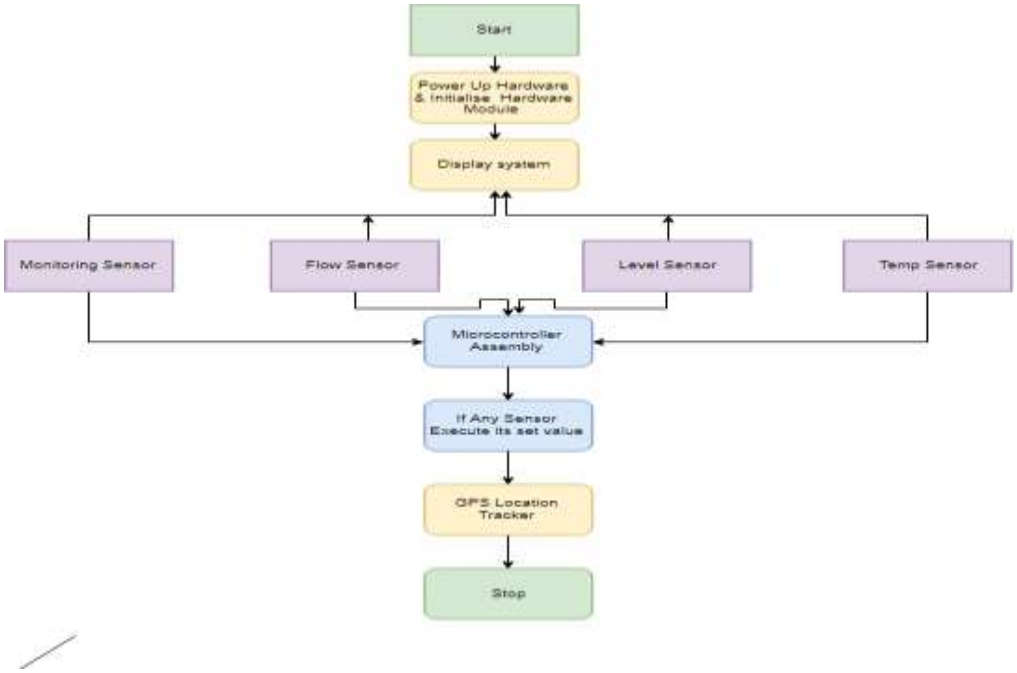

Fig.4 block diagram of saverage system

V. Future Work

Sensor networks are considered as the key enablers for the IoT paradigm. However, due to the widening variety of applications, it is increasingly difficult to define common requirements for the WSN nodes and platforms. This project addresses all automated Internet of Things for Underground Drainage phases of the practical development of an Underground Drainage Monitoring System (UDMS) through IoT applications for metropolitan cities. A real life, demanding application is selected as a reference to guide. Aspects of sensor network platform considered are: platform structure, flexibility and reusability, optimization of the sensor nodes, optimization of the communication, error recovery from communications and node operation, high availability of service at all levels, application server reliability and the interfacing with IoT applications. This project can be used to guide the specification, optimization, and development of sensor network Platforms for other IoT application domains.

VI. Conclusion

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 manhole identification in real time. Various parameters like temperature, toxic gases, flow and level of water are being monitored and updated on the internet using the Internet of Things. This enables the person in-charge to take the 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 avoiding the hazards

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