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Sewage Sensor Monitoring System Based On Embedded System

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ABSTRACT: Blockages in sewer are major causes of both sever flooding and pollution .Water companies fail to tackle this problem face hefty fines and high operational costs if they unsuccessful to provide a practical solution to prevent flooding.As a result, the detection of sewer condition is routinely required to inform on the best course of action to eliminate this critical problem. This paper present a low cost wireless sensor technology to detect blockages proactively, and feed these event data back to a central control room. The practical deployment of the proposed WSN in an urban area will be demonstrated. In addition, the challenges of this technology in a field trial and the recorded data in terms of the sensor and communication reliability will be addressed.In this system ,we proposed the smart sewage monitoring by using with some sensors parameters . This paper presents an approach to built an effective low cost ,real time and in-situ sewage monitoring system using arduino micro controller.

I. INTRODUCTION

Sewer flooding and pollution incidents are significant issues in the wastewater business process in the waste water industry.One of the most processing issues for prevention of sewer flooding and pollution is sewer and gully blockages.Monitoring and maintenance are important part of the many water companies business to prevent catastrophic failures that can shut down a facility which may cost several millions pounds per day.On top of that, water industries regulated by several UK's government agencies,such as the OFWAT and EA ,may be required to pay hefty fines for not meeting the basic standard performance of their services,currently, many water companies have deployed telemetrysystems to replace some of the manual operations,running cost remain expensive. Low cost wireless sensors may be the only cost-efficient option to replace traditional visual inspection which is extremely inefficient and costly. Moreover,existing telemetry systems require extensive cabling for(Public Switch Telephone Network)PSTN and power and cannot be deployed over a large catchment area because of the cost.Low cost and low power sensors could be deployed over an extensive footprint network and provide early warning of impending failure offering time for maintenance teams to prevent service or regulatory compliance failure.This paper describes a practical implementation of a low cost wireless WSN using audrino technologies to monitor the sewage water level of the gullies in a residential urban area.The purpose of this field trial was to evaluate the preliminary design of the proposed system in terms of durability of sensors, sensors nodes and gateways and reliability of communication under real operational conditions and within a typical urban environment.

II. SYSTEM ARCHITECTURE

In this section, the architecture of the proposed low power mesh network wireless sensor system will be discussed. Inherent power limitations of radio communication devices might introduce hard restrictions on the coverage of the WSN [2]. Due to this limitation, direct communication between sensor and base station is not always possible especially over a difficult radio environment with strong attenuation. In order to overcome this difficulty and to extend

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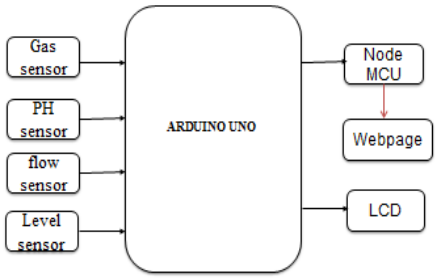
the communication distance, an obvious way forward is to use multi-distributed nodes that use multi-hops to send the data over these nodes (sensors) on the way to the base station. As can be illustrated in , by implementing a mesh network communication configuration, this WSN allows for continuous connections and reconfigurations around blocked paths. This might results in hopping from sensor node to node until a connection can be established with the base station [3-5]. It should be noted that the mesh networks posses the self- healing capability that will operate even when a node breaks down or a connection fails. As a result, it forms a very reliable network. Once the data is received by the data gatherer/hub, it will be stored and published on a webpage via connection to the internet. By accessing the internet, remote mobile devices can request the recorded data with the right user name and password. A arduino based short range WSN was selected for this application due to its attractive features such as low data rate, low power consumption, simple communication infrastructure, low latency and capability to support one master and up to 65000 slave control units. In general, the proposed system has led to the development of knowledge and expertise in four areas of research: a) Embedded Antenna design; b) Sensors and Instrumentation for use in water industry assets; c) Wireless communications and distributed wireless sensor networking; d) Remote monitoring of water related assets.

BLOCK DIAGRAM



Hardware design and implementation
The hardwares are used to PHsensor,Level sensor,Flow sensor,Gas sensor,audrino uno and wifi.

PH SENSOR AND LEVEL SENSOR
PH is the measure of acidity or alkalinity of water solution which is a determined by the relative number of hydrogen(H+) or hydroxyl(OH-)ions present.The PH value (below 7) is said to be acidic and (above 7)is said to be basic.The PH of a solution can change with temperature respectively.Fast response,accurancy and reproducibility regardless of sample composition.It is Detect the PH value and Water level.Combination of PH electrode with built-in temperature sensor.Level sensor detects the level of liquids and other fludies.They are many physical and application variables that affect the selection of the optimal level. The code of the ph sensor is MQ 3 and level sensor is 9031.

GAS SENSOR
Ideal sensor for use to detect the presence of a dangerous LPG leak in your car or in a service station, storage tank environment. This unit can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the LPG concentration.The sensor has excellent sensitivity combined with a quick response time. The sensor can also sense iso-butane, propane, LNG and cigarette smoke.
FLOW SENSOR
To detect the water flow level.This product is light and nimble outline,small size,easy to install.Bearings used in the rotating part.Seals are in the upper and lower force will never leakThe code of the flow sensor is YF-S203.

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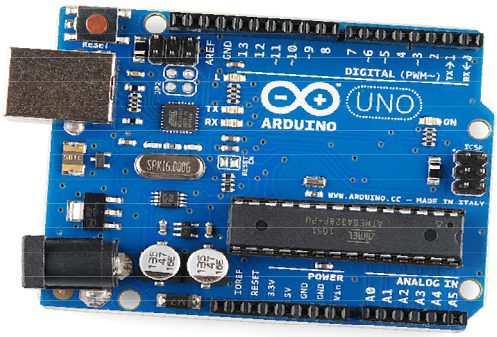
ARDUINO

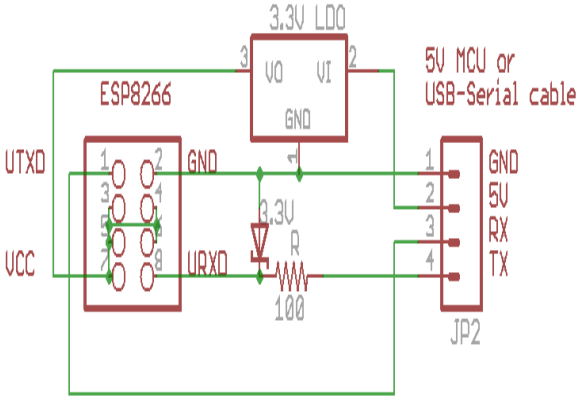
It is a open source electronics prototyping platform .open source resoures that can be used redistributed or rewritten free of charge often software or hardware.Electronics is an technology which makes use of the controlled motion of electrons through different media.Prototyping is an original from that can serve as a basis or standard for other things. Platform is an hardware architecture with software frame work on which other software can run.



WIFI MODULE

The ESP8266 wifi module is self container SOC with in tegrated TCP/IP protocol stack that can give any microcontroller access to your wifi network.The ESP8266 is capable of either hosting an application or offloading all wifi networking functions from another application processor.Each ESP8266 module comes preprogramed with an AT commands set firmware.The ESP8266 module is an extremely cost effective bold with a hug and ever growing ,community.

INTERFACE CIRCUIT



III. RESULT AND DISCUSSION

We have identified a suitable implementation model that consist of different sensor devices and other modules , functionalities.In build wifi module connects the embedded device to internet.Sensors are connected to arduino UNO board for monitoring the readings and from that value the corresponding sewage parameter will be evaluated.After sensing the data from different sensor device,which are placed in particular area.sense the data will be automatically send to the webserver,when a proper connection established with the server device

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IV. CONCLUSION

In this paper Monitoring the ph,level,gas and flow in sewage water.the system can monitor sewage water parameter automatically,and it is low in cost and dose not require people on duty.So the sewage water testing is likely to be more economical convenient and fast. The system has good flexibility.only by the replacing corresponding sensors and changing the relevant software programs,this system can be used to to monitor other sewage water parameters. Future scope:In future we use IOT concept in this project Detecting the more parameters for most secure purpose Increase the parameters by addition of multiple sensor

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