

LITERATURE SURVEY

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1.Procedia Computer Science

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This paper proposes a sensor-based water quality monitoring system. The main components of Wireless Sensor Network (WSN) include a microcontroller for processing the system, communication system for inter and intra node communication and several sensors. Real-time data access can be done by using remote monitoring and Internet of Things (IoT) technology. Data collected at the apart site can be displayed in a visual format on a server PC with the help of Spark streaming analysis through Spark MLlib, Deep learning neural network models, Belief Rule Based (BRB) system and is also compared with standard values. If the acquired value is above the threshold value automated warning SMS alert will be sent to the agent.

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2.Water quality monitoring using wireless sensor networks:

Current trends and future research directions

KS Adu-Manu, C Tapparello, W Heinzelman... - ACM Transactions on ..., 2017 - dl.acm.org

Water is essential for human survival. Although approximately 71% of the world is covered in water, only 2.5% of this is fresh water; hence, fresh water is a valuable resource that must be carefully monitored and maintained. In developing countries, 80% of people are without access to potable water. Cholera is still reported in more than 50 countries. In Africa, 75% of the drinking water comes from underground sources, which makes water monitoring an issue of key concern, as water monitoring can be used to track water quality changes over ...

3.Real-Time Estimation of Population Exposure to PM_{2.5} Using Mobile- and Station-Based Big Data

.Extremely high fine particulate matter (PM_{2.5}) concentration has been a topic of special concern in recent years because of its important and sensitive relation with health risks. However, many previous PM_{2.5} exposure assessments have practical limitations, due to the assumption that population distribution or air pollution levels are spatially stationary and temporally constant and people move within regions of generally the same air quality throughout a day or other time periods. To deal with this challenge, we propose a novel method to achieve the real-time estimation of population exposure to PM_{2.5} in China by integrating mobile-phone locating-

request (MPL) big data and station-based PM_{2.5} observations. Nationwide experiments show that the proposed method can yield the estimation of population exposure to PM_{2.5} concentrations and cumulative inhaled PM_{2.5} masses with a 3-h updating frequency. Compared with the census-based method, it introduced the dynamics of population distribution into the exposure estimation, thereby providing an improved way to better assess the population exposure to PM_{2.5} at different temporal scales.

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4. The main goal of this paper is to build a Sensor-based Water Quality Monitoring System. Arduino Mega 2560 acts as a base station and data from sensor nodes will be sent to it. For the academic purpose, this paper presents a small prototype of sensor networks consisting of temperature, water level, flow and pH. Then pH and temperature sensor values were sent to cloud platform (ARTIK cloud) and displayed as a graphical representation on a local PC. Moreover, GSM shield (SIM808) is connected to Arduino Mega which compares sensor values to threshold values and sends a text alert to the agent if the obtained value is above or below the threshold value.

B. Paul - 2018 - dspace.bracu.ac.bd

5. In our proposed method, Raspberry pi B+ will be run on the LINUX kernel by the use of I/O devices, the DEBIAN JESSY OS is boot on the Raspberry pi. The four sensors' value that are

Temperature, pH, Turbidity and Conductivity can be read by the command line. No need to input a command every time to know the sensor readings. In order to access the terminals of the sensors, Java program is used. Raspberry pi B+ have the installed device driver software no need to load them for interfacing. Whenever it requires then it increase the boot time to process the use of required amount of the system resources. These drivers are stored in the modprobe. This modprob work is to boot drivers into the Linux kernel. The Raspberry pi B+ sends the data to the cloud. From the cloud the water department takes the reading and based on the reading is plot the graph. The monitored parameters of the water from the sensors are stored in the cloud in the form of tags, using XML parsing we parse the data and create xml document, those data will be taken as the latest readings. The Raspberry Pi as only serial in and serial out pin so we used here different sensor we need all the values at a time, so java program help to do this. If the water parameter not in range means it will generate a report automatically and send to the owner of the industry. If the owner is not taken any action then the details will be uploaded to the public cloud or else mark it as resolved.

Design of Low Cost System for Real Time Monitoring of Water Quality Parameters in IOT Environment

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6.Heterogeneous wireless sensor networks for flood prediction decision support systems

In this paper, we propose a new architecture for building decision support systems using heterogeneous wireless sensor networks. The architecture is built around standard hardware and existing wireless sensor networks technology. We show the effectiveness of the proposed architecture by applying it to a flood prediction scenario.

[K Andersson](#), [MS Hossain](#) - 2015 IEEE Conference on ..., 2015 - ieeexplore.ieee.org

7.Heterogeneous wireless sensor networks using CoAP and SMS to predict natural disasters

In this network CoAP is used as a unified application layer protocol for exchanging sensor data. Therefore, CoAP over SMS protocol is used for exchanging sensor data. Furthermore,

the effectiveness of the heterogeneous wireless sensor network for predicting natural disaster is presented in this paper.

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8. Performance analysis of an IP based protocol stack for WSNs

Traditionally, sensor network research has been to be unlike the internet, motivated by power and device constraints. The IETF 6LoWPAN draft standard changes this, defining how IPv6 packets can be efficiently transmitted over IEEE 802.15.4 radio links. Due to this 6LoWPAN technology, low power, low cost microcontrollers can be connected to the internet forming what is known as the Wireless embedded internet. Another IETF recommendation, CoAP allows these devices to communicate interactively over the internet. The integration of such tiny, ubiquitous electronic devices to the internet enables interesting real-time applications. We evaluate the performance of a stack consisting of CoAP and 6LoWPAN over the IEEE 802.15.4 radio link using the Contiki OS and Cooja simulator, along with the CoAP framework Californium (Cf).

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9.Cloud Based Water Reservoir Quality Monitoring System

The research is concentrating on checking stream water quality progressively by using ph value sensor, turbidity sensor, temperature sensor, salinity sensor and Oxygen sensor. In this way, IoT coordinated enormous information examination is have all the earmarks of being a superior arrangement as unwavering quality, versatility, speed, and determination can be given. It is primarily a cloud approach as an Administration movement model that licenses affiliations, end customers and their application to store, deal with and recover data from the cloud. A cloud database commonly fills in as a standard database game plan that is all things considered execute through the arrangement of database programming over a register/establishment cloud. It may be authentically found a good pace Internet program or a trader gave application programming interface (API) for application and organization assimilation

Anzar Ahmad Shashi Shekhar, Abhijeet Roy

10.Selection of energy efficient routing protocol for irrigation enabled by wireless sensor network

Since WSNs are deployed in constraints environment, the life time of sensors is very crucial for normal operation of the networks. In this regard routing protocol is a prime factor for the prolonged life time of sensors. This research focuses the performances analysis of some clustering based routing protocols to select the best routing protocol. Four algorithms are considered, namely Low Energy Adaptive Clustering Hierarchy (LEACH), Threshold Sensitive Energy Efficient sensor Network (TEEN), Stable Election Protocol (SEP) and Energy Aware Multi Hop Multi Path (EAMMH). The simulation is carried out in Matlab framework by using the mathematical models of those algorithms in heterogeneous environment. The performance metrics which are considered are stability period, network lifetime, number of dead nodes per round, number of cluster heads (CH) per round, throughput and average residual energy of node. The experimental results illustrate that TEEN provides greater stable region and lifetime than others while SEP ensures more throughput.

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11. Optimal dynamic routing protocols for agro-sensor communication in MANETs

Our paper studies performance of proactive and reactive routing protocols in a scenario with agro-sensors. Our results, achieved by simulating a network both in OPNET Modeler and NS2, show that the AODV routing protocol performs better for a large-scale network (where node density is higher) while the DSR routing protocol performs better in a small-scale network given the particular scenario we studied.

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12. An IoT-belief rule base smart system to assess autism

An Internet-of-Things (IoT)-Belief Rule Base (BRB) based hybrid system is introduced to assess Autism spectrum disorder (ASD). This smart system can automatically collect sign and symptom data of various autistic children in real-time and classify the autistic children. The BRB subsystem incorporates knowledge representation parameters such as rule weight, attribute weight and degree of belief. The IoT-BRB system classifies the children having autism based on the sign and symptom collected by the pervasive sensing nodes

ME Alam, MS Kaiser, MS Hossain... - 2018 4th International

13. Environmental sensor networks in ecological research

Ecological sensor networks with highly developed cyberinfrastructure lie at the core of major new efforts to address fundamental issues of global change and environmental stability. The National Ecological Observatory Network (NEON), nearing implementation in the USA, is an integrated network of 20 regional observatories designed to gather long-term data on ecological responses of the biosphere to changes in land use and climate, and on feedbacks with the geosphere, hydrosphere and atmosphere (Keller *et al.*, 2008).

Philip W. Rundel, Eric A. Graham, Michael F. Allen, Jason C. Fisher, Thomas C. Harmon

14. Cross-Layer Support for Energy Efficient Routing in Wireless Sensor Networks

The researchers proposed a cross-layer protocol called the MAC-CROSS protocol that operates by exploiting the MAC and network layer information. The MAC-CROSS protocol is based on the S-MAC protocol [14]. The main drawback of the S-MAC protocol is that the listening and the sleep periods are fixed. As a result, once their Network Allocation Vector (NAV) time expires, they wake up thereby wasting energy unnecessarily. The MAC-CROSS protocol overcomes this problem by allowing only nodes which actually take part in the communication to wake up and allowing the rest to be in the sleeping mode. In [15], the authors proposed a protocol called Latency and Energy aware MAC (LE-MAC) based on the cross-layer information obtained from the MAC and the network layer. The main aim of this protocol is to achieve energy efficiency and minimize latency.

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15. The use of artificial neural networks for the prediction of water quality parameters

This paper presents the use of artificial neural networks (ANNs) as a viable means of forecasting water quality parameters. A review of ANNs is given, and a case study is presented in which ANN methods are used to forecast salinity in the River Murray at Murray Bridge (South Australia) 14 days in advance. It is estimated that high salinity levels in the Murray cause \$ US 22 million damage per year to water users in Adelaide.

HR Maier, GC Dandy - Water resources research, 1996 - Wiley Online Library

16. The real time monitoring of water quality in IoT environment

The system consist of several sensors is used to measuring physical and chemical parameters of the water. The parameters such as temperature, PH, turbidity, conductivity, dissolved oxygen of the water can be measured. The measured values from the sensors can be processed by the core controller. The raspberry PI B+ model can be used as a core controller. Finally, the sensor data can be viewed on internet using cloud computing.

[N Vijayakumar](#); [R Ramya](#)

17. A novel anomaly detection algorithm for sensor data under uncertainty

The collected sensor data can be used in various expert systems to support decision-making processes or to predict the occurrence of an event such as flooding (Fang et al. 2014). The wireless sensors are considered due to their low power consumption, low cost and protocol standardization

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18. Sensor based water quality monitoring system

The main goal of this paper to build a Sensor- based Water Quality Monitoring System. Arduino Mega 2560 act as a base station and data from sensor nodes will be send to it. For the academic purpose, this paper presents a small prototype of sensor networks consisting of temperature, water level, flow and ph. Then ph and temperature sensor values were sent cloud platform (ARTIK cloud) and displayed as a graphical representation on a local PC. Moreover GSM shield (SIM808) is connected to Arduino Mega which compares sensor values to threshold values and sends a text alert to the agent if the obtained value is above or below the threshold value.

[Paul, Bishwajit](#), BRAC University.

19. Near Real-Time Scour Monitoring System: Application to Indian River Inlet, Delaware

The present bridge piers within the Indian River Inlet, Delaware, are adjacent to deep scour holes that threaten the bridge. A new scour monitoring system (SM) using two three-dimensional profiling sonars was installed on the Indian River Inlet Bridge to observe more than 19,000 m² of bathymetry daily. The system components, configuration, and operation are described and example data are presented.

Bathymetric data collected by the SM compare favorably with historic high-quality multibeam data from the U.S. Army Corps of Engineers. Quantitative correlations with temporally consistent data from a single-beam personal watercraft survey vessel yield an r^2 correlation coefficient of 0.84 with 93% of the absolute value of elevation differences between the two data sets less than 3 m

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20.The First PPP-Based GPS Water Vapor Real-Time Monitoring System in Pearl-River-Delta Region, China

The first Precipitable Water Vapor Real-Time Monitoring System (PWVRMS) based on Global Positioning System Precise Point Positioning (PPP) technique has been developed for the Pearl-River-Delta region. This PWVRMS system estimates GPS satellite clock error data in real-time while using International GNSS Service (IGS) predicted precise satellite orbit directly. Currently it processes GPS data every 10 min on a daily basis from three networks in Pearl-River-Delta region: Hong Kong SatRef GPS network, Macao MoSRef GPS network and Guangdong CORS network. Compared to traditional double-differencing technique, the advantage of using PPP technique is that (1) the PWV estimation at each station is completely independent and is not affected by data quality at other stations; (2) the computation is much faster and simpler. This PWVRMS system is evaluated using radiosonde water vapor data. The GPS PWV accuracy is about 2.20 mm though the GPS station is 4.1 km away from the radiosonde. It is expected the actual GPS PWV accuracy should be higher if the GPS station is collocated with the radiosonde station.

- [Zhizhao Liu](#) &
- [Min Li](#)