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Remote Monitoring Using Wireless Sensor Node with IoT.

I Abinaya*, and D Manivannan.

School of Computing, SASTRA University, Thanjavur, Tamil Nadu, India.

ABSTRACT

WSN is extensively used for monitoring and controlling purpose in industries. In this work WSN and IoT are integrated together thereby allowing remote monitoring of the devices. The IRIS mote is used to sense, monitor and transmit the information. The main aim of this work is to monitor different workstations at industries using IRIS mote and to correspondingly take action in case the predetermined level is exceeded. Histogram is being plotted which gives an overall idea of the working of the device. The postgresql database values are fed into the internet with the help of web page with limited access thereby providing authentication. Aside from specialists the concerned individuals likewise can check the values and make any strides whenever the threshold point is surpassed.

Keywords: IoT, WSN, IRIS motes and web page.

Corresponding author

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INTRODUCTION

The phenomenal growth in wireless communication technology has led to novel paradigm called as sensor network. The sensors are programmed to listen to the events[1]. Remote monitoring demands the requirement of WSN while IoT helps in viewing the critical events from anywhere throughout the world. The WSN when integrated with IoT provides a better solution to the above problems. The histogram gives the history of the temperature values which helps in better understanding of the situations. The IRIS mote with MDA100 is used to get rid of all the issues related with temperature .Apart from doctors the other concerned people who are related to the infant can also view the values so that they can alert the doctors before any complications. IoT can be stated as the process of sensing, assimilating, analyzing, predicting and serving the user. It envisions a future in which the digital and physical data are all interrelated enabling method to device communication [2]. Recognizing a device, cooperating it with other devices, collaboration of various heterogeneous devices with security are the major investigation issues in IoT. All the low level capacities are, no doubt distributed with by the TinyOS a RTOS which is exceptionally composed with the assistance of nesC dialect. Wireless sensor network is the presiding paradigm in near imminent as it aids in analyzing a particular field with the aids of nodes interfaced with the sensors. Varieties of sensors are being interfaced with the node which facilitates in various bids. The node which contains a microcontroller aids out in carrying out the operations; a transceiver is seen to transfer the small amount of data and a battery backup which obliges as a backbone for these operations. The sensor board is interfaced superficially with the node and it aids in sensing external environment. Thus as a whole a mote is a sensor node which is capable of sensing the external atmosphere, transmitting the small bytes of data and communicating it with it. The nodes are capable of establishing an adhoc network wherein it conveys the information from and to the gateway nodes. Less cost, fewer power and dispersed nature demands the obligation of sensor networks in emergent applications. Likewise the applications of the sensor networks are numerous, starting from the agriculture, environmental home monitoring in homes[3][4],till forest [5], the multihop again facilitates in transmission of data to longer distance, taking care of power consumption of each and every nodes. The self-configurability along with the scalability makes it more fit into the event driven environment. When WSN is integrated with IoT it can be used in various applications including industrial automation, regulating water flow, reservoir levels, estimating the pipe pressure, detecting the current flow and line voltage, monitoring the operation of circuit breakers, regulating the electricity, controlling the rail road –crossing gates and monitoring the process and quality control. The remaining section of the paper is structured as follows.

Wireless sensor network

IRIS mote platform

The IRIS mote is having the capability to sense process and transfer the data. IRIS mote which is invention of MEMSIC is intended specifically for low power wireless sensor networks it is a platform of high bandwidth and enhanced program reminiscence when related to MICA motes. It can conceal the distance of about 500 meters without necessitating any amplification. It is constructed to meet the IEEE 802.15.4 compliant with an RF transceiver through 2.4 to 2.48 GHz subsidiary data rate of 250kbps. Exploiting fully ascendable mesh networking, IRIS mote methods an adhoc network ascendable for the user [6]. IRIS mote takes support of 2X AA batteries with the external power of 2.7-3.3 V.

The MDA100 sensor boards bear an inbuilt thermistor and photo cell. In addition to these sensors it is having the capability to support many more sensors with the facilitates of 51 pin connectors which acts as a prototyping area. The thermistor used is a highly accurate and stable element; it is connected to ADC1 through a basic resister divider circuit. The photocell used is a CdSe photocell. The maximum sensitivity of the photocell is at light wavelength of 690nm [6].The MIB520CB gateway behaves as a base station for IRIS motes wherein it affirms data transfer in addition to USB connectivity. It has got an on board processor which supports the IRIS mote processor boards. The three tiers of moteview called client tier,server tier and mote tier is made use of to establish the operation.

TinyOS

TinyOS is the bantam micro threaded operating system which help in guaranteed concurrent data flow among hardware devices with the ability to provide modularized components with little processing and

less storage overhead. TinyOS is the software platform designed specifically for wireless sensor network. It is designed in such a way that it supports multihop routing, self-organization among nodes with the help of wiring and modules. The nesC is the language which serves to be new design space for developers who concentrate on application area. It applies to all events driven programming model apart from support of concurrency and helps in avoiding race conditions which therefore improves the reliability of the system. When compared to normal OS TinyOS which is an RTOS is preferred because the resources are known in advance (static) and it is specific for an application wherein the introduction of an extra application demands the requirement of extra modules in the configuration.

PROPOSED SYSTEM ARCHITECTURE

MoteWorks thereby avails in updation of results building the IRIS motes more users friendly and thereby enables the database to be stored in the cloud. The distributed sensing has found applications in various domains due to its low cost and low power. This has certainly led to the inaugural of wireless sensor networks which avails in analyzing a particular region and thereby building the nodes conversing with the GUI or other manipulator interfaceable medium like PDA's.The paper focuses on building a device smart ample where the IRIS mote distinguishes itself with the avail of IP address with configuration can be made using client and server tier. The node is identified itself with the node id. IRIS mote along with MDA100 is hired to support various applications. MoteView avails in estimating the data, commands, topologies, and packets released packets received, RSSI, temperature and light sensitivity readings and the value is stowed in PostgreSQL database. It avails in retrieving the data when a query is being given to it. The values in the database are being fed into the cloud. The PostgreSQL is fed into the internet with the help of any servers available. PostgreSQL database stores data in a secure manner which facilitates in retrieving data later whenever a query is being requested. Initially the motes are all interconnected together to the base station. Depending on the applications the sensors can be used. Inbuilt sensors in the IRIS motes with MDA100 sensor boards are light and temperature which avails in measuring the light intensity and temperature readings.

Apart from this external sensors like humidity or gas sensor can be committed to the node. Whenever a particular threshold is increased a pop up message can be intimated to the user thereby alerting him. These values are sent to the PostgreSQL database which provides the data once the query is sent to it, the data can be viewed using the graphical user interface or some control module. The data is fed into the internet, thus the access to the data from anywhere and anytime is made possible. The security and user acceptance about the integration pose an important challenge [7]

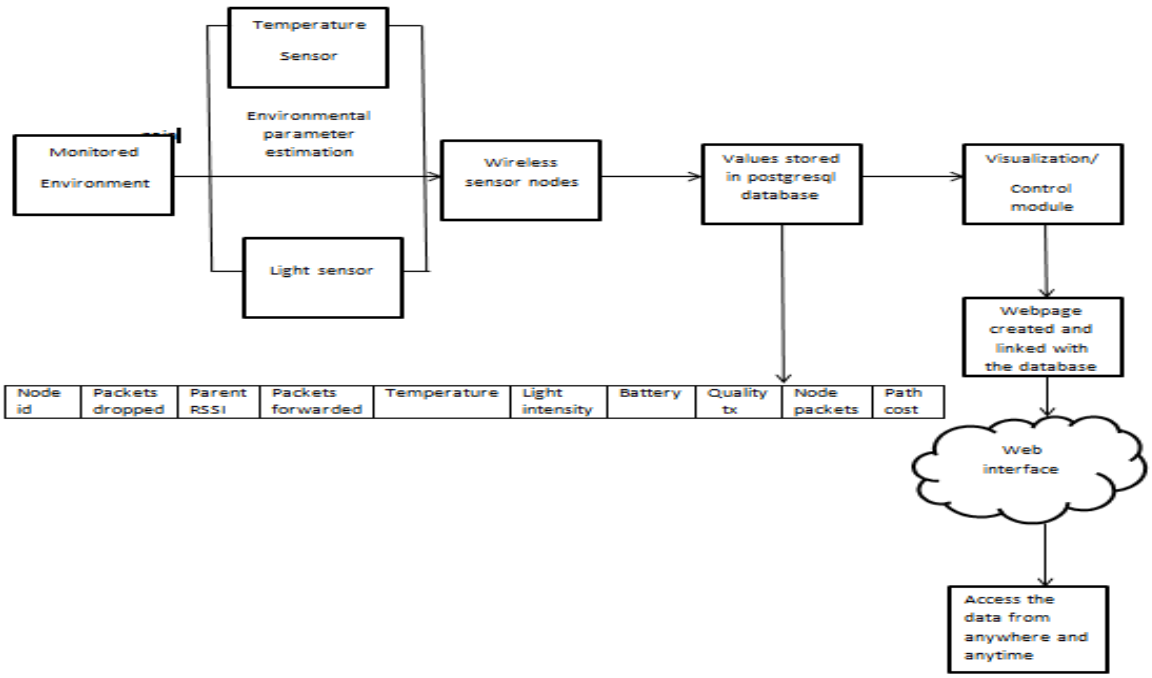

Figure 1: Proposed model

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RESULTS AND DISCUSSIONS

Whenever a particular threshold is being achieved a pop up message or alert mail can be sent to the respective users so that immediate actions are being taken by them thereby avoiding disasters.Sequential number is seen to identify the alert which is being assigned,with the duration which is also fixed.The light intensity values of motes with node id 1 and 2 are plotted with the help of the histogram. Graphical summarization of statistical dissemination of all the sensor data of the two nodes is plotted. Strong indications of the proper distribution exemplary for the data is made and depicted in fig 2.The web page can be linked with postgresql database using microsoft visual studio. The data is updated in postgresql databse and with the help of the visual studio the data is viewed in the localhost. The web page is created with the help of wix and zoho creator.The database can be connected direclty by using the API of the respective database . The exported file can also be included in the zoho creator. The authentication can be set in the database which allows the limited access to the database

Figure 2: Histogram

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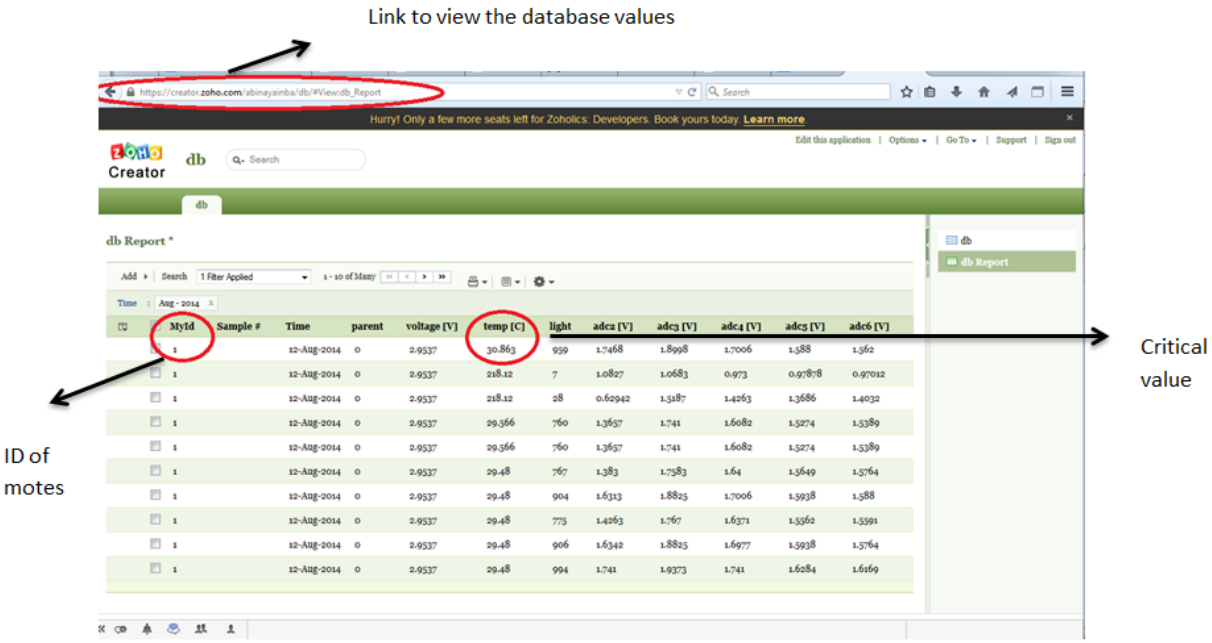

Figure 3: Database report

CONCULSION

It is hereby implemented that a set of sensor networks to monitor the crib of the infant and the room.The porposed system helps is estimating the temperature and light intensity values of the incubator thereby providing efficient monitoring.

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