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IoT based Point to Multipoint Reporting System using Android for NOC Application

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ABSTRACT

The scope of the paper is to propose a point to multipoint reporting system using smart phone for NOC (network operations center) application. The proposed paper is an effective implementation of IoT for NOC application where the various parameters in the will be continuously monitored using the different sensors. The hardware part will consist of a controller, a signal conditioning circuit, analog to digital converter, device driver and sensors. The controller will be connected to the smart phone using the android phone, which will be wirelessly connected to the server. Here the server will also have a database which will keep the logs of all the data. In case of any deviations from the normal operation or in case of any errors, the corresponding data is fetched from the logs stored in the data base. Data mining or the prediction algorithm will be used to predict the future data and perform the actions (sending email/sms) accordingly.

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I. INTRODUCTION

Internet of Things (IoT) is an emerging technology where almost all the objects can be physically connected together with the use of internet. IoT is based mainly on the integration of various devices like sensors, controllers and communication devices and their interoperability with each other to achieve a common goal [1].

A network operations center (NOC) is a place from which the network admins supervise, monitor and maintain a telecommunications network. Different enterprises, small or big have a have a network operations center where the entire network can be continuously monitored, analysed, updated and troubleshooting can be done[2].

This paper proposes an effective and flexible solution for condition monitoring in industrial applications. The basic operation includes monitoring different parameters in NOC using sensors, maintain the records in the database, predict the future data and report the discrepancies if any to the administrators.

II. SYSTEM DESCRIPTION

The remote sensing, monitoring, measuring and controlling of the devices in the NOC room can be achieved by an integration of hardware and software architectures. In the proposed system, the data transmission of the parameters sensed by the sensors can be processed and sent over to the cloud server via android phone. The prediction algorithms can be applied at the server side and will predict the future conditions in the networks operations center. Depending on the actions to be performed, the authorised user will be informed via email or s.m.s. The system will be further implemented for the multiple nodes with increased number of users. Figure 1 shows the basic block diagram of the proposed system.

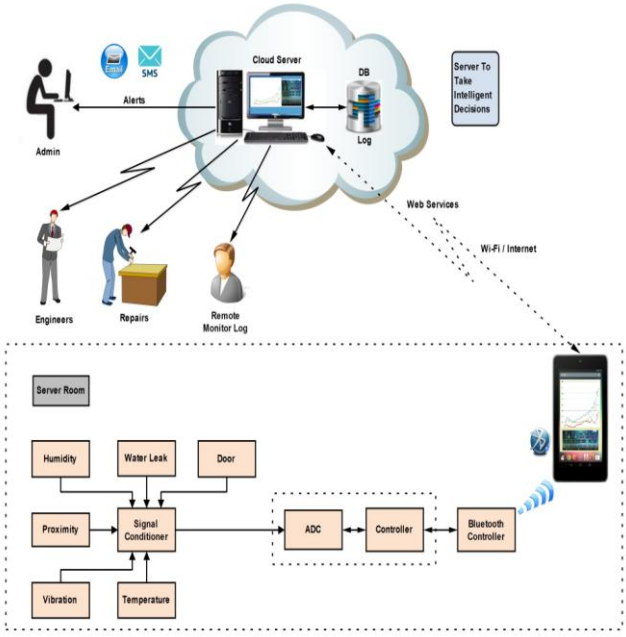

Figure 1: Block Diagram [6]

A. HARDWARE DESCRIPTION

As shown in figure no 1, the hardware part consists of different sensors placed in the server room like temperature sensor, light sensor, proximity sensor, humidity sensor, NOC door status indicating sensor. The LM 35 is used as a temperature sensor to continuously monitor the temperature in the NOC room. Light dependent resistor, LDR sensor is used to change the resistivity depending upon the incident light and thus monitor the deviations in the lighting conditions in the server room.. The sensor parameters are converted to the digital form using and given to the ATMEGA 32 controller and eventually to the HC-05 Bluetooth to serial port module. The ExpressSCH software is used to design the circuit diagram and the ExpressPCB software to design the PCB according to the requirement.

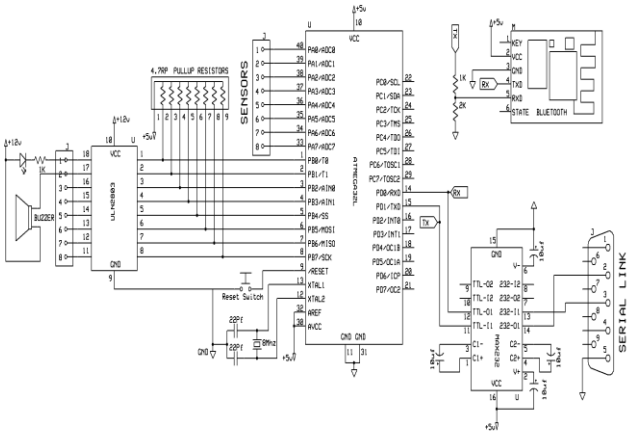

Figure 2: Circuit Diagram

B. SOFTWARE IMPLEMENTATION

The software implementation is the most important part in the proposed paper as multiple tasks are to be performed simultaneously in the system. The tasks to be performed include creating a login for different users who may or may not be the networks admins, creating a database which has a table consisting of all the entries, transmission of the sensor values to the server, storing and analysing the data and predicting the future course of action by using the prediction algorithm. The sensor data is read and processed using the mikroC PRO for the AVR microcontroller. The GIU for login and registration is designed in MYSQL and JAVA. Naive Bayes classifier will be used as a data mining technique.

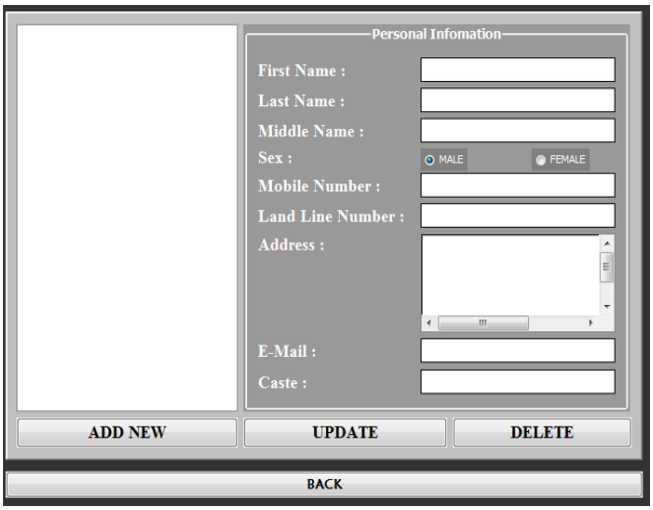

Figure 3: Design of GUI-Registration Page

III. ALGORITHM

1. Start
2. Admin Login
3. Enter/updated Details for Alerts
4. Client Login
5. Connect to Server
6. Connect to Hardware
7. Read ADC Values
8. Send to Server
9. Server Store Values
10. Apply Naive Bayes
11. Generate Alerts
12. View Results
13. Admin Logout
14. Client Logout
15. Stop

III. CONCLUSION

IoT based point to multipoint reporting system is proposed in this paper and its implementation is briefly discussed. The basic design and feasibility of hardware module is given. Use of different software techniques proposed for the implementation of this system in the network operations center is stated in this paper. The system may further be implemented for domestic applications, community applications like pollution mapping or vehicle tracking system and medical applications like doctor patient interaction system and predictive monitoring of patients [4]

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