

# IoT based Point to Multipoint Reporting System using Android for NOC application



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## ABSTRACT

The focus of the proposed project is to implement the IoT for network operations center (NOC) application with a reporting system which will be executed as a point to multipoint communication. In a network operations center various processes occur simultaneously and multiple parameters need to be monitored concurrently. The project is divided into two modules viz. - hardware and software part wherein the hardware part includes the sensing of the parameters from the network operations center and converting them into digital form. The data is further processed and sent to the server where all the values are stored. An android based smart phone is used to control the operations. The database will work in concord with the server and maintain the logs of data related to all the parameters in the NOC. In case of any deviations in the normal operation, the data will be pulled from the logs that are stored in the database and a prediction algorithm will be implemented to and email or sms will be sent to the network admin accordingly.

**Keywords:** IoT, hardware, logs, database, server, NOC

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## I. INTRODUCTION

Internet of Things (IoT) is a promising technology where a system of analog, digital, mechanical devices and objects are provided with exclusive identifiers so that they can transfer the data without requiring human to human or human to machine interaction [1].

Network operations center (NOC) is a network management center where monitoring, controlling and supervising of network takes place over a computer or telecommunication network. Every company, small or big, government or private have their network operations center in place to supervise, analyse, update and troubleshoot the network [2].

This project will implement a technology based on IoT wherein various parameters in the NOC will be monitored using different sensors, records will be maintained using database and after prediction of future values, the discrepancies will be reported to the administrators.

## II. SYSTEM DESCRIPTION

The sensing of the data remotely and controlling of the parameters in the network operations center will be achieved using a combination of hardware and software tools. In this project, the parameters that are sensed from the NOC will be sent to the server wirelessly.

The database attached to the server will store all the information and the prediction algorithms which are applied at the sever will predict the status of the parameters that may be encountered in near future.

The authorised user or the administrator will be informed by sms or email regarding the actions to be performed. Presently the system will be implemented for a single node and will be expanded to multiple nodes and users after successful execution.

The block diagram shown in Figure 1 shows the basic structure of the project that will be implemented.

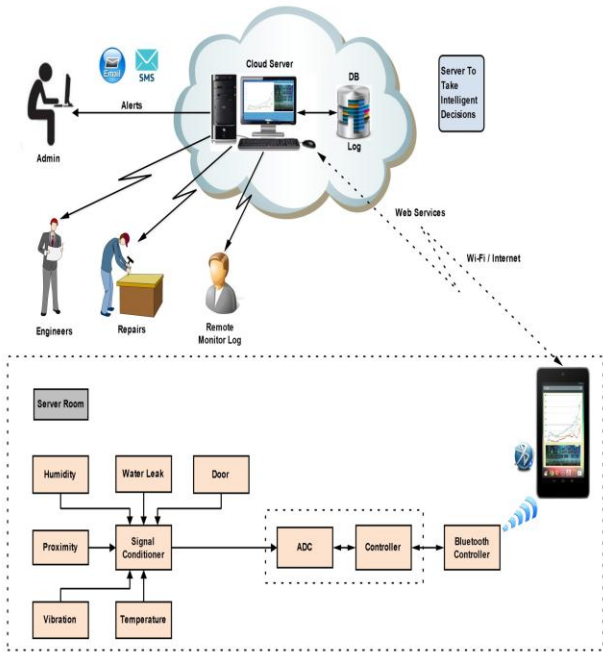


Figure 1: Block Diagram

### A. HARDWARE DESCRIPTION

The hardware part is used mainly to measure various parameters of the networks operations center and consists of various sensors for measuring level, light proximity and temperature, ATMEGA 32 controller and Bluetooth to serial port module HC-05. The circuit diagram of the hardware part is shown in figure 2 and is designed using ExpressSCH software. For the reading of the sensor data is read and processing it mikroC PRO for the AVR microcontroller is used. The layout as shown in figure 3 is designed using ExpressPCB software. The final hardware module is shown in figure 4.

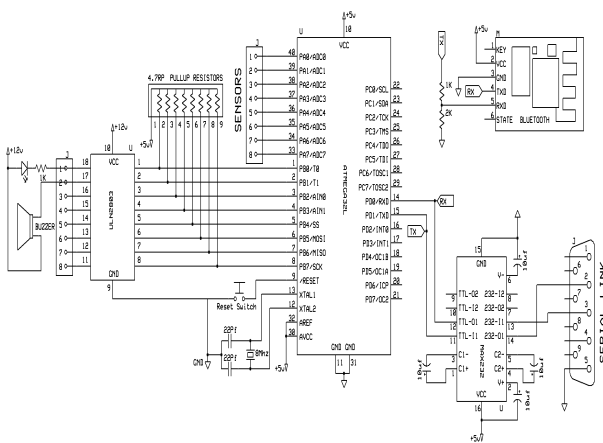


Figure 2: Circuit Diagram of the hardware part

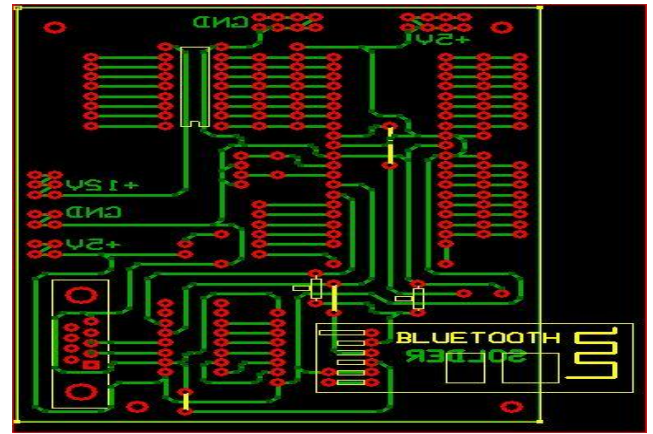


Figure 3: Layout of the hardware part

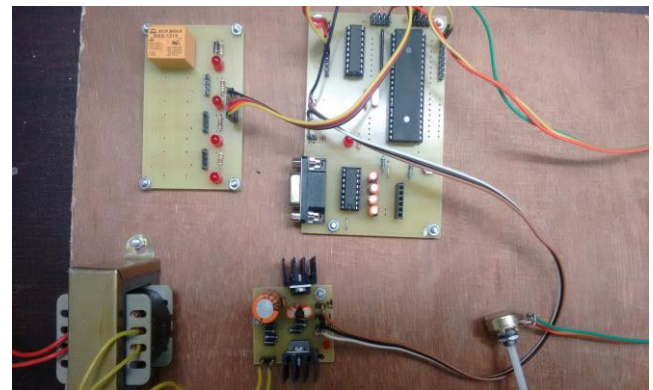


Figure 4: Final image of the hardware part

### B. SOFTWARE IMPLEMENTATION

The primary task of the project is the software implementation wherein multiple tasks are performed at the same time. Creation of the log in page, registration of the users who may or may not be the administrators is mainly done by using netbeans 7.1 and the entries are stored and fetched using MYSQL in a tabular form. For connectivity, the jdbc driver is used. The Naive Bayes classifier will be used for data prediction.

Figure 5 depicts the main menu where in all the options of managing the sensors, notifications, alerts and log details are mentioned.

The admin login page which accepts the user name and password entries is shown in figure 6 and figure 7 shows the screenshot of the output while getting the values from hardware through Bluetooth. In case of emergency situations, the manage alert notification is sent to the contacts who are mainly the authenticated users or the administrators.

Their details like name, email, phone number are stored in the window as shown in figure 8. Which sensors are showing fluctuations and undesirable outputs is also shown in the figure.

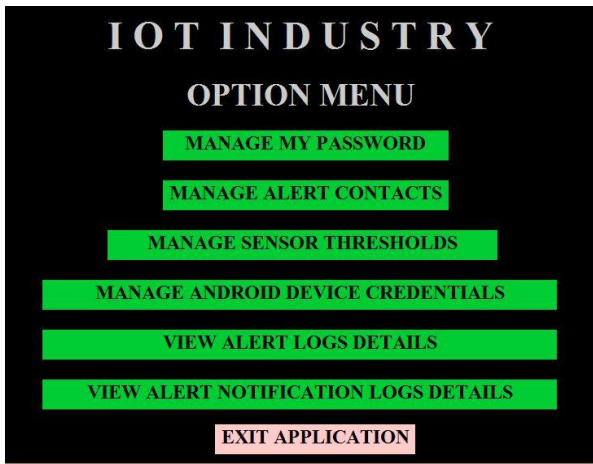


Figure 5: Main Menu

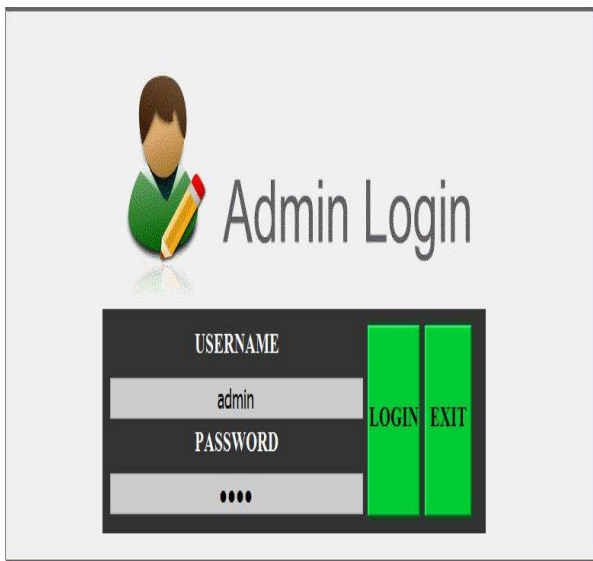


Figure 6: The admin login page



Figure 7: Threshold values of various sensors

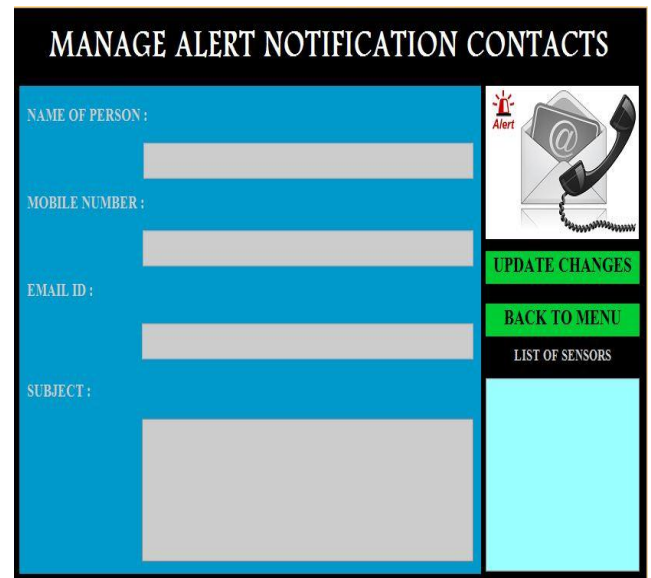


Figure 8: Alert Notification Window

### III.ALGORITHM

1. Start
2. Initiate the Admin Login process
3. Update the details for Alerts
4. Start with the Client Login
5. Connect to the Server
6. Connect to the Hardware
7. Read ADC Values
8. Send the values to Server
9. Apply Naive Bayes
11. Generate the Alerts
12. View Results
13. Admin Logout
14. Client Logout
15. Stop

### IV. CONCLUSION

The primary results of the android based reporting system for the applications of network operations center are included in this paper and its implementation and execution is discussed. Use of different softwares for designing the GUI and Bluetooth connectivity is shown in this paper and hardware functioning and feasibility is checked. The system may be further implemented for various industrial and community application viz. - pollution mapping or medical applications like predictive monitoring of the patients [4].

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