

# Industrial Monitoring using Wireless Sensor Network

Akshay Patil<sup>1</sup>Bhavesh Rewale<sup>2</sup>OmkarSankhe<sup>3</sup>Gaurang Vishwasrao<sup>4</sup>Manoj Mishra<sup>5</sup>  
<sup>1,2,3,4</sup>UG Students  
<sup>5</sup>Assistant professor  
Atharva College of Engineering,Mumbai,Maharashtra,India

**Abstract-** Industrial operations produce many byproducts which can be hazardous to the health of workers working there. Very few industries setup such Wireless sensor networks (WSN) in their workshops as the cost of these systems are high. The purpose of this project is to provide a low cost integrated sensor system consisting of various sensors. This device would collect the data and send it to the main database via API where the information would be analyzed and necessary measures can be taken to avoid mishaps.

**Keywords:** Application Protocol Interface (API), Industries, Sensors, Wireless Sensor Network (WSN).

## I. INTRODUCTION

Wireless sensor network consists of spatially distributed sensors. The wireless sensor network is built of "nodes" – from a few to several hundreds, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. Autonomous integrated sensor systems would be placed in different parts of the industry. These systems would act as client devices which would collect the data like gas levels, temperature, etc. and send it to the server system. The server system would receive and analyse the data and log it the internet database. If value of data is beyond the safety limits, the necessary systems could be activated and bring the values back to normal. This would help in preventing mishaps like explosions, etc.

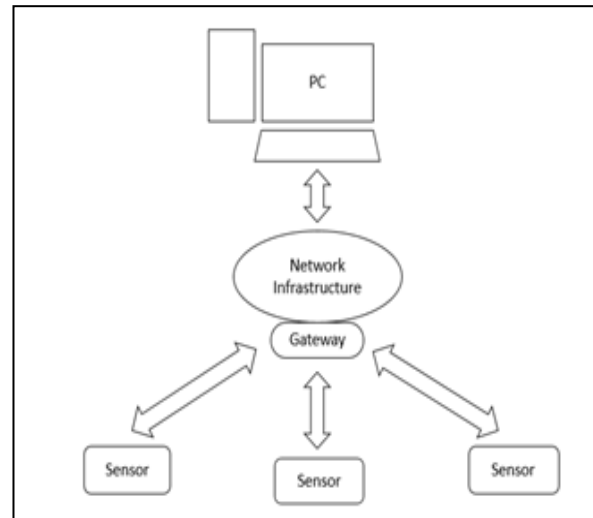


Fig.1

## II. EXPERIMENTAL SETUP

The data collection will be initiated from Client section which would send the sensor data to the server section. Client section comprises of microcontroller, sensors and transmitter module. The sensed data will be received by the Server section. The server section will log the data on cloud database via Temboo API. If any abnormal activities are sensed by the sensors, it would notify it to the concerned person via an alarm system or SMS service. The Server section comprises of microcontroller, ethernet adapter.

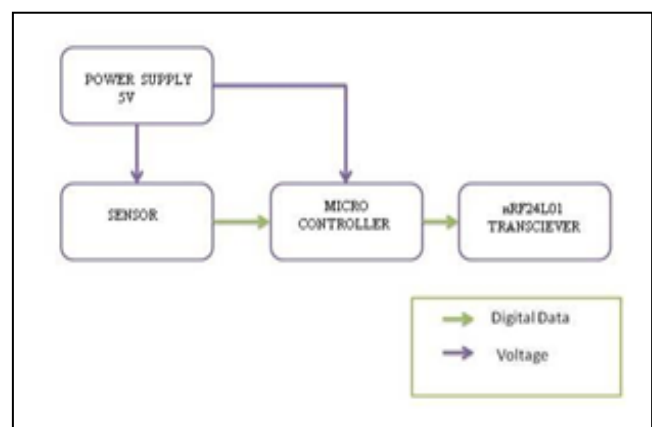


Fig.2 Block Diagram of Client Section

A) Client Section: The client side consists of a micro controller , sensors required to measure the desired parameters and 2.5 GHz transmitter. The data from the sensors is collected by the micro controller and data packets are formed which are then sent to server. The transceiver is connected to the micro controller via SPI ( Serial peripheral interface).

To begin communication, the bus master configures the clock, using a frequency supported by the slave device. The master then selects the slave device with a logic level 0 on the select line. If a waiting period is required, such as for analog-to-digital conversion, the master must wait for at least that period of time before issuing clock cycles. During each SPI clock cycle, a full duplex data transmission occurs. The master sends a bit on the MOSI line and the slave reads it, while the slave sends a bit on the MISO line and the master reads it. This sequence is maintained even when only one-directional data transfer is intended.

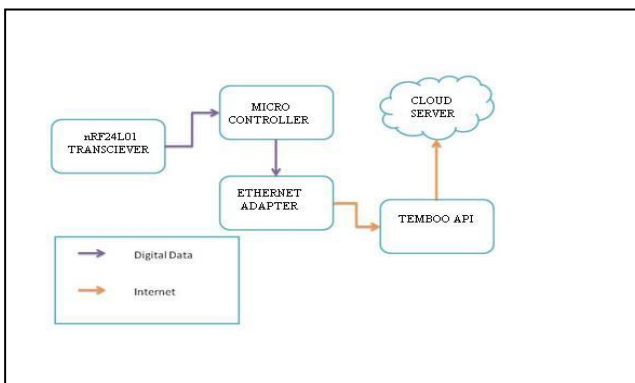


Fig. 3 Block Diagram of Sever Section

B) Server Section: Server consists of micro controller with ethernet shield/ adapter. The ethernet shield is connected to a local router through ethernet cable. This enables the controller to access internet and upload the server side data on cloud. The cloud service called google drive is being used in the project. Google drive allows storing of sensor data in the excel sheets in form of row and columns. The micro controller communicates to transceiver and now works as a receiver to receive sensor data packets. The data is collected into variable in string format.

Temboo which is an application program interface service which is used to upload data to the google drive. These are certain algorithms, scripts that directly uses google authentication services and updates rows and column with sensor data. The communication between micro controller and transceiver is by the spi protocol. Using tcp/ ip and https protocol, internet access is given to the server section. Using standard ftpprotocol changes in the file are made constantly when sensor data gets updated.

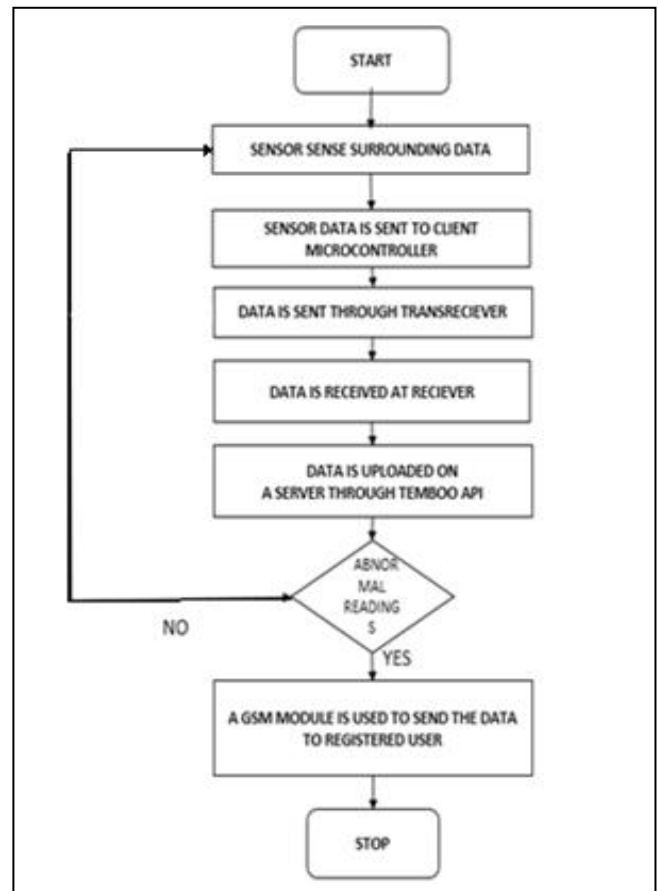


Fig. 4 System Flow

### III. ADVANTAGES

- A) Low cost
- B) Low power consumption
- C) Good accuracy of data
- D) Use of open source hardware and software
- E) Monitoring can be done from remote areas via internet
- F) Easy adaptability as per required application

### IV. APPLICATIONS

A) Area monitoring:Area monitoring is a common application of WSNs. In area monitoring, the WSN is deployed over a region where some phenomenon is to be monitored. A military example is the use of sensors detects enemy intrusion; a civilian example is the geo-fencing of gas or oil pipelines.

B) Intelligent Buildings/Bridges:Measurements about temperature, energy wastage. Monitoring of mechanical stress levels.

C) Air pollution monitoring: Wireless sensor networks have been deployed in several cities (Stockholm, London and Brisbane) to monitor the concentration of dangerous. These can take advantage of the ad hoc wireless links rather than wired installations, which also make them more mobile for testing readings in different areas.

D) Agriculture aid: Wireless sensor network can be setup in farms to measure their health of the soil and plants which would enable the farmers to take the necessary measures. Thus, helping the farmers to grow healthy crops and increase production

## V. CONCLUSION

Thus we would be able to design sensor systems which are capable of sensing different parameters i.e. temperature, pressure, humidity etc. This sensed data is interfaced to the server node via transceiver. These sensed values are processed by the microcontroller. If the sensor nodes are connected to the API's like Temboo. The designer can observe the sensed data globally.

## VI. REFERENCES

[1] S.ARAVINTH, S.K.MANIKANDAN - Smart Sensors for Industrial Monitoring in IOT Environment, International Journal of Electrical and Electronics Research ISSN 2348-6988 (online) Vol. 3, Issue 2, pp: (545-550), Month: April - June 2015, Available at: [www.researchpublish.com](http://www.researchpublish.com)

[2] Poonam Thakur , Prof. Rahul M. Pethe, Prof. Sunita I. Parihar - Real Time Data Acquisition over Cloud using Hardware Based WSN, International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 3 Issue: 5, pp: ( 060 – 064).

[3] Abhimanyu Rathore, (2015) Internet of Things – Connected Smart Systems [ONLINE], Available: <http://internetofthings.electronicsforu.com/2015/02/internet-things-connected-smart-systems>