Wireless Sensor Network For Localization and Monitoring

Akshay Bhanga, Shubham Redekar, Twinkle Thakur and Rasika Pardale

Abstract— Increase in automation and computation in industrial applications has reduced manual interference in monitoring and decision making. Advancement in sensor technologies and the boom of wireless communication has aided largely in remote control of inaccessible locations in any industrial application. This serves as the motivation to understand and apply wireless networks for localization and monitoring of parameters like temperature, humidity, gas leakage and the security in a factory. This work uses a RFID card for localization and a PIC controller for monitoring of parameters. The position and the parameters are communicated at a remote control center for monitoring and corrective actions, if needed.

Index Terms— Wireless Sensor Network for Localization and Monitoring', wireless network, localization, monitoring, RFID, DETECTION, GSM MODULE.

1 INTRODUCTION

The development in wireless sensor networks can be used for monitoring and controlling various parameters in the agriculture field, enviroments. The sensor network hardware platforms are basically low-power embedded systems with some different sensors such as onboard sensors and analog I/O ports to connect sensors. Like hardware, software should also be developed, including OS, sensor/hardware drivers, networking protocols and application-specific sensing and processing algorithms. The purpose or objective of environmental monitoring is different in different situations, but important aims to environmental monitoring to find risks to human and wildlife, scope to population migration from high density areas to low density areas and to restrict emission of gases. Wireless sensor network (WSN)[1]is a low cost, low power wireless network made up of thousands of smart sensor nodes which monitor physical or environmental conditions, such as temperature, pressure, moisture, etc. at different area or different location

2 Objectives

In this project we are detection the temperature, gas leakage and humidity by different sensors like temperature sensor (LM35) and Gas leakage (MQ-5) we will keep it sensing and give to PIC16F877A micro controller and it will display it on display matrix and same will be display to the control room via zigbee transmitter. It will be received via zigbee receiver and it display on PC ya Software. We do localization by the RFID tags and reader's same is process pic controller and send via zigbee.

3 DESIGN

The whole system is implemented in the following manner:

- The sensoring part to senses the environments parameters changes.
- The second is the localization to locate the object by using RFID tags.
- This input from sensoring and the localization part is been processed in pic controller .
- This data is transmitted via zigee to the software ya pc .

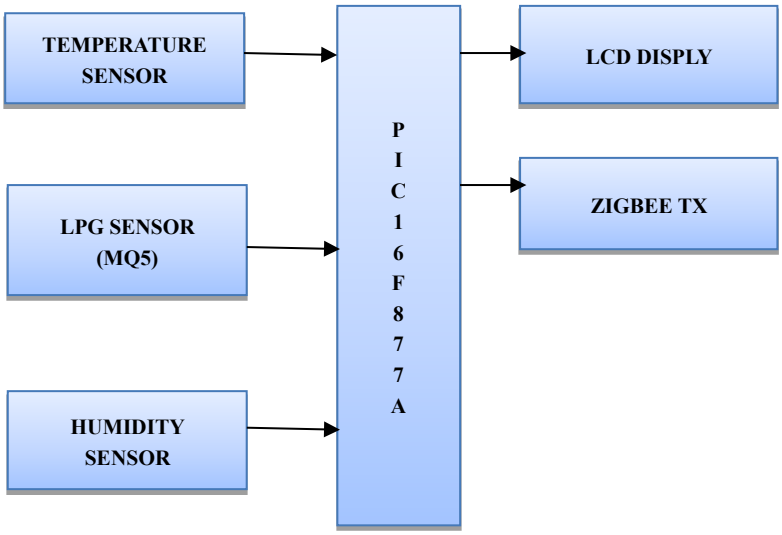

FIGURE 1: BLOCK DIAGRAM

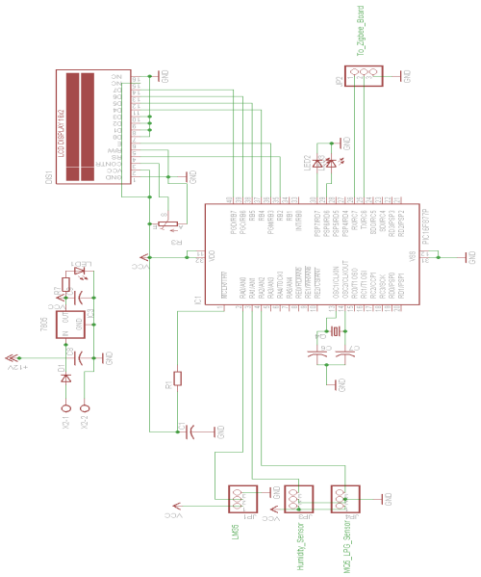

FIGURE 2: Circuit diagram

4 COMPONENTS

4.1 Pic-microcontroller

We have used a PIC Micro controller as a operating source it has an inbuilt ram, flash memory and ADC to do conversion. It has given different input such as temperature sensor, gas leakage and will convert the values and send to pc in the control room to monitor the input signals. It has 4port in it . It is 40 pins IC.

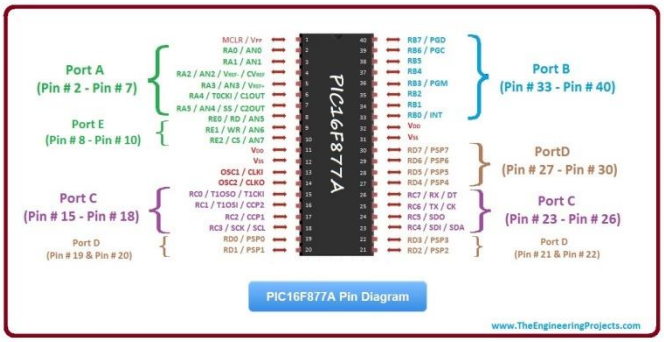

FIGURE 3 PIC- CONTROLLER

4.2 RFID

RFID is an acronym for "radio-frequency identification". RFID is similar to bar-coding in that data from a tag or label are captured by a device that stores the data in a database. RFID, however, has several advantages over systems that use barcode asset tracking software. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database

4.3 ZIGBEE

Zigbee is a high-level communication protocols used to create wireless networks. Transmission distances to 10–100 meters depending on power output and environmental characteristics, ZigBee devices can transmit data over long distances by passing data through a mesh network topology. The Zigbee transmission data rate is 250 Kbit/s [6]. Zigbee is an established set of specifications for wireless personal area networking (WPAN), i.e. digital radio connections between computers and related devices. For the wireless communication between sensor nodes and the gateway node ZigBee RF modules were used. All the ZigBee devices are based on ZigBee standard which has adopted IEEE 802.15.4 for its physical layer and MAC protocols. The wireless devices based on this standard operate in 868 MHz, 915 MHz and 2.4 GHz frequency bands having a maximum data rate 250Kbps. ZigBee protocol layers are based on OSI model. When the pan is to use ZigBee, it is necessary to mention IEEE 802.15.4 standard. One of the finest characteristics about this standard is it allows user to use PHY and MAC layer defined by IEEE 802.15.4 and lets user to define the upper layers of the OSI model. Similarly, ZigBee also use the MAC and PHY layer of IEEE 802.15.14 standard.

FIGURE 4 Zigbee

5 IMPLEMANTATION

This board is made in eagle software. It has pic micro controller and sensors over it and a LCD display and the transmitter and various pins and the future use in the project and it has crystal oscillator for the pic controller.This is the zigbee board for the transmission and receiver the signals in between the pic controller and the control room where we monitor are system parameters. The project was first implemented on breadboard then after its working position we made the layout of the board and the did all eitching and made PCB borad and then we did the soldring process and compled our board .

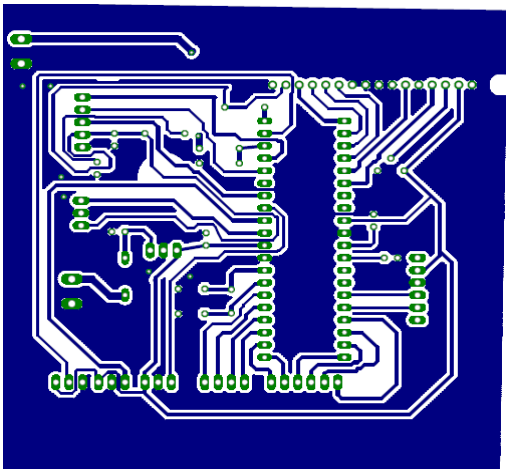

FIGURE 5 PCB Design

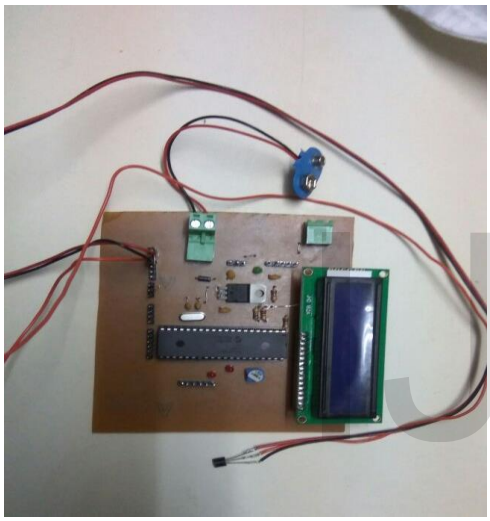

FIGURE 6 Hardware

6 Conclusion

We perform test on the pic controller modules using various input. We make PCB in eagle software and mounted the components on the PCB board and made the board working and removed the reading. This was possible use of wireless sensor motes and networks extends over a vast area of human activity. Although, most of the applications are still under research and few completed products or services have become available for Public use, there is remarkable effort and progress. New scientific fields like pervasive computing have, already, appeared. As most of the applications are focused on Monitoring, the distributed sensing seems to enable the parameterization of the physical environment and the integration of it to established forms of information Propagation (like the internet). Apart from these, adding the parameter "mobility" creates another dimension to the information system.

7 Acknowledgment

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