# An Intelligent Smart Home Monitoring Using Zigbee in Wireless Sensor Networks

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**Abstract:**

Now-a-days home monitoring systems are widely used. An intelligent monitoring system can provide multiple functions for uses. The assumption underlying this thesis project is that a home monitoring system can help people manage their homes better. This thesis presents an intelligent home monitoring system implementation. We will focus on the development of a router platform, which can manage the sensors connected to an intelligent home monitoring system. Such a system will include at least one router, one or more sensors. Some of these sensors will be connected by wireless links. The system will manage and control the various elements of the home monitoring system via the network. Hardware and software requirements are designed and developed. Then whole system is tested and obtained successful results.
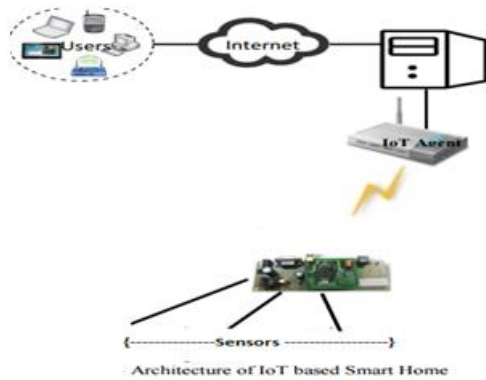
**Index Terms:**

Efficient energy consumption, smart home, sensors, IOT technology.

## I. INTRODUCTION:

The rapid development in the fields of microelectronics, communication/networks and other related technologies enabled us to develop various kinds of wireless sensors [1]. These sensor nodes are consisted of spatially distributed devices using sensors to monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants at different locations [2].

They are capable of doing actuation, communication and computation while enabling us to sense and measure the data more efficiently and accurately independent from wire. A home monitoring/surveillance system may include video cameras, terminals, sensors, actuators, and severs. More generally, such a system can be used for monitoring or controlling devices. Typically the network transfers data from sensors to a server, from which the user can request information. Similarly the user can send commands via the server to sensors and actuators to control devices. These systems are increasingly connected via a gateway (with firewall) to the Zigbee and IoT [3].

As a result home owners can both monitor their homes and control devices in their homes via the pc's and internet or other IP network [4]. Surveillance systems based on IP networks have become mainstream products in recent years. Large numbers of images and other forms of data can be transmitted in real time though the intranet or internet [5]. Moreover, the surveillance system has gradually evolved from only the traditional security monitoring functions to become intelligent management system. Compared to analog surveillance system, a networked surveillance system is more flexible, reliable, and lower in cost. Recent progress in wireless technologies has led to a renovation in home automation which makes it possible to upgrade environmental [6] controls in home.

Architecture of IoT based Smart Home

## Literature Survey:

In this project we are using ARDUINO as heart of entire system, humidity sensor and Temperature sensor to detect the temperature and humidity at home [7]. Vibration sensor is given to detect the change or any abnormal access i.e to identify the theft. LDR [8] is given to detect day and night mode. CO sensor to know the dangerous gas around. A flex sensor and mems sensor are also provided which can be used by patients [9]. All these data will be displayed on LCD and the same values are being sent to the PC using zigbee communication. But this can be implemented within shorter ranges only using zigbee [10].
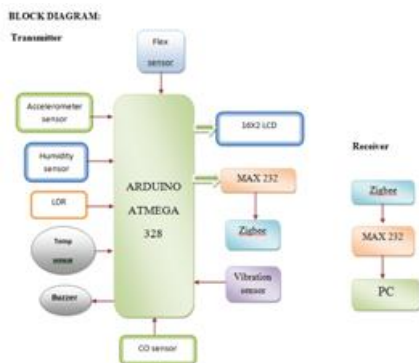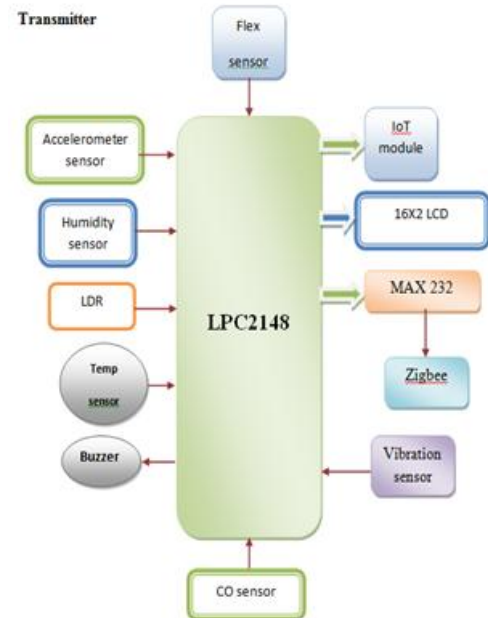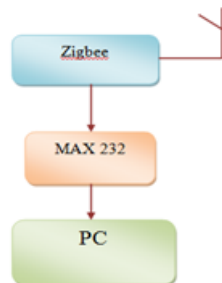


## Drawback:

There is no IoT module for remote monitoring.

## II. PROPOSED SYSTEM:

The project is designed by using LPC2148 to tackle the problems at home. In this project we are using LPC2148, humidity sensor and Temperature sensor to detect the temperature and humidity at home.

Vibration sensor is given to detect the change or any abnormal access i.e to identify the theft. LDR is given to detect day and night mode. CO sensor to know the dangerous gas around. A flex sensor and mems sensor are also provided which can be used by patients. All these data will be displayed on LCD and the same values are being sent to the PC using zigbee communication. ZigBee is the name of a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short range radio. An IoT module is also connected to give the information about the condition at home in the remote place also using internet. This project uses regulated 3.3V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

Receiver



## IoT:

Internet of things helps the things to communicate each other using IoT module.
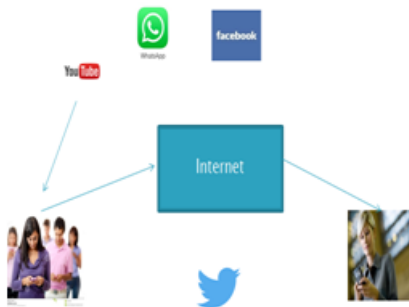


Internet of things helps the things to communicate each other using IoT module

## ESP8266EX:

The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.



## Wi-Fi Module:

ESP8266EX offers a complete and self-contained WiFi networking solution; it can be used to host the application or to offload WiFi networking functions from another application processor. When ESP8266EX hosts the application, it boots up directly from an external flash. In has integrated cache to improve the performance of the system in such applications. Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any micro controller-based design with simple connectivity (SPI/SDIO or I2C/UART interface). ESP8266EX is among the most integrated Wi-Fi chip in the industry; it integrates the antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, power management modules, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

## III. ADVANTAGES:

- Highly sensitive
- Fit and Forget system
- Low cost and reliable circuit
- Complete elimination of manpower

## IV. APPLICATIONS:

- At home
- Military Applications

## V. CONCLUSION:

The proposed framework is aimed at reducing the energy consumption. The wireless node dynamically recognizes new added/removed transducers. A prototype wireless node core was implemented with several sensors. A proof of concept evaluation was done by placing different wireless nodes inside a house. Each node was composed of different transducers depending on the measured environment or object. We have shown a visualization of the data collected by the various nodes dispersed throughout the home setup. And we can monitor our home environment from any place i.e. near or far away by IoT. We have also evaluated the energy consumption of the proposed network and compared it to traditional wireless transducer networks. We have shown that our proposed transducer network consumes significantly less energy.

For our home setup, our proposed method consumes (70%) energy compared to traditional approach.

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