**Development of Indoor Air Quality Supervision**

**Systems Using ZigBee Wireless Networks**

**ABSTRACT**

Recently, due to the increase of environmental awareness, air quality has attracted much more attention. In this paper, an indoor air quality supervision system using ZigBee wireless networks has been proposed. The developed system provides a simple way to monitor and control the indoor air quality (IAQ) for residential building applications. In this present scheme, several sensors are employed to detect a variety of gases, such as carbon monoxide (CO), carbon dioxide (CO2), as well as the fine particulate matter (PM2.5). In addition, by using the developed user interface APP, people could observe the real-time status anytime and anywhere.

**INTRODUCTION**

Wireless sensor networks (WSNs), which have been considered as one of the promising future technologies, has already been widely applied in a variety of fields, including smart home, urban transportation, industrial control, military application, and mobile sensing environments. Features such as transmission distance, data rate, security, and battery life are the factors that users mostly care about. Although each kind of network has its own advantages, the energy problem has been one of the critical factors for constructing wireless networks. As mentioned in, Wi-Fi, Bluetooth, and ZigBee are the specifications which were developed for low power consumption applications and have been applied in plenty of domains respectively based on their features. ZigBee, which is also renowned for its low cost, low data rate and long battery life characteristics, has been extensively utilized to create personal area networks (PAN), such as use for home automation, medical health care, and other small-scale projects with wireless connection needs.

**EXISTING SYSTEM**

In modern society, people are accustomed to staying in indoor spaces for a long time while working, relaxing, or living. Consequently, the indoor air quality (IAQ), which refers to the air quality within buildings and structures, plays an influential role in our health. IAQ can be affected by gases, including carbon monoxide (CO), carbon dioxide (CO2), fine particulate matter (often referred to as PM2.5), and volatile organic compounds, or other microbial contaminants such as mildew and bacteria. The sick building syndrome, introduced by the World Health Organization, is a phenomenon described by people who claimed they have experienced some discomfort effects which appears to be related to the specific buildings they used to stay in. Obviously, poor indoor air quality could cause building occupants respiratory diseases, skin irritation, neuron toxic and other health problems, which means the gases and particulates within and around us, may directly affect our safety silently and imperceptibly. To cope with this problem, one of the effective ways is to create a space with good ventilation, which helps air to circulate in our room, bringing fresh and clean air inside, and keeping moisture and airborne pollutants outside. However, due to the high cost of related measuring instruments, and the inconvenience of wire distribution, approaches which wired networks formerly took cannot fully solve this issue.

PROPOSED SYSTEM

In this paper, we will introduce a system that building occupants could understand the air composition of the room by just taking a look at their own handheld devices such as a notebook, smartphone, or tablet. Moreover, users could also take further steps to activate and control the ventilator directly with the user interface we designed. By diluting the concentration of contaminants, it could effectively reduce the potential health risks in such a simple and secure way proposed supervision system scheme. In our design, we combined Arduino board with some gas (including CO, CO2) detectors, PM2.5 sensor, temperature and humidity sensor, and XBee transmitter into a sensing module, shows the implementation of the supervision system. After collecting required information from the atmosphere, the next step is to transmit the data to our terminal computer via XBee network. Meanwhile, our program will compare the received data with the standard value announced by the Environmental Protection Administration (EPA). Afterward, the system will automatically operate the ventilation system if any figure exceeds the norm so as to refresh the air. Furthermore, users are able to observe the current status of each item either on PC monitors or any devices that could log on to the internet and then link to a specific website.

PROPOSED ADVANTAGE

* Constructing this supervision system is to provide a simple.
* Secure way for building occupants to protect them from being endangered by the invisible menaces.
* System comprises four sensors that could detect different kinds of gases, besides, we apply ZigBee wireless network technology that let users manipulate ventilators remotely, which is much more convenient.

BLOCK DIAGRAM

HARDWARE REQUIREMENT

* Arduino
* Humidity sensor
* Gas sensors.
* Zigbee
* Computer

SOFTWARE REQUIREMENT

* Arduino IDE