

An Efficient Approach for Control of Fire Alarm System using ZIGBEE

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Abstract: In our project victimisation Zigbee protocol the hearth warning device is controlled. By victimisation this protocol the sensors area unit connected to the system while not cables. Zigbee is AN IEEE 802.15.4 primarily based specification for a set of high-level communication protocols accustomed produce personal space networks with little, low-power digital radios, like for home automation, medical device information assortment, and different low-power low-bandwidth desires, designed for tiny scale comes which require wireless affiliation. Hence, Zigbee could be a low-power, low rate and shut proximity protocol.

Index Terms – ZIGBEE, Fire alarm system, AHU, ATMEL Controller.

I. INTRODUCTION

Fire Alarm system is most important in industries. Basically automatic fire alarm system used in manufacturing industries. This fire alarm system made up of smoke detectors, heat detectors, manual call points, audible warning devices and a fire alarm control with remote notification capability. In our project using ZIGBEE protocol the fire alarm system is controlled. ZIGBEE is a wireless protocol. By using this protocol the sensors are connected to the system without use of cables.

A fire alarm features a number of devices working together to detect and warn people through visual and audio appliances when smoke, fire, carbon monoxide gas or other emergencies are present. These alarms could also be activated automatically from smoke detectors and warmth detectors or can also be activated via manual fire alarm activation devices like manual call points or pull stations. Alarms are often either motorized bells or wall mountable sounders or horns. They can even be speaker strobes which sound an alarm, followed by a voice evacuation message which warns inside the people not using the elevators.

II. PROPOSED SYSTEM

In our project the fire alarm system is controlled by ZIGBEE module. This system consists of ZIGBEE transmitter and receiver. Each part have some components with ZIGBEE transmitter and receiver. The transmitter part consist of sensor and the receiver part consists of the system control system. The implementation of our project includes the ZIGBEE module. The fire alarm system contains two parts transmitter and receiver. The transmitter side of the fire alarm system contains smoke detector, gas sensor, heat detector and ZIGBEE transmitter. The receiver side contains ZIGBEE receiver, ATMEL controller and fire alarm, AHU, Water sprinkler. ZIGBEE is high communication protocol. The purpose of the communication protocol is to provide the communication between the control application and detector .ZIGBEE is interface with IC. whatever input will be given to the transmitter through sensor will pass through the ZIGBEE to the receiver. The fire alarm system contains two parts transmitter and receiver. The power supply is used to provide power to ZIGBEE and IC. The 9V of power supply is given by the battery. And thus the info is transmitted by the ZIGBEE module of transmitter to the receiver section.

III. BLOCK DIAGRAM

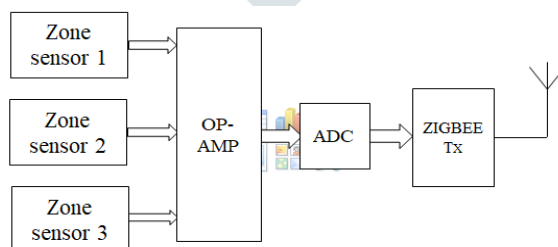


Fig 3.1 ZIGBEE Transmitter

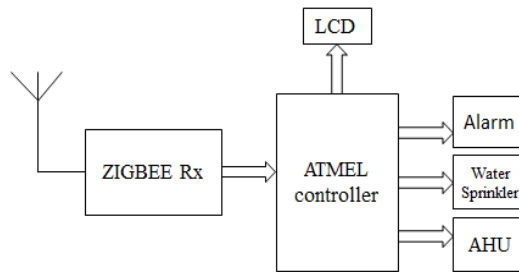


Fig 3.2 ZIGBEE Receiver

IV. HARDWARE REQUIREMENTS

A fire alarm features a number of devices working together to detect and warn people through visual and audio appliances when smoke, fire, carbon monoxide gas or other emergencies are present. The hardware requirements are Gas sensor, Alarm, AHU, LCD and ATMELE Controller.

3.1 Gas sensor

A gas detector may be a device that detects the presence of gases in a neighborhood, often as a part of a security system. This type of kit is employed to detect a gas leak or other emissions and may interface with an impact system so a process is often automatically pack up. A gas detector can sound an alarm to operators within the area where the leak is happening, giving them the chance to go always. This type of device is vital because there are many gases which will be harmful to organic life, like humans or animals. Gas detectors are often wont to detect combustible, flammable and toxic gases, and oxygen depletion. This type of device is employed widely in industry and may be found in locations, like on oil rigs, to watch manufacture processes and emerging technologies like photovoltaic. They may be used in firefighting. Gas leak detection is that the process of identifying potentially hazardous gas leaks by sensors. Additionally a visible identification are often done employing a thermal camera. These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected. Exposure to toxic gases also can occur in operations like painting, fumigation, fuel filling, construction, excavation of contaminated soils, landfill operations, entering confined spaces, etc. Common sensors include combustible gas sensors, photoionization detectors, infrared point sensors, ultrasonic sensors. More recently, infrared imaging sensors have inherit use. All of those sensors are used for a good range of applications and may be found in industrial plants, refineries, pharmaceutical manufacturing, fumigation facilities, paper pulp mills, aircraft and shipbuilding facilities, hazmat operations, waste-water treatment facilities, vehicles, indoor air quality testing and houses . A gas sensor may be a device which detects the presence or concentration of gases within the atmosphere. Based on the concentration of the gas the sensor produces a corresponding electric potential by changing the resistance of the fabric inside the sensor, which may be measured as output voltage.

3.2 Smoke Detector

A smoke detector may be a device that senses smoke, typically as an indicator of fireside. Commercial security devices issue a sign to a fireplace place alarm instrument panel as a part of a fire alarm , while household smoke detectors, also referred to as smoke alarms, generally issue an area audible or visual alarm from the detector itself or several detectors if there are multiple smoke detectors interlinked. Smoke detectors are housed in plastic enclosures, typically shaped sort of a disk about 150 millimeters (6 in) in diameter and 25 millimeters (1 in) thick, but shape and size vary. Smoke are often detected either optically (photoelectric) or by physical process (ionization); detectors may use either, or both, methods. Sensitive alarms are often wont to detect, and thus deter, smoking in areas where it's banned. Smoke detectors in large commercial, industrial, and residential buildings are usually powered by a central fire alarm , which is powered by the building power with A battery backup. Domestic smoke detectors range from individual battery-powered units, to many interlinked mains-powered units with battery backup; with these interlinked units, if any unit detects smoke, all trigger albeit household power has gone out.

3.3 ATMELE Controller

Atmel Corporation was a designer and manufacturer of semiconductors before being acquired by Microchip Technology in 2016. It was founded in 1984. The company focuses on embedded systems built around microcontrollers. Its products include microcontrollers (8-bit AVR, 32-bit AVR, 32-bit ARM-based, automotive grade, and 8-bit Intel 8051 derivatives) frequency (RF) devices including Wi-Fi, EEPROM, and non-volatile storage devices, symmetric and asymmetric security chips, touch sensors and controllers, and application-specific products. Atmel supplies its devices as standard products, application-specific integrated circuits (ASICs), or application-specific standard product (ASSPs) counting on the wants of its customers.

Atmel serves applications including consumer, communications, computer networking, industrial, medical, automotive, aerospace and military. It focuses on microcontroller and touch systems, especially for embedded systems. Atmel's corporate headquarters is in San Jose, California, within the North San Jose Innovation District. Other locations include Trondheim, Norway; Colorado Springs , Colorado; Chennai, India; Shanghai, China; Taipei, Taiwan; Rousset, France; Nantes, France; Patras, Greece; Heilbronn, Germany; Munich, Germany; Whiteley, United Kingdom. To provide for the web of Things (IoT), Atmel offers dual-band 2.4 GHz/5 GHz a/b/g Wi-Fi chips from its Ozmo acquisition. Also, Atmel offers 2.4 GHz b/g/n Wi-Fi chips WILC1000/WILC3000 and WINC1500 from its Newport Media, Inc acquisition. WINC1500 provide a full 802.11 b/g/n network controller with full ip stack TCP/IP, UDP with upper layer protocols as DHCP, DNS, HTTP, Sntp, TLS etc. Also, Atmel makes wireless transceivers using regional 700/800/900 MHz, also as global 2.4 GHz frequency bands, Some chips are standalone transceivers while others are integrated with a

microcontroller. They also sell the Zigbit module that comes with FCC certifications. Atmel also makes remote RF products using the license-free ISM band (industrial scientific medical) frequencies (5.8 GHz, 2.4 GHz, 868 to 928 MHz, 433 MHz, and 315 MHz). The wireless segment also provides RFID chips for tracking, access and identification. Atmel makes both touchscreen controller ICs and its XSense flexible touchscreen. The company makes sensor hubs that manage accelerometers, gyroscopes, inertial measurement units and magnetometers. These sensors give consumer products and embedded systems context awareness. The sensor hub offloads the most application processor and allows product functionality without the necessity to power the most processor. Atmel also makes simple touch controller chips for buttons, sliders, and wheels used on industrial and consumer products. The touch wheel interface became popularized by the Apple iPod. To support the appliance of its touch controller chips, Atmel provides a free QTouch library of software routines.

Variables of the study contains dependent and independent variable. The study used pre-specified method for the selection of variables. The study used the Stock returns as a dependent variable. From the share price of the firm the Stock returns are calculated. Rate of a stock salable at stock market is known as stock price. Systematic risk is the only independent variable for the CAPM and inflation, interest rate, oil prices and exchange rate are the independent variables for APT model.

Consumer Price Index (CPI) is used as a proxy in this study for inflation rate. CPI is a wide basic measure to compute usual variation in prices of goods and services throughout a particular time period. It is assumed that rise in inflation is inversely associated to security prices because Inflation is at last turned into nominal interest rate and change in nominal interest rates caused change in discount rate so discount rate increase due to increase in inflation rate and increase in discount rate leads to decrease the cash flow's present value (Jecheche, 2010). The purchasing power of money decreased due to inflation, and due to which the investors demand high rate of return, and the prices decreased with increase in required rate of return (Iqbal et al, 2010).

3.4 Fire alarm

A fire alarm features a number of devices working together to detect and warn people through visual and audio appliances when smoke, fire, carbon monoxide gas or other emergencies are present. These alarms could also be activated automatically from smoke detectors, and warmth detectors or can also be activated via manual fire alarm activation devices like manual call points or pull stations. Alarms are often either motorized bells or wall mountable sounders or horns. Contemporary fire alarm systems use automatic functions to detect the occurrence of an occasion which will end in a fireplace. They receive a signal from a fire sensor (smoke, heat or CO detector) and automatically transmit it to the fire alarm panel.

3.5 AHU

An air handler, or air handling unit (often abbreviated to AHU), may be a device wont to regulate and circulate air as a part of a heating, ventilating, and air-conditioning (HVAC) system. An air handler is typically an outsized metal box containing a blower, heating or cooling elements, filter racks or chambers, sound attenuators, and dampers. Air handlers usually hook up with a ductwork ventilation that distributes the conditioned air through the building and returns it to the AHU. Sometimes AHUs discharge (supply) and admit (return) air on to and from the space served without ductwork. Small air handlers, for local use, are called terminal units, and should only include an air cleaner, coil, and blower; these simple terminal units are called blower coils or fan coil units. A larger air handler that conditions 100% outside air, and no recirculate air, is known as a makeup air unit (MAU) or fresh air handling unit (FAHU). An air handler designed for outdoor use, typically on roofs, is understood as a packaged unit (PU) or rooftop unit (RTU). The AHU is employed to regulate these parameters as follows,

1. Temperature
2. Humidity
3. Air Movement
4. Air Cleanliness

V.RESULTS AND DISCUSSION

In Industries the RAVEL RE2554 type of fire alarm system is used. In our project the ZIGBEE module is used to control the fire alarm system. The output of this system is used to disable the power connections automatically, AHU unit is used to avoid the spreading of smoke and alarm is used to indicate the fire. The connection made between sensors and fire alarm system.

REFERENCES

- [1] An Intelligent Fire Detection and Mitigation system safe from fire(SFF), International Journal of Computer Applications (0975 - 8887), Volume 133 - No.6, January 2016, Md Iftekharul Mobin¹, Md Abid-Ar-Rafi², Md Neamul Islam³, and Md Rifat Hasan, Department of Computer Science and Engineering, University of Liberal Arts Bangladesh, 4/A Dhanmondi, Dhaka-1209.
- [2] A Survey on implementation of Fire detection System Based on ZigBee Wi-Fi Networks, Mr.C.Santhana Krishnan, Akhilesh Galla, International Journal of Pure and Applied Mathematics, Volume 118 No. 20 2018, 4249-4253.
- [3] Automated Fire Detection and Controlling System Kausik Sen¹, Jeet Sarkar¹, Sutapa Saha¹, Anukrishna Roy¹, Dipsetu Dey¹, Sumit Baitalik¹, International Advanced Research Journal in Science, Engineering and Technology Vol. 2, Issue 5, May 2015.