

## ABSTRACT

Wireless Sensor Network is an embedded system in which there are one or more sensors and devices equipped with communication systems. With the capabilities of the sensors which are connected to the communication system can help us to monitor or control the conditions of a particular area which are accordance with the characteristics of the sensors.

In this final project has been realized a fire disaster warning system based on wireless sensor networks which is based on IEEE 802.15.4 Zigbee technology that operates at a frequency of 2.4 GHz. Zigbee has advantages over other similar technologies, such as low data rate which is 250 kbps, communication range even further, inexpensive to implement, and long battery life. The system is designed and divided into 2 blocks of the Sensor Node and Gateway Controller. The sensors which been used are temperature sensor (LM35), gas sensors (TGS 2610) and light sensor (Phototransistor). The sensors are connected to the minimum system of microcontroller ATmega 8535 to process signals from temperature sensor, gas sensors and light sensors are incorporated into a block of Sensor Node. While at Gateway Controller blocks consist of multiple output devices there are SMS Gateway, LCD and Buzzer which connected into the minimum system of microcontroller ATmega 128L.

This Fire Disaster Warning System was tested with several parameters which are sensor testing, the capability of data transmission in indoor and outdoor. On sensor measurements obtained optimal working temperature sensor capabilities are not affected by the measurement selfheating for 1 minute or more, for gas measurements obtained optimum distance sensor can detect LPG gas (methane) at a distance of 160 cm from the gas source, while for the light sensor shows that the sensor can detecting light a candle flame at the distance of up to 16 cm. On the measurement of the ability of the transmission distance measurement results obtained optimal at 35 meters indoor and 110 meters outdoor distance measurement. System of measurement results indicate that the magnitude of delay on average 59.2 seconds to detect fires up sends warning messages to the user.

Keywords: Sensor Node, Gateway Controller, Microcontroller ATmega 128L, microcontroller ATmega 8535, LM35, TGS 2610, phototransistor, SMS Gateway, LCD, buzzer.