UNIVERSITI TEKNOLOGI MARA

FIRE ALARM AT SYSTEM AT OFFICE BUILDING USING GSM MODULE

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ABSTRACT

This thesis presents a development of a fire alarm system at office building using GSM module with the motivation to provide a solution to help people escape from being trapped in office buildings safely in the event of a fire. One of the main reasons people were trapped during fire occurrences in a building is limited visibility due to heavy smoke hence being unable to find the way out. Furthermore, the late detection of fire also causes panic which consequently causes the evacuation process to be delayed and eventually could lead to a more serious incidence, i.e. fatal.. This project uses Arduino UNO as the microcontroller, where the fire alarm system senses unusual smoke and a rise in temperature using a smoke sensor and a temperature sensor respectively in the occurrence of fire. Then, the microcontroller will send signals to control the outputs, i.e. alarm, LCD display, SMS notification, LED flash and automatic door. The simulation model of the system was developed prior to the hardware prototype development using Proteus software where ~~and~~ the coding for the microcontroller was designed. The results show that the simulation model of the fire alarm system is able to detect fire and outputs simulated results expectedly. On the other hand, the developed hardware prototype is also able to detect fire and provide the expected output, i.e. automatically sending notifications of fire via SMS, warning through the alarm and displaying information on LCD, automatically opening exit door and flashing lights via LEDs to provide exit route. In conclusion, the developed fire alarm system using GSM operates successfully in detecting fire and provides multiple outputs as notifications and countermeasures during fire events in an office building.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Fire incidents could occur at anytime and anywhere. Fires pose such a major threat to life, property, and environment that the number of individuals who perish as a result of them is alarming [1]. In 2019, a total of 50,720 fire incidents were reported and 24.1% of this number increa ed over 2015. Deliberate lit fire and electricity were among the leading causes of fire events in Malaysia. Johor had the most fire incidences, with 8,354 cases, followed by Selangor and Perak with 8,234 and 8,000 cases respectively[1]. The problem usually comes from wiring problem or poor fire system. The cases keep increasing as a cause of irregular service on the fire y tem. Sometimes, it was caused by old firing system and other causes such as due to loo e wires overloaded plugs, and improper connections. It can happen everywhere, including in workplaces which could cause fatality as well as loss of valuable equipment and important documents. Nevertheless, an effective system to notify fire occurrences in an office building could prevent these devastating consequences.

Many problems could occur with the absence of fire alarm system in a building. For example, people could be less unaware of fire occurrence in the building. Other than that, the process of evacuation may be delayed without early notification of fire. Hence, it will increase the risk of people being trapped in the building due to heavy smoke caused by fire. Consequently, this could lead to a more serious problem such as major losses and fatality.

The function of a fire alarm system is generally to help people to evacuate the building or factory as fast as they can. Somehow the occupants of the building may not realize that omething has happened to their surroundings. For instance, in Dhaka, Bangladesh, a fire engulfed a food and beverage factory outside Bangladesh's capital, killing at least 52 people, many of whom were trapped inside by an illegally locked door [1]. The problem in this situation is that the building door did not open automatically when the building was fired up. It shows that the fire alarm system did not work properly in that building. On the other hand, the workers did not find a way to escape or to exit because when the fire accident happened, the smoke was very thick.