



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

WIRELESS AUTOMATIC FIRE ALARM SYSTEM

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology ((Industrial Automation & Robotics) with Honours.

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2020

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: Wireless Automatic Fire Alarm System

Sesi Pengajian: 2020

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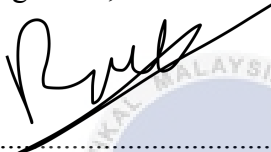
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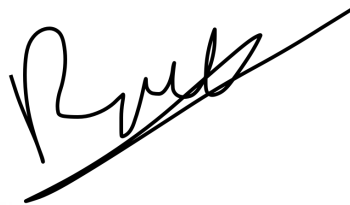
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I hereby, declared this report entitled Wireless Automatic Fire Alarm System is the results of my own research except as cited in references.



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APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electrical Engineering Technology ((Industrial Automation & Robotics) with Honours. The member of the supervisory is as follow:



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ABSTRACT

The main idea of this investigation was to structure and integrate the Internet of Things (IoT) into a fire alarm system based on NodeMCU, which alerts fire-fighting installations, authorities and building occupants to possibly prevent fire occurrences or reduce the probable damages it may cause. The surveillance of home or industrial places through sensors and the prevention of problems via expectation are of crucial significance for the safety of these zones. This paper shows how to increase wireless Fire alarm system techniques by forming new structure techniques and improved a low-cost building safety systems. Fire alarm systems are important means of prevention and are designed essentially to give building tenants prompt warning and guidance to securely clear the premises if a fire occurs. It sometimes take a long time for the fire station to reach to the fire outbreak location and works on extinguish the fire and so these sensors will work as an early alarm system which will send a warning to our mobile phones and web page, fire stations if any fire outbreak happened to let us know the circumstance unmistakably and before its past the point of no return, In the event of a fire outbreak after a long time from its outbreak, we act to maintain significant damage.

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ABSTRAK

Idea utama penyelidikan ini adalah untuk menyusun dan mengintegrasikan Internet of Things (IoT) ke dalam sistem penggera kebakaran berdasarkan NodeMCU, yang memberi amaran kepada pemasangan, pihak berkuasa dan penghuni pemadam kebakaran untuk mencegah kejadian kebakaran atau mengurangkan kemungkinan kerosakan yang mungkin terjadi. sebab. Pengawasan tempat kediaman atau perindustrian melalui sensor dan pencegahan masalah melalui jangkauan sangat penting bagi keselamatan zon ini. Makalah ini menunjukkan cara meningkatkan teknik sistem penggera Kebakaran tanpa wayar dengan membentuk teknik struktur baru dan memperbaiki sistem keselamatan bangunan dengan kos rendah. Sistem penggera kebakaran adalah kaedah pencegahan yang penting dan dirancang pada dasarnya untuk memberi amaran dan panduan kepada penyewa bangunan untuk membersihkan premis dengan selamat sekiranya berlaku kebakaran. Kadang-kadang memerlukan masa yang lama untuk stesen bomba sampai ke lokasi wabak kebakaran dan berfungsi untuk memadamkan kebakaran dan oleh itu sensor ini akan berfungsi sebagai sistem penggera awal yang akan menghantar amaran ke telefon bimbit dan halaman web kami, stesen bomba jika sebarang wabak kebakaran berlaku untuk memberi tahu kami keadaannya dengan tidak salah dan sebelum melewati titik tidak akan kembali, Sekiranya berlaku kebakaran setelah sekian lama dari wabaknya, kami bertindak untuk menjaga kerosakan yang ketara.

DEDICATION

I dedicate my beloved parents and friends this project report to them. Special thanks to my mother Mrs. Rajeswary a/p Ramanathan and father Kalerwanan a/l P.Anavi, both of whom are always supporting my ideas and give encourage to do this project. I would also like to thank my friends Suraien a/l Raja mohan and Kumaran a/l Subramaniam who have always been the backbone in the creation of this project. Last but not least to my talented supervisor Mr. Mazree bin Ibrahim, who always gives plenty of suggestions and shares his experience of reporting concept.



ACKNOWLEDGEMENTS

We would like to express our thanks and gratefulness to all those who gave us the possibility to complete this report. An extraordinary gratitude to our final year project coordinator, Mr.Mazree bin Ibrahim whom help us stimulating suggestions and consolation, helped me to coordinate my project especially recorded as a hard copy this report. I would also like to acknowledge with much gratefulness the vital role of the staff of Electrical Laboratory, who gave the authorization to use all necessary hardware and the vital material to complete the Wireless Automatic Fire Alarm System. Special thanks goes to Mr & Mrs Kalerwanan, whose have given their encouragement and backing through financially to keep up our advancement in track. I would to value the guidance given by other supervisor as well as the panels particularly in my project presentation that has improved our presentation aptitudes by their remark and tips.

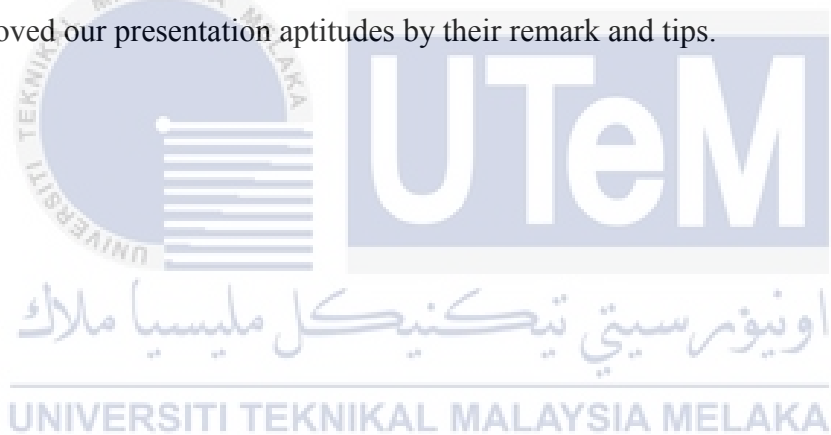


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CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter covers the aspect of introduction, the principle motive is to review background of this various Fire accident that cause destruction, property and life losses. Among the disaster, fire accident become repeatedly, irreparable damage and most influential disasters if compared to other hazard. Development of this wireless automatic fire alarm system is a real time monitor to the building for the fire accident. The purpose of this project, is offer a chance to our people to protect their beloved person and valuable thing.

1.1 Project Background

Nowadays, with the up come technology of the web of things that wide spread of huge information, cloud computing and different ideas. On the other hand, the expeditious detection of fire accident and its can spare lives and property harm worth millions. Standard and addressable are the primary sort of alarm systems, yet unfortunately these fire alarm systems often generate false alarms. The statistic of bogus alarm is more prominent in standard alarm systems compared to the addressable, at the same time the addressable alarm is very expensive. For The Example:

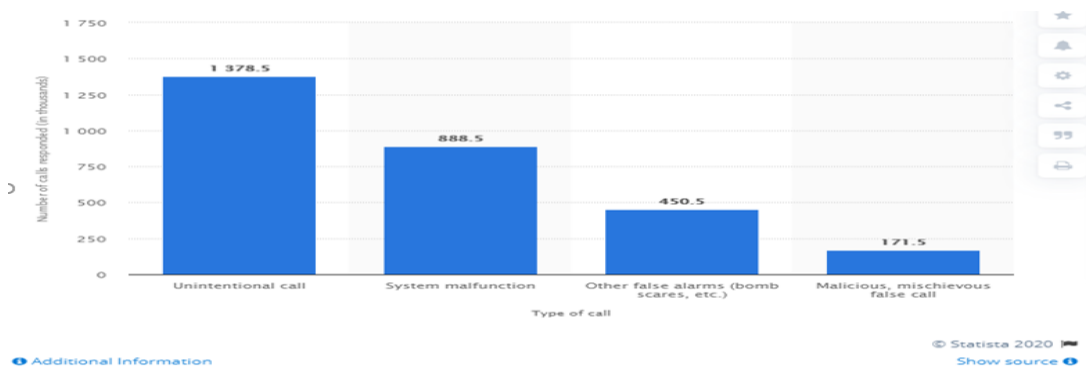


Figure 1. 1: Chart for false fire alarms responded by u.s. fire departments in 2018

The majority cause of a false warning is different for distinct types of detection systems, such as a smoke sensor often being activated falsely due to an environmental effect and human error. According to Malaysia Fire and Rescue Department (JBPM) in 2016, the statistic stated that almost 5500 of fire cases reported are concerned with the households followed by transportations, electrical appliances and leaking gasses. When the fire occurs, there are possibility for the anyone at there to extinguish the fire is higher with immediate precaution from the fire to be spread all over by using fire extinguisher or call the fireman instantly. The main relate of this project is when nobody is at the building or are not aware of the existence of the fire in the building. So, this project can detect the presence of fire accident and alert the human being at the building and automatic start the initial step of the fight against fire. When the fire is cannot control in few second the system will automatic alert to the fire station.

In view of the above problem, this project is developed of building fire alert is built based on NodeMCU as the main microcontroller that interacts with IOT which works in the communication part. The interaction is for the user to know the current situation in building. This system works entirely on the wireless network communication as IOT is performed by sending alert to the building in charge and fire station. The microcontroller is the mastermind of this project to control all the decision.

1.1.1 Fire growth and reaction

To comprehend fire location systems and automatic sprinklers we could know the useful to possess an essential information ablaze turn of events and conduct. This data can support the job and collaboration of these supplemental fire safety systems in the assurance procedure would then be able to be better figured it out. Essentially, fire is a chemical reaction where in a carbon based material that blends in with oxygen and is warmed to a point where combustible fumes are created. The vapors can contact with

something that is hot enough to cause vapor ignition and a resulting fire. With the basic word, something that can consume contacts something that is hot and a fire is delivered. Fire is hot in light of the fact that the changing of the delicate twofold bond in atomic oxygen to the extraordinary bond in the burning make carbon dioxide and water discharges vitality. The bond energies of the fuel respond as a minor job. The burning response, called the start point, flares are delivered at one point.

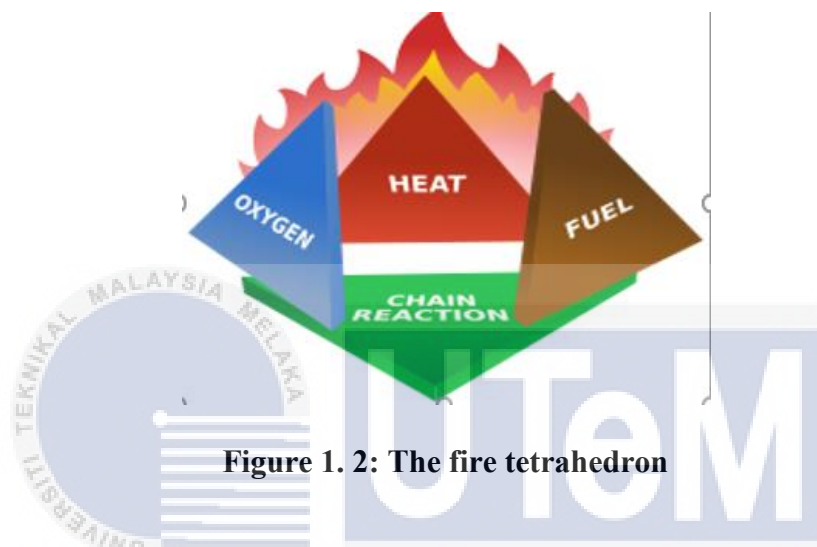


Figure 1. 2: The fire tetrahedron

1.1.2 Types of Fire Alarm Systems

The primary two kinds of Alarm is conventional and addressable. Conventional (also four-wire) fire alarm systems are modest to purchase and are generally utilized in littler properties, for example, shops and eateries. In this system, a building is divided into a some of recognition zones with one or different identifier in a zone. All the identifiers and manual call focuses in the zone are designed to a doled out circuit on the control board. Each caution sounder in this system is associated by means of a different two-center wire to an appointed circle. At the point when a finder is recognized smoke or fire, the control board demonstrates the zone from which that indicator was enact. The inconvenience is that the individual zone must be physically checked so as to pinpoint the specific wellspring of the alert. This can be require some serious energy in a crisis, for the most part in zones with an incredible number of gadgets.

An adjustment of the four-wire regular framework is the two-wire alarm dependent on a similar thought as the conventional system. A two-wire framework utilizes a similar arrangement of two-center links to join all the gadgets that call focuses, finders, and ringer, in a solitary zone to the control board. Two-wire are further working, adaptable and by and large, modest to introduce and work than their four-wire partner yet costly to buy. Conventional systems just give discovery data explicit to a zone yet not the single gadgets in the zone.



Figure 1. 3: Conventional Fire alarm control panel

Be that as it may, addressable alarm systems give explicit data on singular locators. Addressable systems are brilliant and they utilize one or additional single circle wiring to associate various kinds of identifiers or other start gadgets. All the gadget had a one of a kind location or identifier. The control board regularly examination every connected device which in turn report their exact area, wellbeing status, blunders or fire and the important data from the gadgets are shown by the control board. Addressable frameworks have extensive malleability, control, and speed of acknowledgment than traditional frameworks yet they are mind boggling and expensive to convey. They are

most appropriate to huge business structures and premises with muddled organized necessities.



Figure 1. 4: Addressable Fire alarm control panel

Lastly, the wireless fire alarm system which are battery-controlled and at some point radio-connected, and suctioning smoke identification frameworks. Suctioning smoke location frameworks recognize smoke by utilizing a fan to attract air from around a structure by means of a system of examining funnels and gaps, and going past this air through an extremely delicate precision finder that examinations it and creates ready signs of potential fire when it distinguishes smoke particles. They are best where early admonition is required yet are expensive to introduce and keep up.

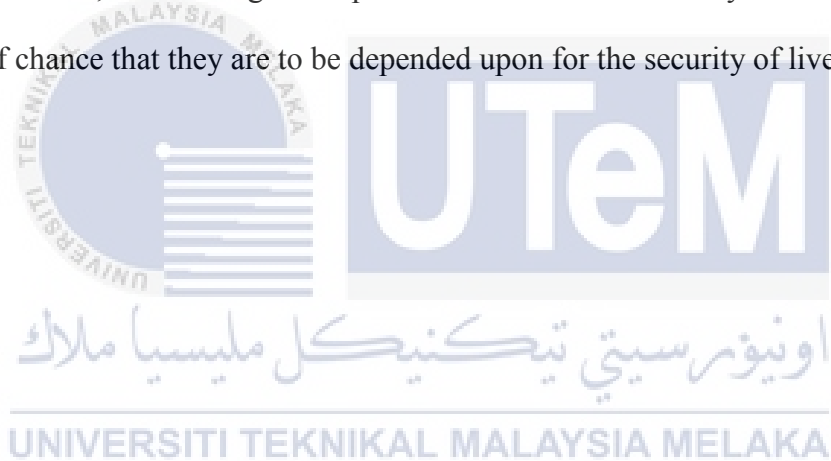


Figure 1. 5: Wireless Fire alarm control panel

1.1.3 Benefits of Fire Alarm

The crystal clear advantage of fire alarm with the early notice benefits that can prompt spared lives and property. Fire can happen at whenever and anyplace. Most recent's system can rise the departure time for the occupant of a structure with the goal that they can get out before the fire spreads wild. Besides, Automatic emergency fire alarm and fire extinguisher services can help rapidly get to those out of luck. It can likewise alarm the notable individuals, for example, building proprietors and office chiefs. With the accuracy of addressable systems, firefight know precisely where the fire is and along these lines experience a difficulty free and generally safe employment fighting the fire and move individuals from the structure securely. Individuals will feel progressively charming, secure, and chipper working in a spot that has an appropriate fire alarm system. If an automatic fire extinguisher system like sprinklers are installed as part of your fire alarm system that incorporates limit a fire, for example, through a sprinkler system, it limited the dangers to life and the introduction of a property and its inhabitants to the dangerous possibilities of a fire erupt.

Fire alarm systems can basically be coordinated into a continuous observing system either on location or offsite. It ready to incorporated with CCTV reconnaissance, Access Control and other Security and Safety systems in many full overhauled structures. Besides, fire alarm have a low introduce cost and furthermore the adaptability of where to put the system and its segments. So it's habitually acceptable to introduce alarm segments on each floor of a structure. The alarms ready to introduced pretty much anyplace in a business building and top of all the fire security measure is costly efficacious for smoke and fire assurance. Be that as it may, it isn't sufficient to have fire alarm system installed. Planed, visit testing of all parts is crucial to the viability of these frameworks on the off chance that they are to be depended upon for the security of lives.



1.1.4 Building Fire Accident in Malaysia



Figure 1. 6: Fire incidents