



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DEVELOPMENT AND IMPLEMENTATION OF SMART
ECONOMIC FIRE CRISIS CONTROLLER USING
RASPBERRY PI**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Computer Engineering Technology (Computer System) with Honours.

by

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CRISIS CONTROLLER USING RASPBERRY PI

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Mechanical Engineering Technology (Computer System) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Pada masa kini, teknologi berkembang seiring dengan kebanyakan tugas harian yang dapat diselesaikan dengan menggunakan kemajuan teknologi ini. Ia berkembang melalui penyelidikan dan garis masa. Terdapat banyak produk teknologi yang sentiasa berada di pasaran global, salah satu produk yang paling banyak digunakan di syarikat atau rumah adalah sistem penggera kebakaran. Tujuan utama produk ini dicipta atau direka adalah untuk memberi perhatian kepada orang-orang sekeliling apabila kejadian kebakaran berlaku. Sebagai tambahan kepada pernyataan ini, matlamat saya untuk mewujudkan pengawal krisis kebakaran yang akan mengesan kebakaran dengan menggunakan gabungan sensor api dan pemprosesan imej. Keseluruhan projek ini dibangunkan dengan menggunakan metodologi air terjun sebagai salah satu kaedah terkenal yang digunakan untuk membina projek dari awal. Projek ini dibuat dengan gabungan beberapa unsur utama seperti sensor api, kamera dan buzzer yang dikawal oleh Raspberry PI. Pengesanan dibahagikan kepada 2 segmen utama atau segmen pengenalan. Pada peringkat pertamanya, sensor api akan mengesan kebakaran yang berlaku atau kepanasan kemudian akan menghantar isyarat kepada raspberry pi untuk menganalisis api menggunakan kamera. Ini boleh dipanggil sebagai pengesanan dua langkah. Ideologi ini dipilih dan disesuaikan untuk mengelakkan penggera palsu dan meningkatkan kualiti projek yang dicadangkan secara tidak langsung. Di samping itu, projek ini juga dilengkapi dengan sistem peringatan pintar dan pengurusan untuk memberitahu dan membolehkan pasukan kecemasan memberikan bantuan yang betul dan cepat. Jadi kita dapat

mengurangkan kesan dan masalah yang mungkin timbul semasa bencana kebakaran dengan menggunakan kajian yang dicadangkan.

ABSTRACT

In the present year, technology is evolving to the extent that most of our daily tasks can be solved and completed using the advancement of this technology. They evolve through research and development. There are many common products of technology that are out in the global market, one of the most used products in companies or houses is the fire alarm system. The main purpose of this product was created or designed is to alert surrounding people when a fire incident happens. In addition to that statement, my aim is to create a fire crisis controller that will detect fire using the combination of a flame sensor and image processing. This whole project was developed by using the waterfall methodology as this is one of the famous methods used to build a project from scratch. This project was created with the combination of a few main elements such as the flame sensor, camera, and buzzer which is controlled by the Raspberry Pi. The detection is divided into two major parts or identification segments. Firstly, the flame sensor will detect the presence of fire or heat, then it will send a signal to the Raspberry Pi to analyze the flame using the camera. This can be called as a two-step verification. This ideology is chosen and adapted to avoid false alarms and indirectly increase the quality of the proposed project. In addition, this project is also packed with a smart alert and management system to notify and enable the emergency team to provide help quickly and accurately. So using this proposed study, we can minimize the impact and problems that may arise during a fire disaster.

DEDICATION

God

Thank you god for given me your blessing and guidance in completing this project

Dear Beloved Family

Thank you because always supporting me in every part such giving me motivations ideas and accompany me while I am doing this project

Dear Supervisor and Lecturer

Thank you all your guidance, patience, encouragement, and supervision to enable me finish this project

Dear Friends

Thank you for all the knowledge, support and encouragement and share all the know ledges together.

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LIST OF SYMBOLS

cm	-	Centimeter
V	-	Voltage
nm	-	Nanometer
°C		degree Celsius
A		Ampere
mA		Milliampere
KHz		Kilohertz
dB		Decibel
GHz		Gigahertz

LIST OF ABBREVIATIONS

UTeM	Universiti Teknikal Malaysia Melaka
HDMI	High-Definition Multimedia Interface
LCD	Liquid Crystal Display
IR	Infrared
VCC	Voltage Common Collector
GND	Ground
GSM	Global System for Mobile
GPIO	General Purpose Input/Output
USB	Universal Serial Bus
DO	Digital Output
SQL	Structured query Language
CV	Computer Vision

CHAPTER 1

INTRODUCTION

1.1 Introduction

The development and implementation of smart economic fire crisis controller using raspberry pi is explain in this section. There are five part in this chapter which are the explanation of project background, problem statement, objectives, project scope and conclusion. Furthermore, clarification about this project system and how the project is functioning will be explain in this part. Besides that, the beginning stage of early preparation for this smart economic fire crisis controller will beings serves also in these chapter. This section are essential since it will be the guidance for the clients. The developer can accomplish the ideal goals based on the section included in this chapter with the clearly specified statement stated.

1.2 Project Background

Automated fire alarm is a system which is designed to handle fire situation during an emergency. The general purpose or use of the system is to identify the fire at

starting stage and notify for evacuation. Based on research there are few design and types of fire alarm systems the world that serve different purpose. Some of the types and design are explained is high level overview so that basic.

❖ **Common design of the fire alarm system**

➤ Conventional Systems

- Simple fire alarm with control panel, manual call point and a sounder. System consist of one or many call points that are connected together.

➤ Analogue Addressable Systems

- Advance fire alarm that have constant two way communication between panel and detectors.

❖ **Types of the fire alarm system**

➤ Type 2

- Manual system that will be initiated by manual calling points only.

➤ Type 3

- Automated system that will be initiated by heat detector and points.