



**Faculty of Electrical and Electronic Engineering Technology**



**DEVELOPMENT OF FACE MASK DETECTION FOR COVID-19  
ENFORCEMENT**

**MUHAMMAD AIMAN BIN MOHD ZULKERNAINI**

**Bachelor of Electronics Engineering Technology (Industrial Electronics) with  
Honours**

**2022**

**DEVELOPMENT OF FACE MASK DETECTION FOR COVID-19  
ENFORCEMENT**

**MUHAMMAD AIMAN BIN MOHD ZULKERNAINI**

**A project report submitted  
in partial fulfillment of the requirements for the degree of  
Bachelor of Electronics Engineering Technology (Industrial Electronics) with  
Honours**



اونيورسيتي تیکنیکل ملیسيا ملاک  
**Faculty of Electrical and Electronic Engineering Technology**  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

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**BORANG PENGESAHAN STATUS LAPORAN  
PROJEK SARJANA MUDA II**

Tajuk Projek : Development of Face Mask Detection for COVID-19 Enforcement

Sesi Pengajian : 2022

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## DECLARATION

I declare that this project report entitled “Development of Face Mask Detection for Covid-19 Enforcement” is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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## APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electronics Engineering Technology (Industrial Electronics) with Honours.

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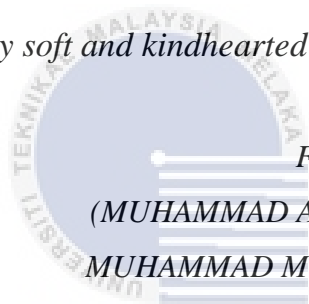
## DEDICATION

*To my beloved father, MOHD ZULKERNAINI BIN MAT  
TAHIR*

*To my beloved mother, NUR AZLIEN BINTI BAHUDIN @  
BAHARUDDIN*

*My family,  
(NUR AIN ARISYA, MUHAMMAD HAFIDZ, MUHAMMAD  
ZAHIDI)*

*My soft and kindhearted supervisor DR HAFEZ BIN SARKAWI*



*Finally, my teammate*

*(MUHAMMAD AMAR FADLAN BIN AHMAD FOZI,  
MUHAMMAD MUADDIBAKHTIAR BIN MUZAFAR)*

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## ABSTRACT

A technique for monitoring the most recently found coronavirus is proposed in this project Body Temperature Check and Face Mask Detector. Many people died in many countries including Malaysia due to this fatal disease. This condition has a wide variety of symptoms, making it difficult to determine whether a person is suffering from it. The symptoms are verified by WHO and we can identify this disease based on them. Using Arduino Uno, this proposed system can track people who not either wearing face mask or wearing it properly to enter the premises. A system is being developed that used MLX 90614 sensor and Python software with PC camera to perform thermal scanning of the human body and detected a face mask. If a person has symptoms and their body temperature is 100F or higher when scanning using a thermal scanner, it will show to the Lcd screen. If nothing happens to the person, they can pass to a premises. If the user got high temperature or not wearing a face mask, the face of users will be capture and their body temperature details will be sent to high management to take a action then buzzer and Led red will turn on. This design also will be doing the same if the person not wearing a face mask properly. This designed methodology system is untouched and runs on its own automatically. If properly implemented, the projects that are working on currently might be used to assist assure community protection and reliability. In this study, the proposed of this monitoring system, which is relevant to a small zone, such as laboratory, small market, office, and others small place.

## ***ABSTRAK***

Satu teknik untuk memantau coronavirus yang paling baru ditemui dicadangkan dalam projek ini (Pemeriksaan Suhu Badan dan Pembangunan Pengesan Topeng Muka Automatik). Sebilangan besar orang mati di banyak negara termasuk Malaysia akibat penyakit maut ini. Keadaan ini mempunyai pelbagai jenis simptom, menjadikannya sukar untuk menentukan sama ada seseorang itu menghidapnya atau tidak. Gejala disahkan oleh WHO dan kita boleh mengenal pasti penyakit ini berdasarkannya. Menggunakan Arduino Uno, sistem yang dicadangkan ini boleh mengesan orang yang sama ada tidak memakai topeng muka atau memakainya dengan betul. Sistem sedang dibangunkan yang menggunakan penderia MLX 90614 dan python beserta PC Kamera untuk melakukan pengimbasan haba badan manusia dan mengesan topeng muka. Jika seseorang mengalami simptom dan suhu badannya ialah 100F atau lebih tinggi apabila mengimbas menggunakan pengimbas haba, ia akan ditunjukkan pada skrin. Jika tiada apa-apa berlaku kepada orang itu, mereka boleh pergi ke premis. Jika pengguna mendapat suhu tinggi atau tidak memakai topeng muka, gambar pengguna dan butiran suhu badan mereka akan dihantar kepada pengurusan tinggi untuk mengambil tindakan serius seterusnya buzzer dan LED akan menyala. Reka bentuk ini juga akan melakukan perkara yang sama jika orang itu tidak memakai topeng muka dengan betul. Sistem metodologi yang direka ini tidak disentuh dan berjalan sendiri secara automatik. Jika dilaksanakan dengan betul, projek yang sedang diusahakan pada masa ini mungkin digunakan untuk membantu memastikan perlindungan dan keboleh percayaan komuniti. Dalam kajian ini, cadangan sistem pemantauan ini yang relevan dengan zon kecil, contohnya makmal, pasar kecil, pejabat dan tempat kecil yang lain.



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## LIST OF SYMBOLS

°C	-	Degrees Celsius
°F	-	Degrees Fahrenheit
+%	-	Accurate Percent
V	-	Volts of Voltage
I2C	-	Inter-Integrated Circuit
SDA	-	Serial Data
SCL	-	Serial Clock
VCC	-	Voltage Common Collector
VSS	-	Source Supply
Mm	-	Millimeter

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## LIST OF ABBREVIATIONS

PCA	-	Principal Component Analysis
ID	-	Identification
PC	-	Personal Computer
PWMFD	-	Properly Wearing Masked Face Detection Dataset
WIDER	-	World Institute for Development Economics Research
RMFD	-	Real-World Masked Face Dataset
KLIA	-	Kuala Lumpur International Airport
MIME	-	Multipurpose Internet Mail Extensions
IDE	-	Integrated Development Environment
VNC	-	Virtual Network Computing
GPIO	-	General Purpose Input/Output
CSI	-	Computer Services Inc
POR	-	Provided on Request
ADC	-	Analog Digital Converter
DC	-	Direct Current
BGR	-	Blue Green Red
RGB	-	Red Green Blue
LCD	-	Liquid Crystal Display



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# CHAPTER 1

## INTRODUCTION

### 1.1 Background

All other large and small countries including Malaysia recently declared an emergency for the novel coronavirus (COVID-19). In action, the entire world's population is on lockdown with people need to maintain social distances as recommended by the World Health Organization (WHO). This fatal virus has infected millions of people worldwide and is still spreading. COVID-19 infections are causing people across Malaysia to lose their jobs, work from home, being hospitalized, and even death. Since taking precautions is the only way to be safe. To prevent making contact with coronavirus, it has been advice for people to wear a face mask and maintain social distance. Therefore, the content of this project will be described as development of an automated face mask detector and body temperature to check the temperature body of human and detect whether they wear a face mask or not.

### 1.2 Problem Statement

The project's overall substance is stated as Development of An Automated Face Mask Detector and Body Temperature Check, which includes a problem description, objective, and scope. The things that need to be achieved to solve the problem arise is the objective while the problem statement is related to how the

problem that we want to solve occur. However, there will be a limitation in completing this project which is discussed in the chapter. Being a guard at a store entry who has to advise people to put on face masks before entering a property or institution is one of the worst occupations in the world right now. Another problem that we are facing right now is the high price of body temperature scanner and it cannot detect face mask. We need to purchase two item which is a body temperature monitor and a face mask detector. As a result, if there are a lot of people, it will not be accurate since humans must physically verify the body temperature of each individual who enters the premises, wasting a lot of time. That's how the idea of this project has been sparked.

### 1.3 Project Objective

The objective of this project are as follows:

- a) To develop an Automated Face Mask Detector and Body Temperature Check by using NodeMCU ESP8266.
- b) To analyze the effectiveness of the proposed system in differentiating between masked or non-masked people and normal or abnormal temperature people.
- c) To reduce the time of checking between masked and non-masked while normal and abnormal temperature people.

## 1.4 Scope of Project

This project will create a prototype of an automated face mask detector that will assess whether a person is wearing a face mask in a range of 35cm to 60cm from the camera to scan their face. Otherwise, the camera will not detect your face and ask you to move closer or back. To pass the scan, you must reach the threshold number, which is 80 percent of your face covered. There is also a pushbutton on the inside to manually open the door. We are using the MLX90614 Temperature Sensor for this project because it reads temperature via infrared, which is more appropriate for this project than any other temperature sensor. As a result, before passing the check, the individual must wear a face mask and scan their body temperature. With this project, user need to scan their facemask first before proceeding to scan their temperature. If the person not wear the facemask they could not proceed to scan their temperature. If they passed the facemask they mask continue to the temperature and must follow the condition temperature, which is below 32°C or higher than 39°C to enter the premise. In this scan, the person needs to stand between 35-60cm from the camera for the best view for the camera to scan and if the person is not within this range, the camera could not initiate the scan. Then, if the person failed the scan, high management or guard will get notification message that someone did not wear the facemask try to enter the premises and they need to scan their face mask again before proceeding. If they pass all the scan, the person will be allowed to enter the premises.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter provided an overview of the creation of development of facemask detection for covid-19 enforcement, as well as previous research on the subject. The advantages and disadvantages of past research are also mentioned and compared in this study. Aside from that, research on hardware components utilized in previous studies is being conducted. The possibilities that impact the quality their project may be studied and assessed by studying past projects. Finally, several recommendations have been made to address the issues identified in the earlier study.

#### 2.2 Overview of Pandemic in Global History

Pandemics are central to global history. They have a worldwide influence and operate as temporal anchors. They also question society's foundations, the sustainability of its material basis, the role of experts, its social standards, and behavioral norms. Medicine historians have long been interested in pandemics, particularly how they rely on and redefine relationships between persons and civilizations in ways that other global events may not. The current COVID-19 outbreak will probably definitely become a pivotal milestone in the twenty-first century. It demonstrates how quickly viruses may travel over the world as they

interact with forces of economic, political, and cultural globalization. It also demonstrates substantial variations views of and approaches to a new health concern, as well as the profound politics underlying responses at the local, national, and global geopolitical levels [1].

### **2.2.1 Precautions to prevent COVID19**

There have been a few precautions make by governments to reduce the effectiveness of COVID-19 which is wearing a mask and social distancing. Masks will help prevent the infection from spreading from the person wearing them to others. Masks alone will not protect against COVID-19, they must be worn in combination with physical separation and hand cleanliness. The present COVID-19 epidemic will almost certainly become a key anchor point in the twenty- first century. It reminds us how swiftly viruses may spread over the world as they mix with economic, political, and cultural globalization forces. It also demonstrates vast disparities in views and approaches to a new health concern, as well as the profound politics underlying reactions at the local, national, and global geopolitical levels. Historical comparisons raise concerns regarding why and how personal, community, scientific, and social reactions to such challenges differ through time. [1]

### **2.3 Previous Work of Project Face Detector**

#### **2.3.1 Face Recognition**

There The student attendance system (SAS) website was set up to automatically update the student attendance sheet when the student arrived at college, allowing

the student attendance statistics to be shown. Students who can verify their recorded attendance from a mobile phone or personal computer can use the authentication method in the student attendance programmed. The present article can be changed in the future to use a Raspberry Pi and an Infrared camera interface in a Smart Surveillance Security Monitoring System. Regardless of whatever sort of public security employs live body monitoring or spying, it may also be used with school attendance apps that use Raspberry Pi or Arduino UNO platform interfaces such as biometric scanner switching, finger tagging, and other capabilities. Scientific research is now being undertaken to allow pictures to be processed on the GPU of the Raspberry Pi, resulting in improved results when utilising specific libraries.

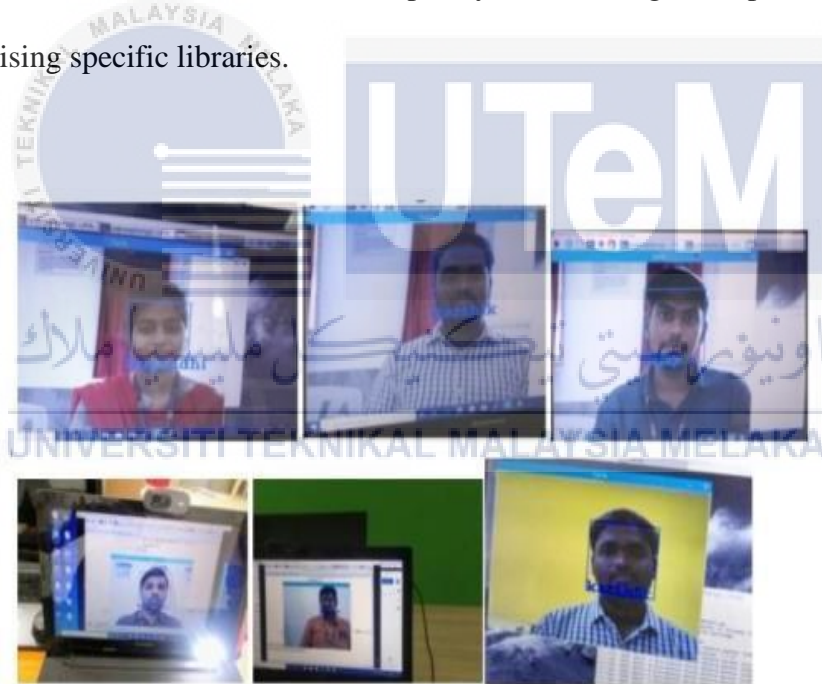


Figure 2.1 Photos captured during class [2]

Attendance												
Total 11 items:												
#	Coursecode	Coursedes	Ltps	Section	Year	Semester	Fr Date	Total Conducted	Total Attended	Total Absent	Tcbr	Perce
1	15EC4110	Digital Image Processing	L	S-7-MA	2019-2020	Odd Sem	N	29	28	1	0	97%
2	15EC4110	Digital Image Processing	T	S-7-B	2019-2020	Odd Sem	N	22	22	0	0	100%
3	15EC4110	Digital Image Processing	P	S-7-B	2019-2020	Odd Sem	N	28	24	4	0	86%
4	15EC3058	Video Surveillance	L	S-2-MA	2019-2020	Odd Sem	N	40	38	2	0	95%
5	15EC4064	Knowledge Based Systems	L	S-1-MA	2019-2020	Odd Sem	N	39	33	5	1	85%

Figure 2.2 Students Attendance in Database [2]

### 2.3.2 Face recognition by MATLAB and Arduino

The task's primary goal is to recognize a human face in each edge originating from a web camera, and the captured image is prepared using viola-jones calculation using MATLAB and to identify the countenances and send signals to the Arduino board to control the development of the camera using two servo engines. This study demonstrates how to extract face some region of midway face gives superior RGB to GRAY image improvement, Get include, the matched channel allows for clustering for Find Neighbor extraction through face coordination. This approach may be used to examine the utilization of a coordinated channel for facial recognition[3]. The person is sorted by contrasting its present location in eigenface space and the position of known people.[4]