DEVELOPMENT OF THIRD BRAKELIGHT AND SIGNAL FOR FOOD PANDA AND GRABFOOD MOTORCYLIST

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Faculty of Mechanical and Manufacturing Engineering Technology

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MUHAMAD RAZIQ AFIQ BIN ANUAR

A thesis submitted
in fulfillment of the requirements for the degree of
Bachelor of Mechanical and Manufacturing Engineering Technology (Air Conditioning and Refrigerant System) with Honours

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Faculty of Mechanical and Manufacturing Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2022

DECLARATION

I declare that this Choose an item. entitled **DEVELOPMENT THIRD BRAKELIGHT AND SIGNAL FOR FOODPANDA AND GRABFOOD MOTORCYCLIST** is the result of my own research except as cited in the references. The Choose an item. has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Date : 15/1/2022

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APPROVAL

I hereby declare that I have reviewed this thesis and believe that it is adequate in scope and quality to be awarded the Bachelor of Mechanical and Manufacturing Engineering Technology (Air Conditioning and Refrigerant System) with Honours.

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Date : 15/1/2022

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DEDICATION

I would like to thank my loving and supportive parents, Anuar bin Mohamed and Idawati binti Md Deros, for their unending love, sacrifices, prayers, and support, as well as my relatives for their financial assistance. I'd also like to thank my supervisor, TS. Mohd Zakaria bin Mohammad Nasir, for his support and advice

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ABSTRACT

Food delivery is a courier service that brings delicious food from a nearby restaurant to hungry customers' doorsteps. People, on the other hand, continue to buy goods from web apps on food delivery services. Motorization is rapidly expanding in Asian countries, and motorcycles have surpassed cars as the dominant mode of transportation. In several major Asian cities, the number of motorcycles per thousand people is significantly higher than the global average. With the increased use of motorcycles, road injuries and fatalities are becoming a growing concern in Malaysia, with speeding being one of the leading causes. The majority of accidents occur when the driver cannot see the vehicle stop at night or in heavy rain. This could endanger other people's vehicles. Between 4 p.m. and 10 p.m., the most motorcycle fatalities occur. This project's objectives is to develop and design brake light and signal hazard system attached on Grab food and Food panda bag and to increase the visibility and to avoid unexpected event especially during a bad weather condition.This study intends to build an LED blinking system that will be attached on Foodpanda and Grabfood bags to help other road users spot other motorcyclists in front of them. The receiver and transmitter are used to design the electrical circuit for the Arduino controller. The Grabfood and Foodpanda bags will be illuminated by an LED blinking light. Wireless connection system has been chosen as the project's wireless protocol. The advantages are lower costs, technicality, simplicity, affordability, and compatibility. Wireless connection system and Arduino are designed well in this system to integrate with current brake and signal to be used in motorbikes. A transmitter and receiver are used as the wireless system in this project. It uses an Arduino system to generate the signal or brake light received from the motorbike transmitter and sends it to the receiver linked to the Grab food and Food panda bag to turn on the light command. A real prototype is success to develop as it simple and working well under any weather. It also a no buffering data transfer from the transmitter and receiver. The current motorcycle has been fitted with the tail light but it is not enough to attract attention from the vehicle behind them. As a result, this third brake light and signal prototype really helps other vehicle from behind to see the motorcycle user clearly. Meanwhile, by implementing this third brake light and signal and LED blinking system help to increase visibility and could attract the vision of other vehicle to notice if there is a motorcycle in front of them. The maximum visual and distance for 3rd brake light and signal is in between the range 30-40 meters.

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ABSTRAK

Penghantaran makanan adalah perkhidmatan kurier yang membawa makanan lazat dari restoran berhampiran ke depan pintu pelanggan yang lapar. Orang ramai, sebaliknya, terus membeli barangan daripada aplikasi web pada perkhidmatan penghantaran makanan. Permotoran berkembang pesat di negara-negara Asia, dan motosikal telah mengatasi kereta sebagai mod pengangkutan yang dominan. Di beberapa bandar utama Asia, bilangan motosikal bagi setiap seribu orang adalah jauh lebih tinggi daripada purata global. Dengan peningkatan penggunaan motosikal, kecederaan jalan raya dan kematian menjadi kebimbangan yang semakin meningkat di Malaysia, dengan memandu laju menjadi salah satu punca utama. Majoriti kemalangan berlaku apabila pemandu tidak dapat melihat kenderaan berhenti pada waktu malam atau dalam hujan lebat. Ini boleh membahayakan kenderaan orang lain. Antara jam 4 petang dan 10 malam, kebanyakan motosikal maut berlaku. Objektif projek ini adalah untuk membangunkan dan mereka bentuk lampu brek dan sistem bahaya isyarat yang dipasang pada makanan Grab dan beg panda Makanan dan untuk meningkatkan keterlihatan dan untuk mengelakkan kejadian yang tidak dijangka terutamanya semasa keadaan cuaca buruk. Kajian ini berhasrat untuk membina sistem berkelip LED yang akan dilampirkan pada beg Foodpanda dan Grabfood untuk membantu pengguna jalan raya lain melihat penunggang motosikal lain di hadapan mereka. Penerima dan pemancar digunakan untuk mereka bentuk litar elektrik untuk pengawal Arduino. Beg Grabfood dan Foodpanda akan diterangi oleh lampu berkelip LED. Sistem sambungan tanpa wayar telah dipilih sebagai protokol wayarles projek. Kelebihannya ialah kos yang lebih rendah, teknikal, kesederhanaan, keterjangkauan dan keserasian. Sisyem sambungan tanpa wayar dan Arduino direka dengan baik dalam sistem ini untuk disepadukan dengan brek semasa dan isyarat untuk digunakan dalam motosikal. Pemancar dan penerima digunakan sebagai sistem tanpa wayar dalam projek ini. Ia menggunakan sistem Arduino untuk menjana isyarat atau lampu brek yang diterima daripada pemancar motosikal dan menghantarnya kepada penerima yang dipautkan ke beg Grab food dan Food panda untuk menghidupkan arahan lampu. Prototaip sebenar adalah kejayaan untuk dibangunkan kerana ia mudah dan berfungsi dengan baik dalam sebarang cuaca. Ia juga pemindahan data tanpa penimbal daripada pemancar dan penerima. Motosikal yang ada sekarang telah dipasang lampu belakang tetapi ia tidak cukup untuk menarik perhatian kenderaan di belakang mereka. Hasilnya, prototaip lampu brek dan isyarat ketiga ini sangat membantu kenderaan lain dari belakang untuk melihat pengguna motosikal dengan jelas. Sementara itu, dengan melaksanakan lampu brek dan isyarat ketiga ini dan sistem berkelip LED membantu meningkatkan jarak penglihatan dan boleh menarik penglihatan kenderaan lain untuk melihat jika ada motosikal di hadapan mereka. Visual dan jarak maksimum untuk lampu brek dan isyarat ketiga berada di antara julat 30-40 meter.

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My parents deserve special recognition for their unwavering support, prayers, and sacrifices throughout my life. I am eternally grateful to my parents for their understanding and support throughout this ordeal. Thank you for helping me to survive all of the stresses and for always advising me not to give up.

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CHAPTER 1

INTRODUCTION

1.1 Background

For every 100,000 people in ASEAN, motorbikes account for more than half of all traffic deaths in Malaysia. In Asia, where motorization is quickly expanding, motorcycles are the primary means of transportation. In several Asian cities, the number of motorcycles per capita is much greater than the worldwide average. As the number of Malaysians riding motorcycles rises, so do the number of traffic-related injuries and deaths, and one of the most common contributing factors is the vehicles' inherent blind spots. These countries consider motorcycles "popular" due of their low cost and low use of gasoline, making them available to everyone. In cities where the roads are continuously congested, owning a motorbike may reduce the time it takes to get to your destination (Abdul Manan & Várhelyi, 2012). Compared to automobile passengers, motorcycle riders are 37 percent greater likely to experience and eight times more likely to be injured (Granieri et al., 2020). As of 2013, Malaysia has 332 motorcycles for every 1000 people, which is less than Vietnam's 358 motorbikes for every 1000 people. Motorcycle accidents are more common when there are more of them on the road.

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There are a lot of reasons why people die on the road. When it comes to fatal motorcycle accidents in Malaysia, distractions are a contributing factor (Abdul Sukor & Fujii, 2011). Riding becomes unnecessary or insecure when a rider's attention is diverted by a specific event, person, or item (Lee, 2017). As a result, drivers begin to drift away from the vehicle and lose concentration. In severe circumstances, drivers may grow weary and make mistakes they should

have avoided. The driver's conduct, the weather, and the state of the road all contributed to the collision. Occurrences Untrained drivers, inexperienced drivers, and those driving under the influence of alcohol or drugs are all at fault for traffic accidents.

Table 1-1 Total data collected on populations of registered vehicles in Malaysia until December 2020 by Research JPJ Malaysia

JUMLAH TERKUMPUL KENDERAAN BERMOTOR DI MALAYSIA MENGIKUT JENIS KENDERAAN DAN NEGERI SEHINGGA DISEMBER 2020

Jenis Kenderaan / Negeri	Kenderaan Persendirian		Kenderaan Perkhidmatan Awam			Kenderaan Barang	Lain-lain Kenderaan	Jumlah
	Motosikal	Motokar	Bas	Teksi	Kereta Sewa Pandu Sendiri			
01. PERLIS	94575	27559	184	187	1	2099	1642	126247
02. KEDAH	1040914	352326	2883	3674	391	43493	22279	1465960
03. P_PINANG	1499538	1143321	4819	4152	375	89054	31119	2772378
04. PERAK	1436239	782175	4960	4602	77	81596	45385	2355034
05. SELANGOR	1527511	1184265	8786	14420	740	222457	125880	3084059
06. W.P.K.L	1934410	4078652	19088	34636	25366	290373	138894	6521419
07. W.P.PUTRAJAYA	94061	56704	349	598	3	4321	2343	158379
08. W.P.LABUAN	20833	53644	85	134	28	1596	888	77208
09. N_SEMBILAN	590171	348051	2430	2141	31	58182	8772	1009778
10. MELAKA	497598	350218	1495	1850	59	29874	10261	891355
11. JOHOR	1977421	1529192	7893	11571	189	169381	74470	3770117
12. PAHANG	650649	400354	1836	2302	9	48642	15988	1119780
13. TERANGGANU	452133	214134	1030	1072	22	22507	6185	697083
14. KELANTAN	569579	317120	1936	1912	7	30869	7610	929033
15. SABAH	443587	681712	2842	4968	835	119787	70022	1323753
16. SARAWAK	870844	845081	2773	1836	381	104260	80060	1905235
17. RAKAN-NIAGA	1191522	2876028	0	939	1577	7189	94101	4171356
Grand Total	14891585	15240536	63389	90994	30091	1325680	735899	32378174

Sumber : JPJ Malaysia

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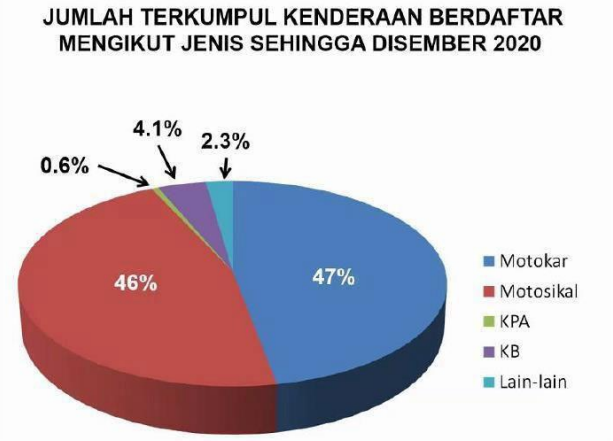

Figure 1.1 Percentage of total registered vehicle in Malaysia

Until December 2020, the bulk of Malaysia's motor vehicles will be automobiles and motorbikes, based on our research and estimates. In terms of proportion, motorcycles are more popular. Motorcycles are a vital form of mobility for the great majority of Malaysians.' More than 13 million motorbikes have been registered in Malaysia, accounting for 46 percent of all registered vehicles. Road accidents are a big issue in Malaysia, and the rate of accidents is growing year after year, as indicated by the indicator released by the appropriate body. To avoid more economic losses as a result of traffic deaths and injuries, action must be taken right now.

1.2 Problem Statement

Malaysia has a plethora of food delivery companies, many of which provide online food delivery services. Grab and Food panda formerly known as food delivery, are one of Southeast Asia's largest start-up companies. People are increasingly ordering food online because it is quick, convenient, and simple. People order food online because they do not want to cook and would rather have the food delivered to their home or office in less than an hour. The majority of accidents occur when the driver cannot see the vehicle stop at night or in heavy rain. This could endanger other people's vehicles. Between 4 p.m. and 10 p.m., the most motorcycle fatalities occur. As a result, new safety system development is required to improve current technology and safety.

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1.3 Research Objective

a) To design and development brakelight and signal hazard system for Grab food and Food panda box.

b) To increase the visibility and to avoid unexpected event especially during a bad weather condition.

1.4 Scope of Research

The scope of this research are as follows:

a) Literature study on electrical, wireless, Radio Frequency and other system

b) Brake by wire

c) Design and modeling in software

d) Program design controller system Arduino UNO/Nano

e) Fabricate prototyping

f) Testing the prototype model

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The goal of this literature study is to examine the third brake light and signal for Grab food and Food panda motorcyclists in order to develop an intelligent hazard system. The Intelligent Hazard System is a technology introduced to current automobiles that increases the safety of vehicle drivers and passengers when driving or riding at night. Night driving puts several limits on drivers and passengers, notably while turning, changing lanes, halting, and driving in severe rain. The majority of automobile accidents are rear-ending incidents. Many are the consequence of failing to respond to a slowed or stopped vehicle.

2.2 Accident Statistics during MCO 2020 (Phase 1-Phase5)

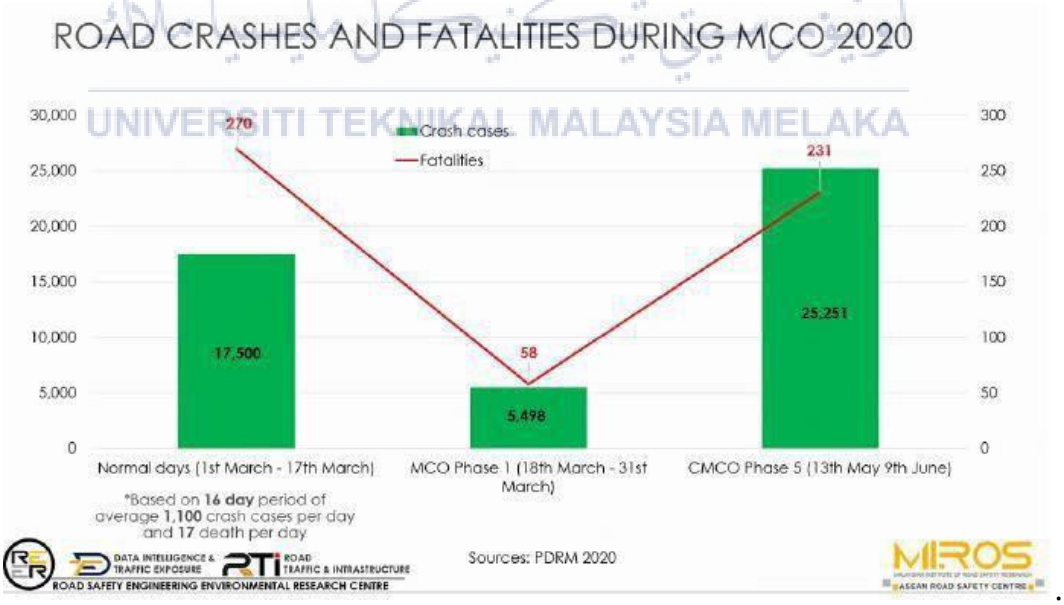

Figure 2.1 Crash cases and Fatalities during MCO

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People in Malaysia are getting more and more injured and even killed on the streets. Between March 1st and 17th, 2020, there will be 17 500 crashes with 270 deaths. Crash instances and deaths decreased by 31.4% and 21.5%, respectively, between regular days and MCO Phase 1. However, the overall number of collision incidents and deaths grew considerably, from 5498 to 25251 and 58 to 231 correspondingly, from MCO Phase 1 to CMCO Phase 5 (13 May 2020 to 9 June 2020). During the period from March 18th, 2020 to June 9th, 2020, there were an average of 238 crashes and 2 deaths every day. When MCO is in effect, individuals are not allowed to leave the home, for example, by going to a restaurant or to a shopping center to purchase food. Many individuals favor meal delivery services like Grab food or Food Panda because of the ease of mobile orders. There are two mobile food delivery marketplaces: Food panda and Grab food. A smartphone app and website are available for customers to use to order food from local eateries.

Table 2-1 Statistic distribution of all kind of accident during MCO Phase 1 until CMCO Phase

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STATISTIK KEMALANGAN, MAUT, PARAH, RINGAN DAN ROSAK SAHAJA MELIBATKAN KENDERAAN M/SIKAL SEPANJANG PKP 18 MAC 2020 - 18 FEB 2021

KONTINJEN	MAUT	PARAH	RINGAN	ROSAK SAHAJA	JUMLAH KEMALANGAN
PERLIS	47	2	92	1	**142**
KEDAH	319	86	497	46	**948**
P.PINANG	239	65	120	10	**434**
PERAK	331	202	856	109	**1,498**
SELANGOR	505	215	868	63	**1,651**
K. LUMPUR	85	10	112	3	**210**
N.SEMBILAN	142	192	464	28	**826**
MELAKA	88	76	37	4	**205**
JOHOR	444	136	234	41	**855**
PAHANG	226	59	90	4	**379**
TERENGGANU	141	59	100	2	**302**
KELANTAN	180	115	536	4	**835**
SABAH	103	52	66	8	**229**
SARAWAK	170	82	151	15	**418**
JUMLAH	**3,020**	**1,351**	**4,223**	**338**	**8,932**

Figure 2.2 Distribution or Cumulative percentages of motorcycle fatalities by time of the day in 2000 to 2009 (PDRM, 2009)

The number of people killed on motorcycles is second only to plane crashes during MCO. A fatality rate of 33.8% is recorded from a total of 8932 collisions. Figure 2.2 shows that the most accidents happened between 8 and 10 p.m., and the least occurred between 4 and 6 a.m. in terms of the number of accidents. Most fatalities happened between 8 and 10 PM, whereas most deaths occurred between 4 and 6 AM in terms of severity in terms of time. There were 243 motorbike deaths each month, 60 per week, and eight deaths per day in Malaysia during the last decade. As a consequence of the lower vehicle density between 4AM and 6AM and 8PM and 10PM, there is a possibility that the speed of the drivers who drove during both times of sleep deprivation might be a factor in the lower outcome.

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Table 2-2 Percentage of fatalities occur by weather and light condition

Weather	Light conditions				Total	%
	Day	Dawn/ dusk	Night with street light	Night without street light		
Clear	1760	289	593	477	3119	93.0
Windy	1	1	1	1	4	0.1
Foggy	4	15	0	10	29	0.9
Rain	90	14	37	41	182	5.4
Other	8	6	2	2	18	0.5
Total	1863	325	633	531	3352[4]	100.0
%	55.6	9.7	18.9	15.8	100	

[4] Excluding 718 unknown cases.