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ALCOHOL LEVEL IGNITION LOCKING SYSTEM USING ARDUINO

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BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY
(Automotive Technology) WITH HONOURS

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Faculty of Mechanical and Manufacturing Engineering Technology

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A thesis submitted
in fulfillment of the requirements for the degree of
Bachelor of Mechanical Engineering Technology (Automotive Techonology) with Honours)

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Faculty of Mechanical and Manufacturing Engineering Technology

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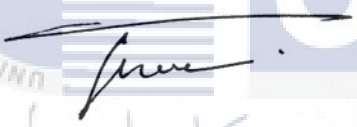
2022

DECLARATION

I declare that this Choose an item. entitled “DESIGN AND FABRICATION OF ALCOHOL LEVEL IGNITION LOCKING SYSTEM USING ARDUINO” 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.

Signature : 

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Date : 17 JANUARY 2022

APPROVAL

I hereby declare that I have checked this thesis and, in my opinion, this thesis is adequate in terms of scope and quality for the award of the Bachelor Degree of Mechanical Engineering Technology (Automotive) with Honours.

Signature : .....

Supervisor Name : TS. LUQMAN HAKIM BIN HAMZAH

Date : 17 JANUARY 2022

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DEDICATION

I would like dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving parents who always giving words of encouragement and push for tenacity ring in my ears. Furthermore, I also would like to dedicate this work and give special thanks to my supervisor, TS. LUQMAN HAKIM BIN HAMZAH for guiding me along the process with precious idea suggestion. I also dedicate this dissertation to my many friends and course mates who have supported me throughout the process to complete this project.

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ABSTRACT

The alcohol level detection system with ignition locking using Arduino will prioritize the convenience and satisfaction of users by giving something unique and never seen before. This project is primarily intended for usage on vehicle safety feature. As we know in Malaysia road accidents due to Driving Under Influence (DUI) has significantly increased in the past 10 years of time. Due to such careless behavior from the alcoholic person leads to loss of lives for the innocent. Malaysian Automotive Industry has posted a great challenge in order to reduce road accidents due to alcoholism. As a result, I started to look forward on this issue, where I came up with this project that was aimed to prevent road accidents due to Driving Under Influence (DUI) while also becomes a contribution to our Automotive Industries in Malaysia. By going through as much as literature reviews regarding Driving Under Influence (DUI), had gained more knowledge where it helps to develop the projects as well. Despite the current techniques to identify alcohol level in breath, I had selected the best materials and components to fabricate the circuit system for this project. By constructing the circuit design of this project an Arduino coding that connected to microcontroller which helps to run the system. Furthermore, the MQ-3 sensor need a calibration method in order set the threshold limit where once the analog value hits the limit it automatically turn off the vehicle's ignition system. Therefore, as an output, several data had been recorded from the system indicated the level of alcohol in breath. Thus, by implementing this project, in the near future we are able to aspect a gradual decreased on road accidents due to Driving Under Influence (DUI).

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ABSTRAK

Sistem pengesanan tahap alkohol dengan penguncian system pencucuhan menggunakan Arduino akan mengutamakan keselamatan dan kepuasan pengguna dengan memberikan sesuatu yang unik dan tidak pernah dilihat sebelum ini. Projek ini terutamanya bertujuan untuk kegunaan pada ciri keselamatan kenderaan. Seperti yang kita tahu di Malaysia kemalangan jalan raya akibat pemanduan bawah pengaruh telah meningkat dengan ketara dalam tempoh 10 tahun yang lalu. Disebabkan oleh tingkah laku cuai dari orang yang minum alkohol membawa kepada kehilangan nyawa bagi yang tidak bersalah. Industri Automotif Malaysia telah mencatatkan satu cabaran yang hebat untuk mengurangkan kemalangan jalan raya akibat ketagihan alkohol. Hasilnya, saya mula memandang ke hadapan mengenai isu ini, di mana saya menghasilkan projek ini yang bertujuan untuk mengelakkan kemalangan jalan raya akibat pemanduan bawah pengaruh sekaligus menjadi sumbangan kepada Industri Automotif kita di Malaysia. Dengan melalui semakan bahan rujukan mengenai pemanduan bawah pengaruh telah memperoleh lebih banyak pengetahuan di mana ia membantu untuk membangunkan projek juga. Walaupun teknik semasa untuk mengenal pasti tahap alkohol dalam nafas, saya telah memilih bahan dan komponen terbaik untuk membuat sistem litar untuk projek ini. Dengan membina reka bentuk litar projek ini pengekodan Arduino yang disambungkan kepada mikropengawal yang membantu untuk menjalankan sistem. Tambahan pula, sensor MQ-3 memerlukan kaedah penentukuran untuk menetapkan had ambang di mana apabila nilai analog mencapai had ia secara automatik mematikan sistem pencucuhan kenderaan. Oleh itu, sebagai output, beberapa data telah direkodkan daripada sistem menunjukkan tahap alkohol dalam nafas. Justeru dengan melaksanakan projek ini, dalam masa terdekat kita dapat melihat penurunan secara beransur-ansur pada kemalangan jalan raya akibat pemanduan dalam pengaruh.

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CHAPTER 1

INTRODUCTION

1.1 Background

As of 2021, there are numerous accident cases due to Driving Under Influence (DUI) had been reported in Malaysia. Most individuals are strongly influenced by alcoholism while in several industrialized nations the proportion of alcoholics has risen substantially over ten years. In these nations, alcohol-related fatalities have risen significantly. Even worse, the use of stump liquor or illicit alcohol manufacturing and drinking continues to cause numerous instances of blindness and even killing. Alcohol is one of the substances that the youth of today is considered to have significant issues. The incentives for alcohol use are difficult to generalize since many cultures had different attitudes about alcohol use. The individual gradually gives up, and alcohol is regularly used. Moreover, alcoholism is induced by the misunderstanding that it is beneficial for temporary respite from difficult living conditions. There is an outstanding need which is to identify the predictors of driving under the influence of alcohol (DUI) where mostly occurs among young adults, particularly women.[1]

It is a grave felony to go behind the wheel of a car, truck, motorbike or other motor vehicle after drinking. Drinking and driving is often referred to by DUI or DWI and includes the operation of an automobile with a level 0.03 percent plasma alcohol (BAC) concentration (refer to Malaysian law). Nevertheless, even a little quantity of alcohol may cause damage. With the Alcohol Level Ignition Locking system helps to automatic engine-locking system which able to detect the alcohol content on the driver, which then the ignition system will be

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automatically turns off if the alcohol content of the driver is more than the threshold level.[2] It's known with the assistance of Safety Hirarc that we can avoid DUI in the future years. In each workplace, hazards occur in various forms and must be recognized, evaluated and managed for workflow or traffic activities.

1.2 Problem Statement

At this century, automotive industry has posted a great challenge in order to reduce road accidents due to alcoholism, these happens to the rapid increasing of drunk and drive within a short period of time. The research showed that, over the same ten-year period, drinking accidents also resulted in 539 severe injuries from 2011 to 2018 and 595 mild injuries. In other respects, from 2011 to 2018, roughly 2.281 people were impacted by drunk driving accidents, about half died and about half had severe or mild injuries in Malaysia. As a consequence of rapid increase in the road accidents due to Driving Under Influence (DUI) the innovation of Alcohol level with Ignition Locking system might help to prevent from such accident to be occur.

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1.3 Project Objective

The aim of this project is to solve the problem of drunk and driver from being able to drive the vehicle that even dangerous for other road users as well. This project will also focus roughly on how to improve the road safety act. Based on the background and problem statement above, the main objectives of this project consist of:

I. To design a circuit of alcohol level detection that locks the vehicle system using Arduino.

II. To analyze the alcohol level that detects from human breath.

III. To prevent road accidents due to driving under influence (DUI).

1.4 Working Principle

The alcohol sensor functions in a similar manner as this, in essence. In the selection position of the vehicle, there is an alcohol detection sensor will be placed. A microcontroller unit (MCU), which serves as the brain of the system. The system is divided into two sections: one for the detection of objects and another for the control of the various components of the automobile. When the driver sits down, the sensor activates and transmits an anomalous alert to the driver, allowing him or her to detect the presence of alcohol. Then the detecting process starts, and the Liquid Crystal Display (LCD) displays the level of alcohol that has been ingested. If the alcohol level is detected in a regular manner, the vehicle may be able to start. If the vehicle senses that the driver has consumed more alcohol than is allowed, it will not operate or turn on the ignition of the vehicle.

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The system produces an output depending on the amount of alcohol in the driver's breath, which is detected by the sensor. If the alcohol level is higher than the stated limit, automatically the reader will perform a mechanical check-up on the unit. If the reading is greater than the threshold, the microcontroller shuts off the ignition of the vehicle. In order run the system there will be a software component includes the programming and the source code which is implemented via the (MCU) microcontroller unit.[3]

1.5 Scope of Project

Further study on prevention system in order to reduce driving under influence (DUI) is to create a better system that actual prevents the driver from driving the vehicle. Thus, this project is what capable of detecting the alcohol from the breath, where it doesn't detect any drug contain substance. Hence, it is clearly knowing that this ignition locking system only detects alcohol from human's breath. As time progresses, designers and engineers will be able to come up with a better solution for these systems, which will be beneficial for all upcoming vehicle models in the future. Due to increase safety concerns in the automobile industry about road accidents, future innovations on alcohol detection systems will add more functions to the system that will brings in more efficient.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, introduce about the alcohol detection system which has been using since decades ago which comparable with this Alcohol level ignition locking system. This part also covers about how Malaysian law makers and automotive industries have overcome such drunk and driving issues so far. The types of alcohol detectors that used by Malaysian road safety act such as Breathalyzer, Intoxilyzer and Alcosensor have influence on the life style of public. By establish the smart alcohol detecting system, will create a better awareness among drunken driver also public and the polices of course. This project will improve the Malaysian road safety act in order for a safer road environment in future.

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2.2 How Alcohol Can Dull Human Sense and Reflect

The incidence of alcoholism in certain industrialized nations has risen significantly, making it a national issue. In these nations, alcohol-related fatalities have risen significantly. Furthermore, the use of marijuana or unlawful combinations and alcohol is still blindness and even death. For instance, several nations ban alcohol use until a child reaches a particular age. Despite such attempts to decrease alcoholism, it remains a concern, particularly among young people.[4] Furthermore, the use of alcohol, marijuana, and other drugs, doesn't matter even a small dose, could impairs the nervous system functions, dulls the senses, and ended up slows

down cognitive processes.[5] Alcohol has become one of the substances that the new generation knows to create many severe issues. The motives for use of alcohol are difficult to generalize since various cultures have different ideas of intake of alcohol. Thus, alcohol is a simple and consumable biomolecule yet its excessive consumption disturbs numerous biological pathways damaging nearly all organs of the human body.[6]

Basically, everything starts with the brain, which is the control center of the body. This enables you have fun, acquire new information and concepts, and experience a variety of emotions. In speaking, our brains can handle things from these sensory organs that touch, sight, taste, smell and hear. There is also a certain portion of our brains which ensures that the essential life functions, like breathing and keeping a steady pulse, continue, even if we are sleeping.[7]

Well, following alcohol use, there are certain consequences on our spinal cord. The body control center is especially sensitive if all the body systems experience the impacts of alcohol. This is because alcohol may readily cross the blood stream, which leads to axons direct. Once alcohol affects these cells, instant alterations take place, which will most likely lead to changes in human behavior. Moreover, even at the low moderate doses consumed, ingestion of the widely used recreational drug alcohol (ethanol) able to impact the cognitive and emotional processing.[8]

Our cerebral cortex takes care of information via the senses, motor control, thought, comprehension and reason. Well, that mechanism, in other words, can also regulate emotion. Alcohol is a cans toxin, where this implies that alcohol reduces the excitement of nerve cells in the brain and makes them progressively slow down. Generally speaking, people often believe that alcohol is a "pick-up" or an energetic experience since it makes the user less reserved and more lively. This is because the first regions that are influenced by tiny quantities of alcohol are

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those involved in suppressing actions that may subsequently enhance animation, increase speech and improve sociability. But what really occurred was that there were numerous signals that slowed the memory progressively. Well, here are a few symptoms:

- Speech that has been altered

- Uncertainty about the future

- Reaction time is slowed.

- The hearing has been postponed

- Reduced visual acuity

- Muscles that are weakened

- A hazy recollection

This is exactly how the activity of the brain slows down, and it is dependent on a variety of factors. The amount (number) and speed with which a person drinks are important factors, just as they are if other drugs, such as marijuana, have been ingested. Your physical characteristics such as height, weight, and gender, as well as your genetics, have a big impact. If you come from a family that abuses alcohol, you are more likely to develop problems. [9]

That is, after all, why drinking may be harmful. It is clear that alcohol has an effect on practically every part of the human brain, as seen by the diagram above. Because alcohol intake causes the different parts of the brain's structure to slow down, young individuals are not very good at maintaining good behavior. Individuals who consume alcohol may be able to do some behaviors while under the influence of alcohol.

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