



**POLITEKNIK**

**SULTAN SALAHUDDIN ABDUL AZIZ SHAH**

**AUTOMATIC HAND WASHING MACHINE FOR  
HOSPITAL USE DURING PANDEMIC**

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**JABATAN KEJURUTERAAN ELEKTRIK**

**SESI 2: 2021/2022**

# **AUTOMATIC HAND WASHING MACHINE FOR HOSPITAL USE DURING PANDEMIC**

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This report submitted to the Electrical Engineering Department in fulfillment of the requirement for a Diploma in Electrical Engineering

**JABATAN KEJURUTERAAN ELEKTRIK**

**SESI 2: 2021/2022**

## **CONFIRMATION OF THE PROJECT**

The project report titled "Automatic Hand Washing Machine for Hospital Use During Pandemic " has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

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“I acknowledge this work is my own work except the excerpts I have already explained to our source”

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## DECLARATION OF ORIGINALITY AND OWNERSHIP

**TITLE : AUTOMATIC HAND WASHING MACHINE FOR HOSPITAL USE DURING PANDEMIC**

**SESSION: SESI 1 2021/2022**

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2. I acknowledge that 'The Project above' and the intellectual property therein is the result of our original creation /creations without taking or impersonating any intellectual property from the other parties.
3. I agree to release the 'Project' intellectual property to 'The Polytechnics' to meet the requirements for awarding the **Diploma in Electrical Engineering** to me.

Made and in truth that is recognized by;

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In front of me, **KHAIRUL NAPISHAM BIN )**  
**ABD RAZAK (Click here to enter text.) )**  
As a project supervisor, on the date: **KHAIRUL NAPISHAM**  
**BIN ABD RAZAK**

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## **ABSTRACT**

The Automatic hand washing machine initiative aims to support people in limiting the spread of Covid-19, germs, and bacteria in hospital. Direct contact at the sink and a lack of community awareness about adequate hand washing can transmit the virus and bacteria. The research's objective is to build a touch-free handwashing device that will aid in resolving the issue of preventing people from contracting the virus in hospital. The project incorporates a soap, water, and tissue dispenser to ensure proper hand washing. After placing a hand on the sensor, the soap and water was released simultaneously to encourage user to use soap. The water will be released afterwards for washing the hands. The tissue will spin in order to dry the hands. This study successfully showed a functional water, soap, and tissue dispenser in a touch-less system that is acceptable for use in hospital.

**Keywords: Covid-19, bacteria, hospital, touch-less system, microcontroller**

## **ABSTRAK**

Inisiatif mesin basuh tangan automatik bertujuan untuk menyokong orang ramai dalam mengehadkan penyebaran Covid-19, kuman dan bakteria di hospital. Sentuhan langsung di singki dan kurangnya kesedaran masyarakat tentang mencuci tangan yang mencukupi boleh menularkan virus dan bakteria. Objektif penyelidikan adalah untuk membina peranti basuh tangan tanpa sentuhan yang akan membantu dalam menyelesaikan isu mencegah orang daripada dijangkiti virus di hospital. Projek ini menggabungkan dispenser sabun, air dan tisu untuk memastikan cuci tangan yang betul. Selepas meletakkan tangan pada sensor, sabun dan air dilepaskan serentak untuk menggalakkan pengguna menggunakan sabun. Air akan dilepaskan selepas itu untuk mencuci tangan. Tisu akan berputar untuk mengeringkan tangan. Kajian ini berjaya menunjukkan dispenser air, sabun dan tisu yang berfungsi dalam sistem tanpa sentuh yang boleh diterima untuk digunakan di hospital.

**Kata kunci: Covid-19, bakteria, hospital, sistem tanpa sentuh, mikropengawal**



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# CHAPTER 1

## 1 INTRODUCTION

### 1.1 Introduction

Coronavirus, also known as covid-19, was a virus that wreaked havoc on the world in early 2020. The virus, which spread around the world, was named coronavirus. It is expected that the first coronavirus would be discovered in China before the end of the year 2019. The World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern on January 30, 2020, and declared the virus a pandemic on March 11, 2020. The entire world is currently battling against the coronavirus, and Malaysia is one of the countries that is also fighting against the virus. According to the findings of the study, people can become infected with coronavirus by coming into contact with a surface that has been contaminated with the virus and then touching their mouth, nose, and eyes. As a result, washing hands often with soap and water is one of the most effective ways to prevent the transmission of the coronavirus.

Studies have shown that the coronavirus virus may be spread to people's mouths, noses, and eyes after they have touched a surface contaminated with it. One of the greatest strategies to prevent the transmission of the virus is to wash hands often with soap and water. In this scenario, the initiative is aimed towards people in hospital to use such as doctor, nurse, patient and public. A hospital is a health care institution providing patient treatment with specialized health science and auxiliary healthcare staff and medical equipment. Proper hospital cleanliness is critical in preventing patients from contracting serious illnesses and diseases, as well as preventing germs and bacteria from spreading to visitors and out into the general population. In this case, hospital is the primary place for any Covid-19 concern. Hence, a perfect hygiene must be implemented to avoid any harm. Nowadays, most hospital and its facilities still utilise a standard faucet for sinks or a single automated faucet without an automatic soap dispenser and use a manual soap and tissue dispenser or vice versa. In this situation, it is unsanitary and out of date. This sort of issue must be addressed in order to prevent the spread of viruses and germs in the washing area.

The goal of the project is to develop a touch-free system that will dispense soap and water to allow users to wash their hands. The project is titled an automatic hand washing machine that concluded Water/Soap Dispenser and Tissue Dispenser. This project is specified for everyone uses in hospital. The steps that must do to get the water and soap to start flowing is present the hands in front of the sensor. The system also includes a tissue dispenser, which allows people to dry their hands after washing their hands. The Arduino Uno, an ultrasonic sensor, a water and soap pump, and a

power supply are the primary components of the project. As a result, the idea aims to discourage people from touching the sink, which will assist to decrease the spread of coronavirus and germs in hospital.

## **1.2 Background Research**

Both bacteria and viruses are microscopic creatures that can infect humans and cause disease. While these bacteria share some traits, they are also rather dissimilar. Bacteria, on the other hand, are often much larger than viruses and can be observed with a light microscope. Viruses are approximately 1,000 times smaller than bacteria and can be seen with an electron microscope. Bacteria are unicellular organisms that reproduce sexually in isolation from other organisms. Viruses cannot multiply without the assistance of a living cell.

Coronavirus or covid-19, a virus that swept over the world in early 2020, was the cause of a global pandemic. In China, the first coronavirus detection is expected around the end of 2019. It was stated by the World Health Organization (WHO) on January 30, 2020, that the outbreak of Public Health Emergency of International Concern would be declared a pandemic on March 11. Coronavirus is a global threat, and Malaysia is one of the countries currently combatting the virus. People can contract coronavirus by touching contaminated surfaces and then touching their mouths, noses, and eyes, according to the study. One of the greatest strategies to prevent the spread of the coronavirus is to wash hands often with soap and water. However, where everyone touches the sink to get the water flowing, the virus can spread to everyone who touches the sink if one person has coronavirus infection. People can contract coronavirus by touching contaminated surfaces and then touching their mouths, noses, and eyes, according to the study. As a result, one of the best ways to prevent the spread of coronavirus is to wash hands frequently with soap and water.

## **1.3 Problem Statement**

The problem for the statement is most hospital still use the normal faucet for sink, manual soap dispenser and tissue roller in toilet and any healthcare facilities. This is not hygienic as it needs a touch of body parts to use it. Therefore, this type of matter needs a new system and improvement which is an automatic hand washing machine (that included water, soap, tissue dispenser together) .The modifications that needed to be done is a faucet that can detect a hand with sensor and automatically dispense a water, soap, and tissue. If this system invented, it is easy to do a proper hand-washing technique. Doctors, nurses, visitor, hospital staff and public are the main role that involved in this new system. It is because hospital is a public place that can visit by many people.

## **1.4 Research Objectives**

- Provide an easy hand washing machine with 20 seconds timer for everyone.
- Helps to prevent and minimize the bacteria and virus spread out around the hospital to provide a perfect hygiene.
- Demonstrate a proper hand washing procedure.
- Helps to monitor and reduce water consumption.

## **1.5 Scope of Research**

This project is to develop an automatic faucet that is user-friendly and easy to plug in regular water pipe for standard hand-washing routine. The faucet utilized HC-SR04 sensor to detect presence of hands that would automatically commence the hand-washing process. First, the faucet will dispense soap and water simultaneously, then it will dispense only water for hand-washing process and finally followed by dispenses tissue. This project also force user to use soap. It is because the only way to get the flowing water is by dispensing the soap first. For example for this process; First, user presence the hands on the faucet sensor and the faucet will dispense the soap and water together first. The function of this is to make the soap become foam and lather. Then, user needs to lather hand with soap and water and scrub the hands for 20 seconds until the faucet will released water automatically once more. The timer will mark by buzzer and LED. So, user no need to worry. Then, user can present the hands on tissue dispenser sensor to get tissue for hand-drying process. Furthermore, the sensor also was marked by buzzer's sound and LED's light will change its colour once the sensor detects the presence of hands.

## **1.6 Project Significance**

As maintaining a cleanliness and hygiene such as washing hand is important to prevent the transmission of virus and bacteria in hospital has given rise to an idea to create an innovation known as 'Automatic Hand Washing Machine for Doctor in Operating Theatre'. The importance of this innovation is to encourage a right-hand washing technique that can perform by many people. This innovation is created using the ultrasonic sensor component that will function when it is detecting the presence of the hands. The buzzer will be beeping once the sensor detects the hands as a notice while LED will change the colour between red and green which is red for in-use and green for available. Also, it has a timer feature for 20 seconds to encourage people to scrub hands properly.

## 1.7 Chapter Summary

The project's purpose is to raise awareness among the hospital community about the need of hand washing in hospital and to ensure that everyone can do their part to prevent the spread of viruses such as covid-19 and bacteria. The use of a touch-free system for washing hands can be extremely beneficial in preventing the transmission of viruses and bacteria that can infect people through contact with contaminated objects or surfaces. During the same time, doctors may ensure that their hands are free of bacteria and viruses when they are working in the operating room. Furthermore, because hospitals and healthcare facilities consume such large amounts of water, it is anticipated that they will face increased pressure to develop methods and systems that would assist them in reducing their usage. Fortunately, this project can assist in reducing water consumption to the greatest extent feasible because it has a function that restricts the amount of water that can be used in a single use. Those issues will be resolved as a result of this innovation, which will result in the development of a new automatic appliance that uses a sensor for hand washing to avoid the transmission of viruses and bacteria while also reducing water and soap usage in the operating room. Finally, this innovation concept will expand the use of technology in the future and will have the potential to become a high-tech sink in hospital.