

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF A PROTOTYPE
SMART WASTE BINS**

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Dissertation submitted in partial fulfillment
of the requirements for the degree of
Diploma
(Mechanical Engineering)

College of Engineering

Feb 2023

ABSTRACT

With the ever-increasing population, urbanization, migration issues, and change in lifestyle, municipal solid waste generation levels are increasing significantly. Waste management has been a crucial issue to be considered. The current smart bins in market that are used not sophisticated enough to achieve robust and efficient waste management mechanism. Hence, there is a need to improve the current smart bins to work more efficiency by using Ultrasonic sensor and Arduino system. Through this project, student is required to develop an Arduino system and design a new smart bin integrated with an Ultrasonic sensor HC-SR04 with Arduino by using state-of-art SolidWorks 2019. The use of sensors on this bin will detect the user holding the trash and automatic the dustbin door will open. Other than that, the buzzer that has been connected to the Arduino will emit a sound when it detects there is garbage dumped outside the bin. The designed smart bins will be fabricated (prototype) as a proof of concept. Analytical and finite element analysis of the critical parts shall be carried out. This project shall assist the user by reducing energy required with the reducing the operation time.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Dr. Wan Muhammad Syahmi bin Wan Fauzi .

Finally, this dissertation is dedicated to my father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The issues linked with rising solid waste are rapidly becoming out of control in Asia's developing countries. Despite this, most countries continue to prioritise fast economic growth while paying little attention to waste management. This section addresses Asia's waste management shortcomings and emphasises the need for more international collaboration in fighting the challenge[1].

Smart bins can distinguish between various types of trash. A smart system inside the container achieves this by combining sensors, image recognition, and artificial intelligence. They are made up of IoT-enabled sensors that operate as real-time indications of whether or not the bins are full, allowing the waste collection schedule to be customised accordingly. The current smart bins in market that are used are not sophisticated enough to achieve robust and efficient waste management mechanism. The product produced is more focused on small scale such as in the home, and around the hospital area. It is more geared towards small -scale placements so that these small scales are able to work efficiently and give a big impact to large-scale placements[2].

Apart from their 'likes to eat,' the group is also infamous for wasting food, whether it is food they have prepared themselves or food they have purchased, which often surpasses their needs. Food waste is divided into two categories: 40% unavoidable waste, such as bones, vegetable stalks, and fruit skins, and 60% avoidable waste, such as expired food, spoilt before cooking, and spoiled before eating. Domestic families waste the most food, at roughly 38%, compared to the wet market, restaurants and hotels[3].

In fact, the study discovered that people in this country frequently throw away uneaten food, despite the fact that roughly 20% of trash discarded can still be eaten and avoided being discarded. It is no surprise that food makes up 45% of solid trash in landfills across the country. Malaysians' food waste culture is a serious problem that must be addressed urgently. It is necessary to change society's thinking so that it does not waste, much less throw away food[3].