

**UNIVERSITI TEKNOLOGI MARA**

**MOBILE IOT-ENABLED WASTE BIN  
WITH REMOTE CONTROL**

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## **ABSTRACT**

Waste management describes a set of system and process for monitoring and managing amount of waste throughout its entire waste cycle, from the low of technology until it can disposal efficiently with advanced system and the main crucial of waste management problem is the system of waste management used for every generation is traditional, so it not possible to manage and collect all type waste effectively. The main objectives of this project are to design an automatic waste bin by using Arduino uno as a microcontroller and to develop a user-friendly mobile application by implementing Internet of Things (IoT) technology by including NODEMCU ESP 8266 as a Wi-fi module and Blynk software to remotely control automation waste bin. Furthermore, the development purposes to validate the Mobile IoT-enabled waste bin with remote control performance in real-world environments. This study explained a project that is combined with a microcontroller-based Arduino uno board and is connected to ultrasonic sensors which its function to measure the percentage amount of waste through into bin, and IR sensor is integrated to open the bin's lid automatically which included mechanism part, servo motor. Then, the movement of bin is controlled and connected with NODEMCU ESP 8266 (Wi-Fi Module) to give self-instruction through mobile application with Blynk app, however they are for input sensors. For the output sensor, such as a servo motor is functioned as the mechanical of opening bin's lid, an LCD is displayed the percentage of bin's capacity, and buzzer is triggered a sound when the capacity in the bin is full. The device is controlled its movement by a mobile application, and the lid of the bin opens in response to motion from humans. The future work will be happened is the device's user-friendly interface the smartphone with remote-control capability, and the automation waste bin functionality and its full operation therefore it will ensure a valuable and long-lasting waste management solution in urban environment.

**Keywords:** Automation Waste bin, Arduino uno, Waste management, NODEMCU ESP 8266, Mobile Application

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# CHAPTER ONE

## INTRODUCTION

### 1.0 Research Background

Waste management system has become a bigger issue in Malaysia as the amount of waste generated. Malaysia generates over 30,000 tons of municipal solid waste (MSW) per day, which equates to 1.17kg of waste per capita. Food waste creates the majority of MSW components, such as plastic, paper, mixed organic waste, and others. The amount of waste discarded in Malaysia has steadily increased alongside the country's population growth, and most of the waste ending up in landfills. According to the National Solid Waste Department, Malaysia has 165 landfills, eight active landfills, and three passive landfills for materials such as sand and concrete. Malaysia has a recycling rate of approximately 31%, which is lower than neighbouring country such as Singapore, Taiwan, Korea, and Thailand [1]. With the capabilities provided by the specific project, it is developed for contributing to the reduction of landfill waste and improve waste bin technology through the implementation of remote control that integrated with Internet of Things (IoT) from the waste bin management location's headquarters. Consequently, the country recognized as a tropical nation, namely Malaysia has an opportunity to become one of the most hygienic countries in ASEAN with less amount of waste.

The purpose of the project about Mobile IoT-Enabled Waste bin with Remote Control is to apply the concept to the real-world applications and optimise user operations when it concerns throwing trash in a waste bin that can be controlled by a mobile application by designing and developing innovative technology that is integrated with an Internet of Things system. In realistic terms, the system facilitates the comfortable for consumers to dispose of waste by automatically opening the bin's lid when they touch the sensor. The waste bin's front has messages that the user may view the indicating its current capacity and status either its open or close.

In addition, an alarm sound sends out to the user to empty the waste bin and get dispose the trash into a larger waste bin when it fills up completely. By enabling users to transmit desired