CHAPTER 6
SMART TRASH BIN CONTROL TO PREVENT ANIMAL DISTURBANCE

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6.1 INTRODUCTION

Trash bin is an essential tool for human daily activities. It can be found everywhere and very useful in keeping the city clean. However, littering is a common issue that occurs frequently. Litter is defined as any type of rubbish strewn in little volumes in inappropriate locations. It adds up over time. It also paints a negative picture of a location. Having said that, littering is not only done by humans but also by animals especially monkeys. This is because, a lot of forest area have been developed into urban area.

This effects the animal's ecosystem and they tend to target trash bin as their food resource. Based on that, the smart trash bin project is important because it may help to prevent the disturbance of animals and tend to keep the environment cleaner. Furthermore, the aim of this project is to create a system that is advanced, user friendly and also affordable by the consumers. In order to accomplish the project, a lot of previous research studies have been observed and the ideas have been analysed.

A study has been carried out to implement artificial intelligent (AI) that automatically catches a falling trash (Cheng et al., 2020). In this study, Arduino and NVIDIA Jetson Nano used as the underlying

hardware to develop AI smart home trash cans based on artificial intelligence technology. However, this system only can be utilised inside the home. Besides that, another study has been carried out which able to segregate trash and send alert to the user whenever the trash bin is full (Dasari et al., 2021). In this study, Raspberry Pi and IoT based system have been utilised. However, this system can only send alert if the trash bin is full, but it won't be able to send alert if the trash bin has been breached by an animal. Therefore, a smart trash bin that operates autonomously with human detection will be presented in this study to ensure that there is no animal disturbance towards the trash bins.

Animal encroachment and even attacks can be exacerbated by litter from food and beverages. Animals are always on the lookout for food, and when we trash our food waste, the animals become attracted and leave their native habitats. The most common animal disturbance are monkey and cats as they can reach the trash bin easily compared to other species of animal. Therefore, trash bin without any locking mechanism would be easy for the animals to reach it.

Although locking mechanism may sound useful, sometimes it's very inconvenient for the consumer as they need to unlock and lock whenever they use the trash bin. Followed by that, the user might also forget to lock the trash bin which may end up in the animal's hand. An automated trash bin which can lock and unlock by itself with the help of image recognition to differentiate between human and animal would be useful for the consumer. This may prevent the animal disturbance.

6.2 PROCEDURES TO RUN THE SYSTEM USING LAPTOP INTERFACE

Few configurations are required for system operation. The Raspberry Pi system cannot function without an output display. In this project, however, the Raspberry Pi output may be viewed via the laptop interface. There are various procedures required to use the laptop with the Raspberry Pi board.

6.3 FINDING THE IP ADDRESS

Figure 6.1 below illustrates the interface of the Advanced IP Scanner application. It displays a typical scan result, showing the IP addresses of devices detected on the local network, along with additional information like the MAC addresses and device names. This tool is particularly useful for network administrators and users troubleshooting connectivity issues or identifying devices in a home or office network.

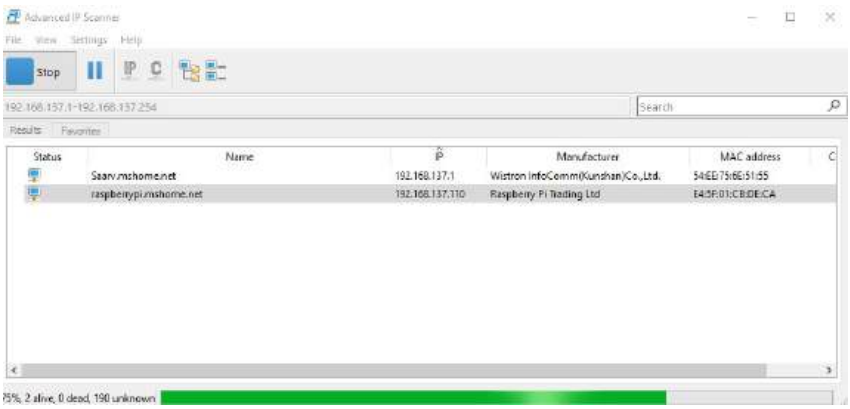

Figure 6.1 The advanced IP scanner application

6.4 SSH CONNECTION PROCESS

Mobaxterm must be installed on the laptop in order for the Raspberry Pi system to function. Mobaxterm is a remote desktop solution that provides organisations with access to a number of networking capabilities, such as VNC, RDP, and FTP, as well as a selection of UNIX commands for managing tasks on remote Windows PCs (Namala et al., 2016). After collecting the IP address from the Raspberry Pi, a new session should be formed in the Mobaxterm menu. Then, within the new session, the SSH option must be selected. SSH is used to encrypt and authenticate all connections. SSH checks the devices themselves instead of requiring a password to make a connection between a client and server. As seen in Figure 6.2, the Raspberry Pi's IP address must be entered into the remote host in order to establish a connection.