

**UNIVERSITI TEKNOLOGI MARA**

**IOT-BASED SMART LUGGAGE  
CARRIER FOR AIRPORT  
CONVENIENCE**

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## ABSTRACT

The aviation industry is one of the areas which have a solid potential to benefit from the Internet of Things (IoT) and its technologies. At the same time, the logistics system is believed to be very important for many industries and business solutions to solve transportation problems and fix all expenses, including in the airport environment. Airports are increasingly implementing new technologies in their systems to make travellers' journeys more enjoyable and smoother. Currently, airports are using the manual trolley as an alternative to help travellers' manage more than one piece of luggage for their trip. However, dragging heavy luggage for a long distance could be tiresome and challenging, especially for old folks. This project presents the solution for luggage management without human intervention in an airport. The Smart Luggage Carrier can carry loads and follow the user simultaneously with IoT implementation. This project's primary objective is to reduce human effort in handling luggage and increase their productivity at the airport. This project also applies the use of a vibration sensor and an ultrasonic sensor to increase the carrier's efficiency to secure and follow the user. To effectively secure the luggage while the owner's dismissal, a feature of sending an alert message to the owner if theft happens is also highlighted. On top of that, there will be a website to act as User Interface. This website will transfer instructions from the user to the server, then from the server to the microcontroller. In a nutshell, a prototype system has been developed and successfully tested. Including usability and performance testing to ensure the system can perform well in real time. The usability testing results showed that the sensors serve the purposes of detecting distance and vibration to provide a smart feature. The microcontroller is also well functioned to send alert messages and connect with the server. As for the performance testing, the results indicate that the website is not ready to be run on all browsers but will perform better in Mozilla Firefox browser version 89 in Windows 10 and 7 rather than Google Chrome and Microsoft Edge. However, the website is more compatible using Google Chrome version 91 and Microsoft Edge version 91 for macOS Big Sur. Hence, future researchers can enhance the project to function efficiently and smoothly.

***Keywords: Airport trolley, Firebase, Internet of Things, Sensor, Microcontroller***

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# CHAPTER 1

## INTRODUCTION

In chapter one, all related information that will provide a view regarding this project was stated and explained. The details will allow a better understanding to develop strategic planning for the project implementation.

### 1.1 Background of Study

Debajyoti et al. (2018) interpreted the Internet of Things (IoT) as the physical network of things combined with electronics, software, sensors, and network access that allows data to be collected and shared by these things or objects. In almost all fields, these embedded devices' interconnection is expected to result in automation while also enabling innovative capabilities such as a smart grid. Hence, with the assistance of various existing technologies, these devices can collect valuable data and then autonomously flow the data between other devices. This statement can be supported by Bouyakoub et al. (2017) research paper as he mentioned that the IoT provides a platform for these smart devices allowing them to interact and communicate using existing Internet standards. Indeed, the aviation industry has now become the primary means of travel. It can provide an alternative and fast track to a destination over the sea. Referring to SITA (2015), airline companies and airports need to improve their services to enhance customer satisfaction by pinpointing the passengers and their baggage wellbeing, guaranteeing their safety, and delivering help when needed. These are a few forms of facilities that they should provide and focus on. Even though airports' facilities nowadays are considered bearable, there is still room for changes towards excellent services and better security with more intelligent features appropriate for the modern era. Therefore, the development of IoT-based Smart Luggage Carrier for Airport Convenience was an effort to