CHAPTER 1
INTRODUCTION

1.1 Background

According to the Badan Pusat Statistik (BPS), Indonesia will have 148,212,865 automobiles on the road in 2022. In 2022, motorcyclists will continue to dominate the private vehicle market in Indonesia, accounting for 125,267,349 units. With a total of 17,175,632 units, the new passenger automobile moved up to second place [1].

The growing population of each city in Indonesia has an impact on the high frequency of activities in the city center, such as places of study, schools, shopping malls, and university education, as well as increased need for transportation services. The issue of parking places for drivers who park their automobiles in the wrong location. This causes the road to narrow, resulting in traffic congestion during particular occasions.

Parking is a critical issue that must be investigated further because practically all outdoor activities require parking facilities. There must be appropriate parking space available. One of the reasons is that the greater the volume of traffic that flows towards or away from the center, the greater the demand for this car parking space. As a result, parking spaces must be available at the various activity locations. Furthermore, proper parking settings must be implemented because a chaotic parking lot arrangement will result in a variety of issues. On weekdays, for example, it is extremely difficult to locate parking at a shopping center in Jakarta. Drivers waste time looking for vacant parking spaces. This can be quite frustrating for all drivers, particularly those who are in a hurry. The lack of parking map and weather information are also very important for drivers, especially for drivers whose using the uncovered vehicle. Vehicle owners sometimes doesn’t know where they will park. This conditions can have an impact on the time wasted and material loss from vehicle owner. In addition to other problems, parking tickets manual payment system using ticket and regular payment — resulting

in long queues at checkout which also takes a long time [2]

Weather changes also has very broad impact on people's lives. The increase in the earth's temprature not only has an impact on increasing the earth's temperature but also changes the weather system which affects various aspects of changes in nature and human's life [3]. Unpredictable weather fluctuations make it difficult for people to plan ahead of time and anticipate weather changes when traveling. For individuals who will travel, especially those who will be operating uncovered vehicles, it is necessary to have knowledge and information about the weather [4]. So the author designing the weather monitoring to help drivers have information wether the parking area is rainy or not. This design is expected to be implemented to outdoor parking area especially. The information about weather changes expected to help driver to prepare themselves before arriving the parking lot.

In its application this system uses sensors to collect data. This information is transmitted across the device which extracts the relevant information and sends it to the ESP32 device which gives command instructions for the data to that particular device at the same time. Then arduino sends a signal to the servo motor along with the GSM module which then gives instructions and notifications to the user. When the user enters the parking area, this RFID card allows the user to get information about the available parking spaces as well as SMS notifications to the registered user's mobile number. The drawback of this system is that the driver has not been able to check the existence of available parking slots from a remote location [3].

This project proposes to create an Internet of Things (IoT)-based Intelligent Parking system that can book parking spaces and smart payments so as to improve parking management efficiency, save driver time, facilitate parking payments and reduce congestion. This project also providesthe weather monitoring system to help the users has more information about climate change. In its application this system uses sensors to collect data. This information is transmitted across the device which extracts the relevant information and sends it to the Arduino device which gives command instructions for the data to that particular device at the same time. [5].

Seeing from the problems that exist in the previous system, therefore the

author proposes to create an IoT-based Smart Parking application that utilizes Android Application technology, and ESP32CAM. This application is expected to make it easier for drivers because this application is accessed using a smartphone.

1.2 Problem Formulation

According to the background that has been described, the formulation of the problem to be studied is as follow. The lack of definite information media about the availability parking lots for drivers. The lack of information about parking lots quite a significant problem due to many drivers end up parking carelessly. The climate changes also had very broad impacts for drivers, because it will disrupt the activities of the drivers.:

1.3 Objectives

The objectives and benefits to be achieved in this research are:

1. Build an application for drivers by ordering parking spaces based on Internet of Things (IoT).
2. Create an application by combining Android Application technology and ESP32 CAM into a smart parking application.
3. Integrate android application and web database to find out available parking lot data
4. Provides a weather monitoring system in the smart parking application

1.4 Scope of the Work

Based on the problems described above, a broad picture of the dimensions of the problem can be obtained. Time and ability limitations make the writer need to define the problem clearly and focus, including:

1. The device is located at the entrance and exit bars of the parking lot.
2. Application provides 28 parking slots.
3. The system is a model simulation.
4. Application provides weather monitoring system.
5. Application can be viewed in real time.
6. Database using cloud.
7. Does not discuss network security.

1.5 Research Method

Research methodology is a technique for collecting data or facts which where be studied and finally used as material for analysis. The techniques used in this thesis research are as follows:

1. Literature Study

   Collecting several references needed to obtain information and data related to smart parking. References are obtained from related research and articles.

2. Discussion with the supervisor

   Discussions with lecturers were conducted to obtain solutions and additional information about the research conducted.

3. System Design

   Perform system design. This stage determines the structure according to the needs of smart parking.

4. Simulation

   Perform simulations on the smart parking system. It aims to find out errors or damage to the application.

5. Analysis and Evaluation

   Perform analysis and evaluation to get conclusions from the application.

1.6 Bachelor Thesis Organization

For the next writing systematics this final task is as follows:

- Chapter II BASIC CONCEPT

  This chapter provides the necessary background about the payment based smart parking system development and some reference systems.

- Chapter III SYSTEM MODEL

  This chapter provides a detailed description of the simulation and experimental model developed for the payment based smart parking system development.

1.6 Milestone

The following Table 1.1 shows the milestone list :

Table 1. 1 Milestone

No	Stages Description Duration	Implementasi Date	Milestone
1.	Study Literature About Smart Parking System Development	1 months	2024
2.	Construct Smart Parking System Development	2 months	2024
3.	Smart Parking System Development Analysis	1 months	2024