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ParkFinder: "IoT-Based Real-Time Parking System with User-Friendly  
Interface for Spot-Level Availability"

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## Abstract

This report presents the development of an IoT-based Smart Valet Parking Reservation System designed to address urban parking challenges through an integrated IoT solution along with back-end support using an AWS server. The system uses the back-end server of the AWS system to launch the system globally and lets users make reservations via the web interface. It utilizes the IoT ultrasonic sensors to detect the presence of availability of the parking slot with ESP32 microcontrollers connecting it to the back-end server. The RFID system is added to verify the user's identity upon arrival. A centralized AWS web hosting platform processes and presents this data along with a database setup to ensure efficient parking management.

Users can interact with a web-based interface to check real-time parking slot availability and make reservations in advance, making the valet process more orderly and reducing congestion at arrival points. To enhance security, the system includes an RFID-based access control mechanism that verifies user identity at the entry point and controls a servo motor gate for automated access.

The report explores the background and significance of proven smart parking solutions, which justifies the best technology for the project and details the system architecture through diagrams and code. Furthermore, the key development stages, the strength of the architecture, future security improvement of the architecture, and recommendations are discussed in the report. Last but not least, the legal, professional, and ethical considerations are examined alongside proven project management strategies.

# Table of Contents

1.0 Introduction .....	6
1.1 Problem statement .....	7
1.2 Project Objectives .....	7
1.3 Project Scope .....	8
1.3.1 In Scope .....	8
1.3.2 Out Scope .....	9
2.0 Literature Review .....	10
2.1 Platform IO .....	10
2.2 MQTT Broker .....	11
2.3 ESP32 .....	12
2.4 AWS cloud server .....	13
3.0 Methodology .....	15
3.1 Project Development .....	15
4.0 Legal, Social, Ethical and Professional Issues .....	19
5.0 Design Architecture .....	19
5.1 HC-SR04 Ultrasonic Sensor .....	20
5.2 ESP32-S3 Microcontroller .....	21
5.3 MQTT Broker .....	21
5.4. AWS Cloud Server .....	21
5.5. Web-Based Valet Parking System .....	21
5.5.3 Algorithms random choose slot .....	23
6.0 Implementation .....	24
6.1 IoT implementation .....	24

6.2 Database Implementation .....	32
7.0 Interface Design .....	33
7.1 User Interface Design .....	33
7.2 Admin Interface Design .....	38
8.0 Results .....	40
8.1 Testing .....	40
8.2 What went well? .....	41
8.3 What Didn't Go Well? .....	42
8.4 What Would Be Performed Differently? .....	43
8.5 Future Enhancements .....	44
9.0 Conclusions .....	45
10.0 References .....	46
11.0 Appendix .....	46
11.1 Trello Boards .....	46
11.2 User Requirements .....	51
11.3 Sprint Reviews .....	55
11.4 Stage Plans .....	63
11.5 Project Poster and Thumbnail .....	68
11.6 IoT integration code.....	68
11.6.1 Main.cpp.....	68
11.6.2 App.py .....	87