INTELLIGENT PARKING MANAGER

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Kertas ini membentangkan cara untuk sistem prototaip ("Intelligent Parking Manager") mempersembahkan informasi dalam bangunan berhenti kenderaan kepada pengguna. Pengguna dapat mengetahui maklum tentang status dalam bangunan berhenti kenderaan menerusi system prototaip ini. Litar dibina untuk kegunaan mengesan kenderaan yang memasuki kedalam atau keluar dari bangunan berhenti kenderaan dan menghantar isyarat kepada sistem prototaip. Sistem prototaip digunakan untuk mengesan isyarat yang dihantar dari litar dan membezakan kenderaan yang masuk kedalam atau keluar dari bangunan berhenti kenderaan. Selepas itu, sistem prototaip akan menghitung bilangan kekosongan berhenti kenderaan yang masih boleh diguna dan juga bilangan kekosongan berhenti kenderaan yang sudah diguna dan mempamerkan informasi ini kepada pengguna.
ABSTRACT

This paper presents an approach for the Intelligent Parking Manager system. Intelligent Parking Manager is an informative system that is able to provide the required information and status of the car parking building to the users. Users would be able to know the parking status of the building’s car park through the system prototype. Hardware (circuit) is designed to detect the car and send the signal to the system prototype. The system prototype designed will capture the signal or pulse that sends from the hardware and differentiate between the cars entering the building or cars exiting from the building. After that, the system will use the signal that is captured to calculate the vacant and occupied parking bays then display the result to the end user.
CHAPTER 1: INTRODUCTION

1.0 Introduction

The Intelligent Parking Manager is a system that gives information on the availability of parking lots to the users who enter a building’s car park. It is able to record the number of car entering and exiting from the building’s car park. It is utilized to manage the building’s car park in more a systematic way by providing real time information in the building’s car park to incoming cars to guide drivers in making proper decisions.

The parking lots in a building’s car park is limited, so the system will always display the number of vacant parking bays and the number of cars entering each floor for the purpose of letting the user know the availability of parking lots in the building’s car park to avoid the possibility of entering a building’s car park that is full.

1.1 Problem Statement

The problems that we encounter today in seeking for vacant park lots in buildings are:

i. Time wasting in order to find vacant parking bays

   Currently a building’s car park cannot provide accurate information to user if there is any vacant parking bay. So, it is difficult for users to know that whether there is any vacant parking bay in the parking building. This is due to users not able to gauge the situation inside the building’s car park. This is an inconvenience because they must enter the building’s car park in order to find whether there are any vacant parking lots.
It is a waste of time if they enter the building to find the parking lots when there are none.

ii. Absence of systematic management

Most of the management duties in a building’s car park are done manually by parking attendants. They provide a ticket to users entering a building’s car park. This form of arrangement is not systematic because it is very difficult for the parking attendants to check the availability of vacant lots in the building. By utilizing this system they can inform users of the building’s parking situation.

1.2 Objectives

The objectives of the project are:

i. To build an informative and convenient system which provides information regarding the building’s car park to users. The system should be able to give information regarding:
   - Occupied and unoccupied car park bays in each storey of the building.
   - The current status (whether full or otherwise) of parking bays in building.

   With the information above, users can save time in finding parking bays.

ii. To build a system that can manage the building’s car park in a more systematic way. It is efficient and time-saving if users can know the exact situation in the building’s car park before entering. The management of the building’s car park will be more systematic if users can make proper decisions and avoid unnecessary traffic jam in a building.
1.3 Scope
The scopes of the project are:

- This project is designed for a building’s car park.
- Design for a two storey parking building.
- User can set preferred parking bays.
- Helps to monitor cars entering or exiting a building and display the information to the users.
- Able to give the information of occupied and unoccupied parking bays in each storey. And the status (whether full or not) of parking bays in building.
- Hardware is designed specifically for use with the system.

1.4 Methodology
To view the problem as a system of cooperative object and to trace back directly to user requirements, the following structured sets of activities are required to develop the prototype of the system:

i. Specification and analysis
   - Concerns the project that will be developed, studies on features of the existing systems to help in providing insight on developing a useful system with good features.

ii. System design
   - Designing the multi-storey car parking guidance system based on analysing the needs of the requirement.
iii. System implementation
   - Produce the prototype of the multi-storey car parking guidance system using Visual Basic 6.0.

iv. System testing
   - Test the system for further improvement and identify possible bugs and monitor the performance of the system.

The methodology selected for developing this project is Object-Oriented Methodology and Unified Modeling Language (UML). Unified Modeling Language (UML) is a notation that uses graphical charts in specifying, constructing, visualizing and documenting the software system and its components.

1.5 Significance of Project
The system is designed for users who are searching for vacant parking bays in building. It helps the user getting real time information about car bays reserve in the building and helps them in making a decision to enter the building.

1.6 Expected Outcome
At the end of the project, it is expected to come out with a system prototype that is able to provide information about car parking bays available in car parking building and aiding them in making a decision to entering the building or not.
1.7 Chapter Review

Each chapter in this report will cover an aspect and outline of the whole system done.

Chapter 1: Introduction

This chapter will present a brief description on the entire project. The introduction of the multi-storey car parking guidance will be described in this chapter and it should be able to give readers a summary of this system. The methodology should also be stated and described here.

Chapter 2: Background

This chapter will present the background of the existing system of multi-storey car parking guidance in the market. It consists of a literature review of the existing system and it will be used as a guideline for developing the system.

Chapter 3: Requirement Analysis and Design

The requirement analysis is related to establishing the detail requirements specification for the multi-storey car parking guidance system that will be developed. The design of the system should meet the identified requirements from the analysis done.

Chapter 4: Implementation and Testing

This chapter will focus on the realization of the multi-storey car parking guidance system design by way of implementation. The behaviors of implementation should be described. The testing of the system is needed to ensure it performs as designed.
Chapter 5: Conclusion and Further Work

This chapter will conclude the whole system developed and outline for further work.
CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Comprehensive literature reviews are needed to gain enough knowledge to develop a new system. Studies on features of the existing systems will help in providing an insight to develop a useful system with good features. A car parking guidance is a system that provides guidance to users on the information regarding the car parking status so that the users can make a decision to find the available car park bays. This will help in providing good traffic management in a building’s car park.

2.1 Reviews on Existing System

There are two main types of car parking guidance being designed to manage the traffic for car park. They are:

i. Car parking guidance design for multi-storey car parking building.

ii. Outdoor Car park guidance that provides the car park information within the controlled area.
2.1.1 Car Parking Guidance Design for Multi-Storey Car Parking Building

2.1.1.1 Navigator Parking Guidance Information System

(http://www.appian-tech.com)

Figure 2.11: LED Display of Navigator Parking Guidance Information Systems Outside Building

Figure 2.12: LED Display of Navigator Parking Guidance Information Systems Inside Building
Figure 2.11 and Figure 2.12 shows the display of navigator parking guidance information system outside and inside parking building.

This system provides effective guidance and management for parking facilities. The system comprises easily-installed patented vehicle detection processors (VDP’s), variable message sign (VMS), control processor and management software suite. The vehicle detection processor count vehicle at entrances and vehicle exits and it will pass information to the control processor to display information on variable message signs.

The users can get the parking bay information from variable message signs. This product provides customers satisfaction, reliability, improved traffic flow and improved space utilization of car parking building.
2.1.1.2 Single-Space Recording in Multi-Storey Car Parks

(http://www.dambach.de)

Figure 2.21: Single-Space Recording in Multi-Storey Car Parks Monitor by USS 300

Single-Space Sensor

Figure 2.22: Single-Space Recording in Multi-Storey Car Parks Architecture
Single-space Recording in Multi-storey Car Parks is a system that can provide the car parking bays information in multi-storey car parking building in real time. Refer to Figure 2.21, the sensor in this system is used for the purpose of detecting the vehicles that enter or exit the building. The USS 300 single-space sensors are used in this system. Every parking bay in the building’s car park will be allocated a sensor on the ceiling above the parking bays. The sensor allocated will be used to detect the vehicles that occupy the current parking bays.

The USS 300 single-space sensor will be used in recording and evaluating the occupancy of each individual parking bay. In combination with the installation of traffic lights, the system is able to direct the person to a vacant parking bay.

Refer to Figure 2.22, up to 96 single-space recording sensors can be connected to a zone control via three lines, whereas any number of zone controls can be connected to a control centre for the administration of a multi-storey car park. In larger systems with numerous zone controls and a PC as a control centre, the zone control works as a data concentrator which passes its information on to the PC. The control centre (PC) will then control the complete system.