Dominican Parking Management System

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Abstract – *The proponents decided to develop the Dominican Parking Management System, where parking data pertaining to vehicles belonging to school deans, school officers, the SDCA school busses, and privately-owned cars can be accessed and managed as necessary, and only a system admin will be able to access the system. The study focuses on vehicles that enter and leave parking lots in St. Dominic College of Asia. Chapter 1 of the research mainly discusses the background of the study, the project's description, and the objective of the study. The project proposal will focus on the car parking management system at St. Dominic College of Asia. The researchers also stated the problem that the users encountered. It also tackles the main goal of the study and the scope, limitation, and delimitation of the study. In Chapter 2, the proponents show the review of related literature, related foreign and local studies, and locally-programmed systems. Also, the proponents consulted recent studies, books, and internet articles as references in developing the system. Chapter 3 discusses the methodology, feasibility, and flow of the system. Within this chapter, the proponents show how they used the waterfall methodology for developing the system, and how it is feasible through making a cost-benefit analysis. The system's flow will be interpreted with tables and charts. Chapter 4 tackles the result of the system`s evaluation, where it got an overall average of highly acceptable to moderately acceptable based on ratings from expert users and end-users. Chapter 5 discusses the summary of the system`s evaluation, wherein the proponents explained the reason behind the highly acceptable and moderately acceptable rate. It also has the study's conclusions and future recommendations for the developed system.*

Keywords – *Parking management, RFID, system design.*

Introduction

RFID parking management solutions were designed to efficiently control the entrance and exit gates of parking facilities within a wide range of reading distances and access speeds. In this study, RFID technology is seen as a solution to SDCA's parking problems. Using RFID readers, labels, computers, barriers, and software, all parking problems would be handled efficiently. In this system, software will handle the parking lot's management, control, transaction reporting capability, and operation tasks. Meanwhile, RFID readers, labels and barriers will control check-ins and check-outs within the parking lots.

The use of RFID technology reduces the amount of time required to perform circulation operations in parking lots. The most significant time-saving factors are attributable to RFID's capability to be read faster than barcodes and that several items in a stack can be read at the same time. The most notable benefit of using RFID parking management solutions is that vehicles can be permitted to enter or exit the parking facility without human intervention. In other words, instead of swiping an ID card or pushing numbers on a keypad, all one has to do is simply approach the gate, where RFID readers authenticate the vehicle and allow it to pass through (Hayes, 2009). This eliminates the need for parking attendants and avoids inconvenience to drivers, especially those who are too

short to reach a card swiper or keypad from where they are sitting and must routinely get out of the vehicle to make the parking gate open (Gallo, 2002).

The Dominican Parking Management System will be used to monitor cars going in and out of the SDCA parking lot. The process starts when cardholders tap their RFIDs at the gate, which directs them to the system database. This allows every car to know where to park for efficient and non-hassle parking (Panwar, 2011). The procedure is to decrease the need to manually log in cars that arrive and depart the parking area.

The Dominican Parking Management System is very smart to use, especially for parking facilities at St. Dominic College of Asia. It is also attainable in this generation because of modern RFID technology (Brains, 2008). The time bound is reachable because computers are made by factories nowadays, and quality analysts make sure their systems are ready to go and can be used properly.

Methodology

The proponents used Patrix's waterfall model (Patrix, 2012) as the basis of the system's System Development Life Cycle (SDLC). The first phase, Requirement Analysis, tackles gathering the system's requirements in order to identify the system's development timeframe. The second phase focuses on Design, where the system's overall architecture is identified. The third phase, Implementation, is where the data gathered is compiled and translated into the project output. Lastly, Testing and Maintenance focuses on the system's deployment.

Requirements. All possible requirements of the system to be developed are captured in this phase and documented in a requirement specification document.

System Design. The requirement specifications from the first phase are studied, and the system design is prepared. System Design helps in specifying hardware and system requirements and also helps in defining the overall system architecture.

Implementation. With inputs from system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality, a process referred to as Unit Testing.

Test. After each unit is tested, all the units developed in the implementation phase are integrated into a system. Post-integration, the entire system is tested for any faults and failures.

Maintenance. There are some issues which come up in the client environment. To fix those issues, patches are released. Also, better versions of the program are released to enhance the product. Maintenance is done to deliver these changes.

The proponents were able to develop the Dominican Parking Management System by using Visual Studio 2013 and VB.NET.

Results and Discussion

This chapter shows the results of the research project. This tackles the system's content, usability, efficiency, functionality, reliability, and security as evaluated by expert users and end-users.

To test the system, the proponents used the following criteria in the evaluation of the developed system.

1. **Content.** Refers to the visual content of the system. This had a rating of Highly Acceptable.
2. **Usability.** Pertains to the ability to use the system in an easier and understandable way. This had a rating of Extremely Satisfied.
3. **Efficiency.** Pertains the system's effectiveness in displaying information requested by the user. This had a rating of Very Satisfied.
4. **Functionality.** Refers to the range of operations that can be run on the system. This had a rating of Very Satisfied.
5. **Reliability.** Focuses on the ability of the system to perform tasks requested by the user under stated conditions. This had a rating of Very Satisfied.
6. **Security.** Refers to the ability of the system to organize and authorize its administrators for the system's security and integrity. This had a rating of Very Satisfied.

The proponents determined the system's rating through the computed results of its evaluation test from expert users and end-users. The researchers used the levels of satisfaction and respondents' frequency. Frequency in both end-users and expert uses was at 75%.

Conclusions and Recommendations

Conclusions. Based on the ratings given by the expert users and front-end users, the proponents conclude that the proposed system was effective.

Based on the above summary of findings, the proponents also concluded that:

1. The system was successfully developed and deployed, meeting all the requirements to implement the Dominican Parking Management System.
2. As a result of gathering the requirements, the proponents designed the system with a user-friendly interface for parking lot users and system administrators.
3. The system gave parking lot users and vehicle owners convenience with the help of RFID technology and a user-friendly system.
4. The system's rendered modules were tested, and they helped the system to succeed.
5. The system was turned over to the ICT department for its future development and maintenance.

Recommendations. By taking into account all the comments and suggestions given by the respondents, the proponents came up with the following recommendations:

1. The Dominican Parking Management Systems' drop-and-go module should send a short message the vehicle has been parked for 10 minutes. A second advising text message would then be sent if the 15mins drop-off limit has been reached, notifying the user that the vehicle must leave.
2. The Dominican Parking Management System should integrate a voice recognition module that will recognize the voice of the owner upon entry.

3. The Dominican Parking Management System should have a mobile application wherein the driver can use the app for securing a parking slot or for checking the slot availability. Upon entry, the system will detect if the driver reserved a parking slot through the mobile app.
4. The Dominican Parking Management System should also have a wireless sensor network. This is where upon the entry of a vehicle with an attached microchip, the parking boom will be automatically lifted up to allow the vehicle to pass into the parking area.
5. The Dominican Parking Management System could improve with a 3D mapping tool. Upon entry, a screen will automatically flash the available and unavailable parking slot locations and show the area where a vehicle can wait for drop-and-go.

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