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Online Car Rental System using Web-Based and SMS Technology

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Abstract

The motivation behind this research is the growing popularity of web-based systems and the need to explore the Short Message Service (SMS) technology that industries could tap into to enhance their services to the customers. This paper described a notification-based content alert and web-based system using SMS technology. It was specifically developed for the alert notification to the customers about the car rental information, and the availability of the car reserved. The main purpose of developing SMS-based content alert for car rental system is to reduce the cost and time consumed, which is beneficial to the car rental agencies and customers. Therefore, the system was designed automatically to send an alert SMS to the customers about the availability of the car reserved. This system was developed based on System Development Life Cycle (SDLC) using the waterfall model as a methodology. A user acceptance testing was conducted with thirty (30) respondents to determine the effectiveness of the system by evaluating the questionnaire which was categorized into three (3) parts includes user interface design, usefulness, ease of use and usability and alert system function. Results of the system evaluation showed that overall were satisfied with all categories respectively. Hence, the system using web-based and SMS technology is accepted by customers, convenient, economic and reliable method of notification for the car rental agencies.

Keywords: *Web-based system, SMS technology, car rental system, SDLC, user acceptance test.*

Introduction

Car rental or car hire agencies are private companies that provide short time leasing vehicles for a specified time with a fee to their customers. In Malaysia, car rental service increasingly becomes the preferred option for most people, especially among students in campuses and universities. This occurs because not all students can afford having their own vehicle and perhaps the university bus service doesn't always help. Besides, the raising taxi fares and inconsistent bus arrivals in Malaysia continue to discourage people from taking up the public transport. Therefore, car rental service continues to grow in Malaysia, hence it required an improvement and good monitoring system.

Many organizations used web-based system that can be integrated with SMS technology because most people often used mobile phone that gives convenience to the users who are familiar with SMS technology. The technology has been implemented into the wide-range different sectors, such as education (Song & Fox, 2005; Vera & Comendador, 2016; Verma & Gupta, 2013), health organization (Gurol-Urganci, de Jongh, Vodopivec-Jamsek, Atun, & Car, 2013; Wang & Andoh-Baidoo, 2017), government (Onashoga, Ogunjobi, Ibharalu, & Lawal, 2016; RoshanTharangga et al., 2013) and private sectors (Ghoreishi & Shajari, 2010).

Many revolutionaries have changed from manual to the online system, especially in the workflow and type of resources that are stored in the car rental services. The changed from the traditional car rental system to the digital system is predictable. Besides, at the end of 2006, total of car rental companies has more than six thousand around the world and in the year 2013, statistics showed that almost 2 million cars were rent in United States (Yang, Jin, & Hao, 2009). Currently renting services are given based on manual work, which includes a lot of time and resources required is also increased because each process requires different resources. Besides, the user will have to go manually at the centre or must first contact the car rental company for the desire vehicle. Therefore, the online car rental system integrated with SMS notification was provided and supported the customer for the reservation, assist management in knowing rental car inventory at a specified time and notify the customers about the availability of the car reserved, which support the satisfactory service to customer and support the company's operational processes.

The earlier studies shown that Management Information System (MIS) could be used to manage car rental, expected to accelerate the processes and services to customers (Busse et al., 2017; Li, 2013; Qurratul, 2012). Meanwhile, the used of the web-based system become a popular trend due to the services can be accessed remotely by using web browser and can be accessible from anywhere in the world. Besides, a mobile phone is an essential medium to communicate, interact or device to gain knowledge (Asmara & Aziz, 2011). Nowadays, SMS technology can be implemented with the web-based system in the more convenient way. SMS text message is also possible to be send from computer to recipients by using GSM modem and SMS gateway as a transmitting device.

With the growing popularity of mobile phones and SMS, the technology should be seriously considered because most people have high usage of mobile technologies. It becomes a need of the generation as it makes the work faster and hazel free. The challenge will be to determine the nature of services that the car rental agencies should deliver via SMS and to come up with solutions to their various challenge mobile phone technologies currently present to ensure satisfactory services to its customer. Furthermore, many car rental agencies are still using traditional methods by manually notifying the customer using phone calling. Hence, it considered time-consuming and the worst case, the information is not delivered to the customer at the right time. Most of the car rental agencies have no automation system to notify the customer to return the car and take the reservation of the car when it is available. Therefore, taking this into consideration, the service at the car rental agencies is enhanced through the development of the web-based system integrated with SMS notification for making it simple for the customers.

Methodology

The web-based car rental system integrated with SMS technology has a very user-friendly interface. By using this system, employees can manage bookings, payment, vehicle issues and SMS notification to the customers within a few clicks only. The new data can be added or an existed data can be edited or deleted too by administrators. Thus, there is no delay in the availability of any information, whether needed, can be captured very quickly and easily. For security purposes, all customers need to create a new account before logging in or he/she can log into the system with his/her created account before they can make a reservation for a car. Then, the customer will be notified the availability of the car reserved through SMS. This system becomes very helpful for employees, administrator and customers. Figure 1 shows the car rental system architecture for the proposed system.

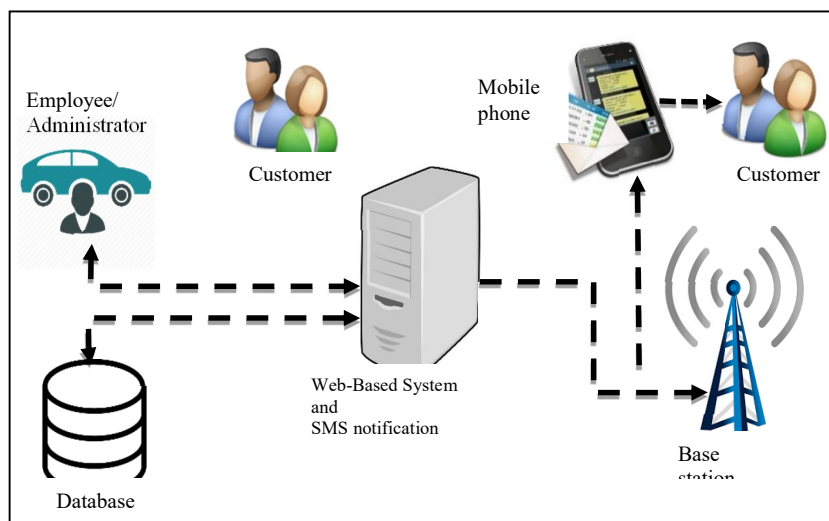


Figure 1: Car Rental System Architecture

The Software Development Life Cycle (SDLC) was used to develop the web-based system and SMS notification. SDLC is a framework that describes all activities and processes in a software development project. The process is associated with the waterfall model which consisted of five phases such as planning, analysis, design, development, and evaluation.

i. Planning.

In this phase, all information, data and problems about the project were gathered by read articles, journal, and thesis from previous research. From the information gathered, all the requirements and opportunities were recognized. The aims to find the core problems and constraints occur on the current car rental system and to formulate goals of analysis construction, and system development that focuses on online car rental system and SMS technology.

ii. Analysis.

Analysed the current car rental system management workflow, looked for problems occurs in the current car rental system, car rental procedures and car rental data processing. Besides, the activities included were the identification of the hardware and software requirement in the development system, scope of project, schedule of activities such as Gantt chart and the total budget.

iii. Design.

In this phase, the researcher designed the requirement needed in system development. Included were the system components, system architecture, contextual diagram, data flow diagram, entity relationship diagram, user interface design and system flowchart.

iv. Development

Layouts of interfaces for the web-based development were created using HTML and PHP coding through Adobe Dreamweaver CS6 and notepad++. PHP language is used to execute the system and MySQL is used for the database, while Apache runs as a web server software using Xampp package. Then, SMS Gateway script by iSMS was embedded in the web-based to make the system able to send the message to the customer's mobile phone.

v. *Evaluation*

Debugging and testing of the program for fixing bugs or errors of the design were also done in this phase. Free from error is a necessary testing to find errors that may occur as in the language error, logic errors and error analysis program. Then, the system was evaluated to determine the system performance and to ensure all requirements accomplished. User acceptance testing was done by testing the system on users to ensure that users can perform the tasks respectively.

In the development SMS system notification, the researcher was used SMS gateways and mobile phone, which are connected to the web-based system. The SMS gateways served as the gateway to connect with the mobile phone users and the system for sending the alert message automatically to the customers about the availability and the status of the customers' car reservation. The mobile phone was used for receiving the text messages and alert messages about the booking status from the system.

The system was tested and conducted to the targeted respondents. For this study, the targeted respondents were university students around Perlis. In order to evaluate the effectiveness of the system, user acceptance testing was conducted. A quantitative approach was taken, and a survey questionnaire was the data collection instrument for this study. A total of thirty (30) survey questionnaires were distributed and received for the analysis. The questionnaire consisted of three (3) parts. The first part was comprised of user interface design. The second part of the questionnaire investigates the usefulness, ease of use and usability, whereas the third part, evaluate the SMS alert function. The data were analysed using arithmetic mean technique based on the ranking score value.

Research Results

To evaluate the user acceptance testing on the Web-based and SMS System, the study was tested to thirty (30) respondents. The study has successfully done to evaluate the effectiveness of the system which contains seventeen (17) questions overall and categorized into three (3) parts respectively. The score value with scale one (1) to five (5) was given for every type of criteria identified. Every scale represents from strongly disagree(1), disagree(2), average(3), agree(4) and strongly agree(5).

Table 1: Analysis and mean on the effectiveness of the system

No.	Criteria	Score (1-5)					Mean
		1	2	3	4	5	
<i>User interface design</i>							
1	The characters of the system are easy to read.			2	9	19	4.57
2	The terms used in the system are consistence.			3	18	9	4.20
3	The interface of the system is pleasurable.			5	15	10	4.17
4	I like the interface of this system.			5	15	10	4.17
5	Message displaying error of the system is helpful.			2	14	14	4.40
6	Performing tasks in this system is clear.				13	17	4.57
TOTAL MEAN							4.35
<i>Usefulness, ease of use and usability</i>							
7	Using the system helps me to rent faster.		1		9	20	4.60
8	Using the system saves my time.			2	10	18	4.53
9	This system is easy to use.			1	12	17	4.53
10	I am satisfied when using this system.			2	12	16	4.47
11	I am comfortable using the system.			3	12	15	4.40
12	It is easy to find information needed in the system.		1	5	12	12	4.17

13	The system has all functions and capabilities I want.		1	5	13	11	4.13
14	I found various functions in the system were working well.			3	17	10	4.23
TOTAL MEAN							4.38
<i>SMS alert function</i>							
15	The SMS alert system used in the system is appropriate and relevant.			1	14	15	4.47
16	I found that the SMS notification system is helpful to the users.			1	16	13	4.40
17	Overall, I am satisfied with this system.			1	13	16	4.50
TOTAL MEAN							4.46

In order to evaluate the effectiveness of the system, the study has successfully done for each type of the criteria. Table 1 summarized the results for the identified criteria. The mean for every question and total mean for each category was calculated respectively. The overall results shown that respondents were satisfied with the system that integrated with SMS alert function, and it can help them completed their task easier and faster. This can be proven when the total mean for the criteria was calculated as the highest which is 4.46 for the SMS alert function. Besides, most participants were accepted and satisfied with the system since each of the question categories grades were above 4.0.

Conclusion

This paper has presented some insight on user technology to construct and integrating the web-based system with SMS technology to enhance the service provided by the car rental agencies. The system helped the workers to notify the customers through SMS system by sending a reliable message to alert the customers about the booking status, and the availability of the car reserved. Thus, the system provides a convenience way of notification through the use of mobile phone, which is a common personal communication medium for most people. Besides, this system makes it easy to get car information, book a car and quickly rent a car.

To measure the effectiveness of the system, user acceptance testing was conducted to evaluate the performance of the system used questionnaire method. Based on the results and analysis, the overall system was measured to be acceptance by the users. From the testing session, the system functions are well-functioned and most of the respondents were satisfied with the system.

In conclusion, the integration of web-based and SMS technology in the car rental agencies is the best way to take the advantages of today technology, in order to enhance the productivity and efficiency of organization. In reality, SMS has been adopted by many users and has in fact, become extremely popular. Despite their limitations, mobile devices, especially mobile phones have become a natural part of the everyday life of a huge number of people, especially the younger generation growing up with computing and Internet technologies.

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