UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SMART E-Ticketing Train System (SEQR)

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Engineering Technology in Computer (Computer System) (Hons.)

by

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910722-08-6137

FACULTY OF ENGINEERING TECHNOLOGY

2015

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

TAJUK: **SMART E-Ticketing Train System by Using QR Code (SEQR)**

SESI PENGAJIAN: **2014/15 Semester 2**

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfilment of the requirements for the degree of Bachelor of Engineering Technology in Computer (Computer System) (Hons.). The member of the supervisory is as follow:

……
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ABSTRAK

E-Tiket adalah system untuk penjualan tiket secara dalam talian. Pengguna boleh menempah dan membeli tiket ke acara kebudayaan atau sukan secara dalam talian dengan mudah, membayar mereka secara dalam talian dan kemudian mencetak tiket elektronik mereka yang telah turun sebagai tiket dalam format PDF atau format imej dengan pencetak kertas dan terus pergi ke tempat acara itu. Pengguna juga tidak berasa tertekan kerana perlu beratur panjang untuk mendapatkan tiket sebelum acara bermula. Objektif projek ini adalah untuk menyediakan satu aplikasi Android mudah alih yang menyediakan E-tiket sistem kereta api dan boleh dipasang ke dalam telefon pintar penumpang. Pada akhir projek ini, kod QR akan dijana sebagai tiket kereta api menjadi kaedah alternatif untuk membeli tiket kereta api. Kaedah ini dapat mengurangkan penggunaan tiket kertas dan koin plastik dan mewujudkan gaya hidup berkonsepkan “teknologi hijau” ke dalam masyarakat. Sistem pangkalan data dicipta untuk menyimpan data pengguna dan meningkatkan sistem tiket dalam keadaan sistematik di kalangan syarikat kereta api. Pengguna diperlukan untuk mendaftar akaun atau log masuk ke dalam akaun mereka untuk membolehkan mereka untuk membeli tiket kereta api. Sistem ini akan meningkatkan keselamatan aplikasi dan mengelakkan data akan hilang ke dalam pengguna yang tidak dibenarkan. Satu kajian yang dikendalikan antara 50 responden untuk mengumpul data daripada penumpang dan data dianalisis untuk mengetahui masalah yang telah dihadapi oleh mereka.

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ABSTRACT

E-Ticket is a system for online ticket generation and sales. The user can easily book and order the tickets to a cultural or sport event online, pay them online and then print their electronic tickets that been downloaded as PDF ticket or image format at home printer and go directly to the event place. There is no need to wait in queues or be stressed to get tickets just before the event. The objective of this project is to provide an Android mobile application that provide a train E-ticketing system and can be installed into the passenger's smartphones. At the end of this project, QR code will be generated as a train ticket to be an alternative method of buying train ticket. This method reduces the usage of paper ticket and plastic coin and creates a 'green technology' lifestyle into society. A database system is created to store the data of users and improve the systematic of ticket system among train companies. Users needed to register account or login into their account to enable them to buy train ticket. This system will improve the security of application and avoid data to be lost into the unauthorized users. A survey is handled among 50 respondents to collect data from the passengers and analyze the data to know the problem that been faced by them.

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DEDICATION

This project is lovingly dedicated to my respective parents who have been my constant source of inspiration. They have given me the drive and discipline to tackle any task with enthusiasm and determination. Without their love and support this project would not have been made possible. This project is also dedicated to friends and my lecturer who has given me a lot of help and always helps when I need it. They also often provide support during the project has been run.

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ACKNOWLEDGEMENT

I would like to express my gratitude and appreciation to all those who gave me the possibility and encourage to complete this report. A special thanks to my project supervisor, Mr. Aiman Zakwan bin Jidin, who has helped me stimulating suggestions, giving a lot of encouragement and also helped me to coordinate my project especially in writing this report.

I would also like to acknowledge with much appreciation the crucial role of the staffs of Faculty of Technology Engineering, who gave the permission to use all required device, equipment and materials to complete my project.

A special thanks goes to my family and friends as well, who have helped me to complete the surveys and giving ideas on how to complete the project.

Last but not least, I also would like to appreciate the guidance given by my co-supervisors, Mdm. Norfadzlia Binti Mohd Yusof, who also has helped to give ideas to finish this report and special thanks also to the panels especially in our project presentation that has improved our presentation skills through their comments and tips.

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CHAPTER 1
INTRODUCTION

This chapter will briefly discuss about the background of this project. This chapter includes project background, problem statement, objective, scope and significance of project.

1.1 Project Background

Traffic jams often occur and become a problem for society in Malaysia. Various initiatives have been undertaken by the government, including public transportation in order to avoid this problem from getting worse. The hike of in vehicle prices and fuel prices are also pushing the society to use public transport to move from one destination to another. Various companies exist to provide transportation to the community. Now, people can choose to use any public transport available depending on their affordability. One of the available public transport in Malaysia is a railway services. There are a variety of rail services provided in Malaysia such as Electric Train Service (ETS), Keretapi Tanah Melayu (KTM) commuter services, Light Railway Transit (LRT), Kuala Lumpur monorail and KLIA monorail.

The most important thing when using train services is the process of purchasing tickets. Various types of tickets are used to board the rail services. In most of the cases, people have to queue at the counter provided at railway stations to buy train tickets. However, other alternatives are offered to the ticketing process such as coin tickets which were introduced by KTM Commuter Service to replace the use

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of paper tickets. There are also a number of railway companies that offer online ticketing system that ensure can save time and simplify them.

In general, online ticketing system has yet to be accepted by people in Malaysia. Many of them are still willing to queue at the ticket counter to buy train tickets. However, if certain steps are taken, the use of online ticketing system in the ticketing process can be improved. The technology is becoming more sophisticated and the use of smartphone is rapidly growing in our society, a new initiative has to be taken to give more options to the community in the process of purchasing tickets. Android application also needs to be developed to enable the society to access this system by simply using of their smartphones.

One technology that has been created is a QR code. This system may allow data to be stored and accessed again by scanning the generated QR code by using QR scanner. If this technology can be applied in the online ticketing system, a new way exist in the process of purchasing train tickets. The use of this technology will reduce the use of paper tickets and create a new green technology in the ticketing system because of user and environmentally friendly.

1.2 Problem Statement

A survey has been handled to know about the problem that been faced by consumer in train ticketing system. Among 50 respondents has been selected to collect the data based on problems in this system.

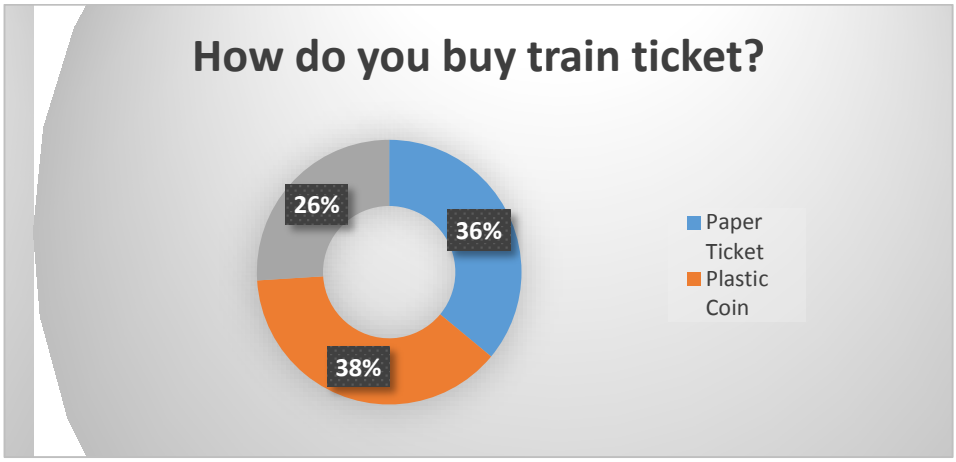

Figure 1.1: Survey Analysis (1)

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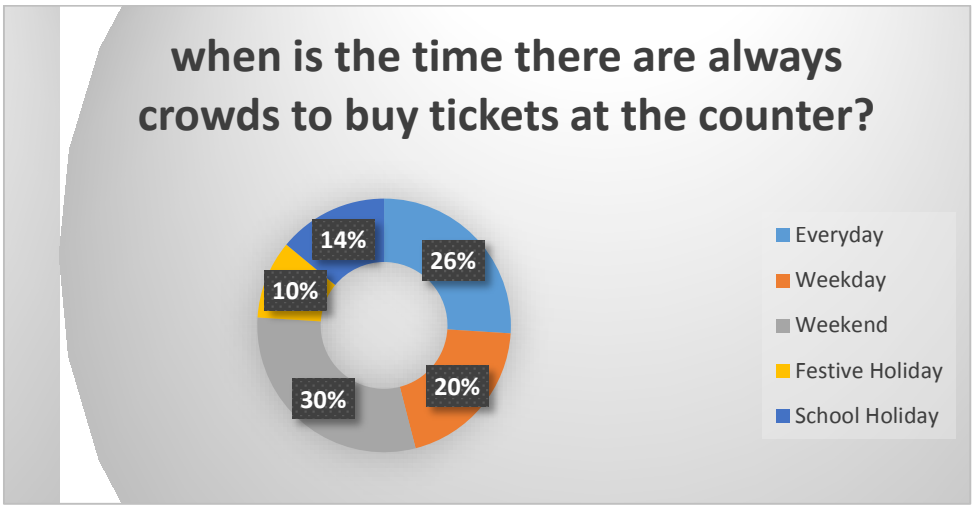

Figure 1.2: Survey Analysis (2)

Nowadays, the society often buy their train tickets at the ticket counters or at the coin machines available at the railways stations based on analysis as shown as Figure 1.1. But, the problem that they are facing is they have to queue to get a ticket or a coin. This will cause their time wasted even be difficult for them to do other routines. In fact, they also face the problem of running out of tickets. At some time, after they had to queue up and wait for a long time to get tickets, but eventually the tickets that they wish to purchase had sold out. Even if they can buy a ticket or coin to ride a train, but the tickets are only for single or return trip. However, they had to queue again if they wish to go to another destination and this situation will be difficult for them.

There are also problems faced by consumers who have to provide enough amount of money when buying a ticket or coin. If the user gives a large amount of money when buying a ticket at the counter, they have to wait for the ticket seller to refund the balance of their money. Sometimes, this takes a long time and cause the user to wait for a long time.

The next problem faced is the loss of a ticket or coin. The tickets and coins are thin and small and will be difficult for passengers to keep the ticket or coin securely. In addition, the tickets purchased easily torn or damage and the railways

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management will not accept and allow the user to ride the train if the tickets is found torn or damaged.

There are several options that were introduced to user in the purchase of tickets. First, users can buy the Touch 'n Go (TNG) card to be used as a ticket. If the balance on the card is insufficient, the users can reload the card in any TNG hubs, TNG spots, petrol kiosks, pharmacies or customer services counters at the selected toll plazas. In fact, users can also reload their card by using automated teller machine (ATM). They can also use TNG finder to find the nearby location of TNG point because there are more than 6 000 points nationwide for easier user to reload their Touch ‘n Go card. This card can also be used by anyone to purchase movie tickets and buying snacks and drinks because this card is not registered. Thus, the problem is when the card is stolen; the thief can use this card with impunity. So, the owners are advised not to reload a high amount of money on this card and always put this card in a safe place.

Users also buy the ticket via online through the web browser as an alternative option on buying the train ticket. They can browse the website provided by the railway company and make the purchase of their tickets. The ticket payment will be usually made via online banking. This way can save users time and can be used anywhere at any time as long as the internet connection is available. However, there are no android apps that are built to be downloaded by users using their smartphones. If android application is built, this will make it easier for more users.

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1.3 Project Objective

Some things have been emphasized in this project. One of them that been emphasized is the project objective. The objectives of the project are as follows.

a) To study and understand the problem that been faced by society during buying train tickets and analyze the data to solve the problem.
b) To create a new method to buy train ticket.
c) To develop a mobile Android application that provides a train E-ticketing system and stable for any Android smartphones.
d) To develop a secure application that store data of passengers securely and prevent data can be accessed by unauthorized users.
e) To develop a page of application where passenger can choose their trip and their confirmation can be stored into database successfully.
f) To develop a database that can store user private information and trip data securely and prevent data in the database system from lost.
g) To create and generate QR code for passengers as train tickets and the code can be saved into their smartphones.
h) To enable the QR code to be checked for confirmation of trip.

1.4 Project Scope

The scope of this project is to develop a mobile application e-ticketing system based on android that can be accessed by society using their smartphones. Users will be able to login into their account or register a new account to access this application. A database will be installed on server to store user accounts and data. QR code will be generated to be scanned by a QR scanner to access the data of the users and check the ticket validation. However, the constraints in this project are no security in place for the storage of user data that can guarantee no data loss or data infringements. Applications that been developed also not necessarily stable with all android version that been installed on user's smartphone. This is because there is no specific works that are of concern to ensure this application is stable to use in any version of android. In fact, QR code generated does not have the safety features that can prevent

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complete renovation of QR code image. This is because the project was focused on the ability of a QR code that can be used in the ticketing system.

1.5 Project Significance

The significance of this project is to develop an application that is able to help the community in the process of purchasing train tickets. The use of Android OS is becoming more widespread in the community. The project is also expected to increase awareness of the use of android application in the process of purchasing train tickets via online. The project is also expected to be introduced as an alternative in the process of purchasing train tickets. In fact, the use of paper as a ticket can be reduced when a new ticket system by scanning the QR code method is introduced. By using this system, the people can buy the train ticket from anywhere and at any time and the, they do not have to queue up at the ticket counter for buying train tickets, thus can free their time to do other daily activities. This project also can help to increase the systematic of train ticket system and reduce the cost of rails companies to print the paper ticket and produce the plastic coins as train tickets.

1.6 Conclusion

Many problems are faced by train passengers when buying train tickets such as queue up for a long period of time and ticket lost or damaged. The objective of project is to develop a mobile Android application that provide train E-ticket system for users to buy train tickets anywhere at any time. QR code is generated as train ticket and as alternatives ways to reduce the usage of paper tickets and plastic coins and thus, this new method can create a green technology lifestyle into society. The rails companies can also improve their ticketing system to become more systematic.

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CHAPTER 2

LITERATURE REVIEW

This chapter will briefly discuss about the literature that been reviewed for idea of project. This chapter includes review of E-ticketing system, QR code and Android.

2.1 E-Ticketing System

2.1.1 Overview of E-Ticketing System

An electronic ticket or E-ticket is a paperless digital document for ticketing system. Electronic ticketing is been used in airlines system, public transportation and entertainment industries. In public transportation, this ticket is been known as transit pass (Mohezar, 2009). This system allows authorized agents to transmit ticketing information directly to the database. Besides that they are enabling passengers to check-in and board the flight without showing a paper ticket (Chen, 2009).

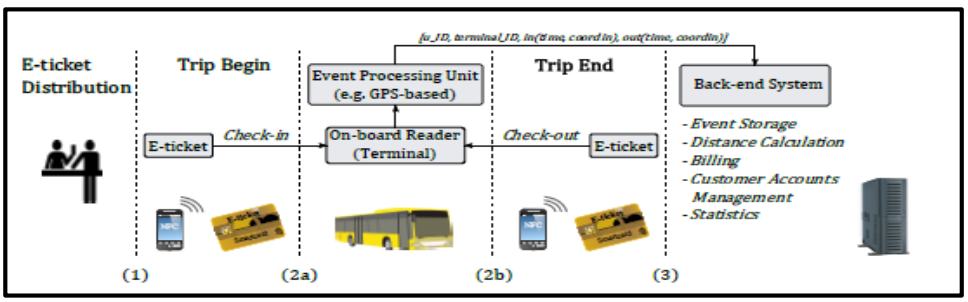

Figure 2.1: E-ticket System: A General Scenario (State-of-the-Art Privacy Analysis of E-ticketing Systems, 2012)

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Electronic ticketing has been developed as an evolution of credit card with magnetic stripe due to the concern of insufficiency in the control of the operations and information management. The platform controls ticket sale, register users, and issues management reports allowing accurate on monitoring of data. The development of this system will cause the use of paper tickets and plastic chips in ticket system will be reduced. So, the credits on users account to be used in any companies that operate on the same platform (Lübeck, 2012). E-ticketing is the new method of delivering and issues tickets is becoming widespread because airline companies is employed this system in an effort to reduce the costs and increase systematic in their system (Fu, 2009).

Milton Luiz Wittmann (2009) states that the electronic ticketing system can help to support corporate travel efficiently.

2.1.2 Advantage and Disadvantage of E-Ticketing

The advantage of this system is convenience because it is quickly sent and arrived into email within minutes of a booking. Besides that, the users do not need to wait for passes to arrive through the mail and this is useful if consumers urgently to book a trip on short notice because they can receive a pass on the same day as a booking and can be traveling on the next day (Mezghani, 2009).

Furthermore, the ticket is difficult to be lost as long as when they have a copy of ticket and the ticket is not been deleted in their email. Thus, if there are probabilities that they have misplaced their ticket and lose it, a copy of new ticket can be printed. The transportation companies will also have a copy in their database. If they arrive at a station and cannot access a printer, the company can print a new copy of ticket (Crosby, 2011).

By using this system, it is also easier to make changes to the itinerary, both for consumers and the public transportation companies because they can quickly update any changes of their trip to the companies by electronically pass the information on to the company. The speed in which you can notify all parties also saves money for everyone and cheap tickets are offered in electronic form only and the, it will reduce cost to the travel company (Crosby, 2011).

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The disadvantage of this system is the risk users details can be wiped from the company's database. If there is a major system failure on the server, information can be lost. This can include entire periods where bookings were made. This can cause problems when it is time to travel because the company may lost any record of their booking and can deny them from traveling (VDK Travel and Tourism, 2013).

Electronic ticket can be a hindrance if they are changing plans at the last minute. A common scenario where this can happen is when their original trip is delayed, and they cannot afford the delay due to transfers. Transportation companies will then try to find alternatives ways. However, each company has their own rules regarding electronic passes and this can cause issues when they are trying to change from one company to another (Simone Fischer-Hbner, 2011).

2.1.3 E-ticketing: Privacy Issues Considered in the Respective Standards

A concise assessment of security and privacy measures specified in the standards is performed in a 'top and down' way. But, the proprietary privacy solutions with respect to privacy are not considered.

Table 2.1: Security and Privacy in E-Ticketing Standard Stacks (State-of-the-Art Privacy Analysis of E-ticketing Systems, 2012)

Standard	Security	Privacy
ISO EN 24014-1	- definition of security policy; - security management (by the Security Manager entity).	coarsely specified privacy requirements, targeted at compliance with the regulation
EN 15320	- Security Subsystem (SSS); - security-related operations are defined in profiles.	- privacy-relevant data groups; - protection through access control (AC) and encryption.
EN 1545	security-relevant fields	privacy-relevant fields, see Table 2
ISO/IEC 7816-4	- secure messaging; - security architecture with AC	security mechanisms can be applied to privacy-critical data
ISO 14443 (1-3)	not considered	not considered

Legend: – Architecture Layer
– Data interfaces Layer
– Communication interface Layer

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