The Design of Parking System Based on Rfid And Database to Succesful Enviromentally Program

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The Design of Parking System Based on Rfid And Database to Succesful Enviromentally Program

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Abstract

This research developed a motorcycle parking system based on RFID, supported by Visual Basic database. First, to developed an open-close system of motorcycle portal and a database on RFID. Second, the system encoded either the registered visitors or temporary visitors. The on-off controller of DC motor-driver was used for open-close of portal. Portal was equipped with RFID Box. The portal will opened after the Card is moved nearby to Reader. The maximum distance between Card and Reader is 7 cm, before being connected with SIMPARK. The unique Card code will be identified by Tag Reader. It's according to Card owner identity and function as a trigger to open portal. The portal automatically closed after microcontroller receives a signal from PIR sensors. Motorcycles which passed portal were detected by PIR sensor. Identification of incoming and outgoing visitor, were encoded in the database. One hundred ID cards were tested, 97 % success to detect identification the unique number. The parking and the database system model can be continued test, hopefully could applied in any parking area. This research has succeeded and could use a database model for parking of motorcycles system activities.

Key words: parking, environmentally friendly, rfid, database

1. INTRODUCTION

This research is the planning phase of the integrated motor parking system. Radio Frequency
Identification (RFID)as an electronic modul which utilize radio wave is integrated with Information Communication Technologies (ICT). RFID Module comprise of RFID Tag and Box, serves respectively as a data storage device and reader. RFID Tag (contained unique code) is moved nearby to RFID Box, the Card owner data will be read. The card owner can enter to motor parking area [1], [2] for a certain time period. Automatic vehicle parking system there have been researched and realized.
Automatization is served by machine box that give off the sound and parking ticket. Parking visitor take the paper parking ticket and then pay the parking retribution (fee). Using of paper will polute the environment due to discharge of parking ticket in an indiscriminate manner. Reduction in paper usage also support to minimization of tree felling as one of paper raw materials. The idea for designing of "go green" parking system is a form of participation for succeding nationally and internationally eco-friendly program.

Usually, parking area especially in campus still was managed conventionally by security officer. Parking area visitors are classified in two categories i.e registered visitors and temporary visitor. Retribution fee payed by temporary visitor difficult to traced. The retribution payment in the campus is not calculated based on the parking time. The problem in campus parking area is not in jaming/queue but how to secure the vehicle. Parking area visitor generally are students/employee/lectures who are doing their activities. Parking time period in the parking area is different from one another but have same tariff. The problem occure in the morning when many visitors (students, employee and lecturers) come together in the same time at 07.30 The improvement of

servicing by shorten the entrance time will prevent long queue.

The visitor needs to know about space availability in the parking area as soon as posible when the visitor in front of the parking gate. The ease to find parking space is aimed to speed up the time of vehicle storage and will not happen queue. The queue occur because of delivering of parking ticket and retribution payment. Visitor recieve card and retribution evidence with a certain periodic time and served by officer. Delivering of parking ticket and reciept can be done more modern. Vehicle jam due to queue can be overcome by displayed on LCD (Liquid Cristal Display). RFID Tag (as ticket substitution) possesed by registered visitor, will be detected as Valid Card if the visitor has already paid the retribution for one semester, otherwise will be detected as Invalid Card if the visitor haven't paid yet the retribution or card have already expired. Registration and payment will automatically recorded in the PC when the officer gives RFID Tag. Retribution payment will be a benefit income for the institution in order to improve the parking servicing and securing in the campus. Database of visitors and retribution are stored in the parking system so will be able to give a benefit to the involved officer.

2. METHODOLOGY

This research inline with the theme of Research Master Plan of Jakarta State Polytechnic year 2011-2016 point 1 i.e Innovation of On-Wire and Wireless Based Control System. Parking system in the campus generally managed by one of units/parts the Personal and General Affair Head Department responsibility (The Head Department). Information about using of parking system be very important for monitoring the ammount of motorbike and result of parking retribution. Handycap for The Department Head is imposible to supervise the parking activities by time to time. The Department Head needs information system which can be directly accesed from his/her PC (on wire) or wireless by Ipad. Parking system that can be directly monitored by the department head anytime and anywhere is very important to be realized.

2.1 Environmentally Friendly Parking Ticket and Retribution

Computerization of parking system by using RFID technology has been many researched, among them is vehicle parking automatization system [1]. RFID tag identify the vehicle which entering the parking area according to the owner identities. [2] Identities recognition using RFID tag has equiped with modular method management system.[3] This method improve the excisting parking management system which estimate the empty space in the parking area. [One of output data forms is parking fee which is counted when the vehicle leave the parking area and then recorded in the financial report of parking area. Data of total visitor using RFID Tag can be displayed in the 7 segment [4], shows the left slot on block/location of parking area. Parking ticket and payment receipt are designed as simple as using RFID Card to reduce using of paper succeding eco-friendly program, clean product and paperless [5]. Function combining of ID Card either as a presence card and parking card. Parking card is identified from student or employee or lecturer ID card interested for being researched.

Beside this data of parking visitor can be saved in Microsoft Excel or

PDF files, and will be printed out if necessary to support eco-friendly program. Parking visitor who didn't have or have paid retribution will be detected by the system. Parking officer ask retribution to temporary visitor who haven't ID card. Parking card for registered visitor in the campus generally used for along one semester/six months and after this period will expired.]

RFID card can be used along six semester and do not need paper as parking ticket. Using of paper as parking ticket is not environmently friendly because it will result waste and going to mess the environment, beside that will need raw materials. Increasing of paper production using of new raw materials identically with using of wood. Wood logging specially in the conservation forest are contributing in damaging the environment and not support afforestation program . Paper as parking ticket has shifted by RFID card having multifunction. RFID card is a smartcard which environmentally friendly can be used for long time unless damage or is broken. Using of
RFID card support the environmentally friendly program because no waste will be produce as like using of paper, and preventing tree logging in conservation forest.

2.2 Analysis of Parking Area Requirement

Parking is a condition where a vehicle is not move for temporary moment. [4] Parking space requierement on a certain area need to be known. Formula for calculating of parking area requirement when survey be calculated (1).

$$S = \frac{N_t}{T.f} - D \quad (1)$$

Remark:

S: Number of space needed for recent time

D: Average time for park (hour/vehicle)

N_t: Total number of vehicle during the survey. (vehicle)

T: Period of survey (hour)

The total number of vehicle which is parked during a certain period time. The accumulation is gain by summing the incoming vehicle minus out going vehicle. The definition of 'parking term' is every vehicle that stop at certain place is signed by parking mark. Parking not just for loading or unloading of stuff and or human tetapi penting untuk meningkatkan pendapatan [5].
Difference of time is park duration, average of parking time from all motorbike when surveybe calculated (2)"

$$D = \frac{\sum(N_s)(X)(I)}{N_t} \quad (2)$$

2.3 Integrated ICT Based Parking System

Detector mode of parking by face detection (camera) difficult to detect of change expression from visitor. Visitor who is not building occupant is not recognized by system, so need a solution[2], [5]. RFID-based motor parking system substitues monitor of camera system. Someone who entering parking area is given a parking card (RFID Tag). The system detect unique code contained in the RFID Tag which is move nearby the RFID
Box, so will be recorded incoming time of visitor. RFID system has connected with computer that enable encode the

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data of parking visitor. Generally RFID-based parking system can be develop with data storage on database. The function of database is for viewing the data of parking activities. It is necessary found a connector between RFID [5], [6] could improve with camera Database if be applied with Cristal Report can be printed as a report. Parking services equiped with camera as a parking information system, will more efficient.

2.4 Design of RFID And Database Based Parking System

Smart card based parking system, such as camera, RFID continously developed nowdays. Specially RFID is activated by module using radio waves can open-close parking portal wireless. RFID Tag moved nearby RFID Box Reader which is installed on the entrance gate. RFID card also can be integrated with Identity Card, e.g. Student ID Card. Beside this information about parking space availability is also needed, so will not happen queue or difficult to find parking space. Information system which display of parking space availability very required by parkir area visitor.

3. RESULT AND DISCUSSION

Before visitor enter the parking area can know availability of parking space. RFID based parking system can be integrated with previous parking system using addition equipment for displaying information so visitor enable to know space availability in parking area.

Parking system operated by Administrator, Personal Department Head or Security officer. Security officer logs in to the parking system according the step shown in figure 1, figure 2, figure 3 figure 4. SIMPARK Icon is chosen, Log in by enter Username and Password which will display Parking System Monitor. Parking area is managed by an administrator (autorised staff), who have responsible for manage the system. The system can be accessed by Personal Department Head/an autorised staff for monitoring the parking system.

Figure 1. Desktop Screen

Figure 2. Main Menu SIMPARK

Figure 3. Login Activity

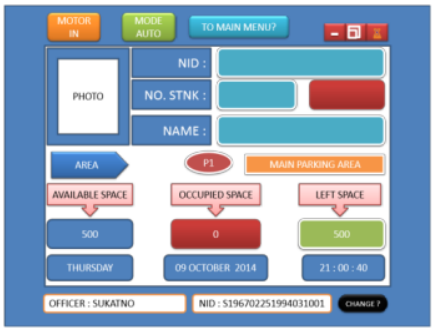

Figure 4. Parking Display Monitor

3.1 Database System Security as an operator in parking area operates parking system. The authorities of Administrator are acces all of the system, input data, setting password, add the data, edit data, view data, print out data, monitor as well as operate the parking system. The authorities of Department Head are add data, edit data, view data, print out data and monitor parking system. The authorities to operate the parking system different one another, according Use Case Diagram (Figure 5). Table display from input data process via Visitor Form, contain NID, Visitor's Name, Education, Origin University (lecturer and employee), sex. Religion, address (Figure 6). Data input for Paid/Not paid, Date payment, Date Expired are fill in Status_Motor_tbl_Form (Figure 7). Input Data figure 7 is very important to ensure that visitor's motorbike can come in or goes out from parking area. Motor status is state valid, when RFID card of the visitor move nearby to RFID Reader and having 'Paid' Status or hasn't beyond the expired limits (Figure 8). Visitor status have already full filled, will displayed on the monitor Valid status. Displaying the Valid status identic with Valid Card, automatically portal opened.

Figure 5. Use Case Diagram

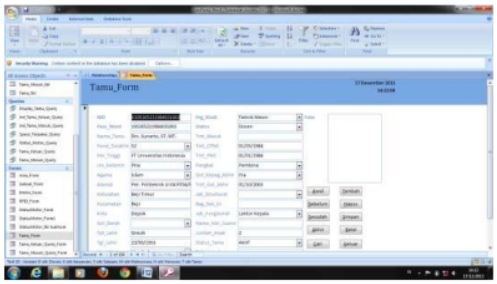

Figure 6. Entry Data Form

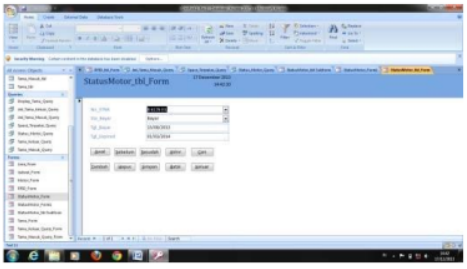

Figure 7. Motor Status Form

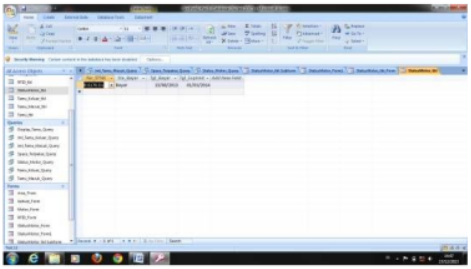

Figure 8. Motor Status Data

3.2 Parking Application

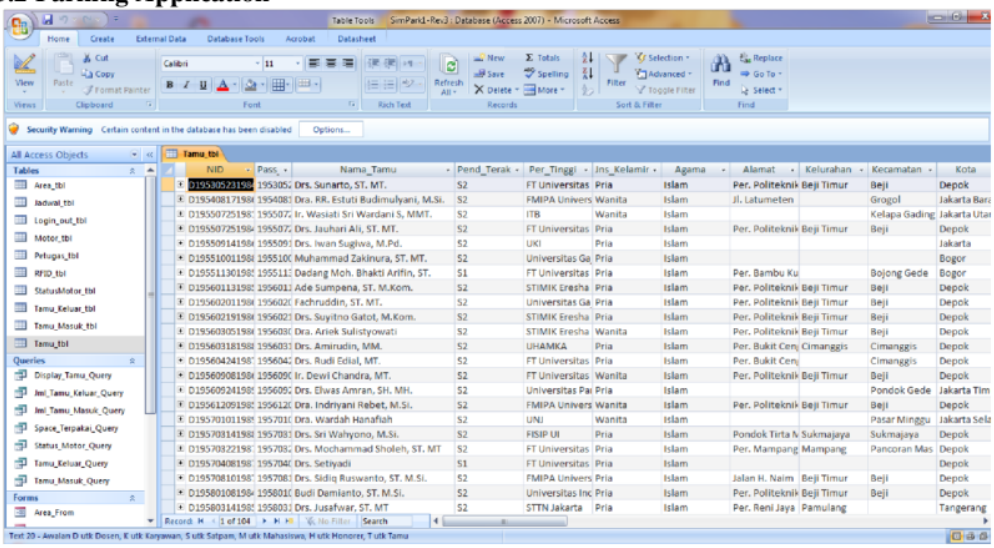

Figure 9. SIMPARK Database

SIMPARK software is designed as a user interface. In this part will be displayed some figures which related with operation method and how to operate SIMPARK, start from Desktop screen till appear Parking
Display Monitor (Figure 4). Sequence for using SIMPARK are: Press SIMPARK Icon on the desktop screen (Figure 1), appear Screen for Log in (Figure 2).

Using the system by pressing Login button, appear input screen to input account (Figure 3). The next, press OK button, chose sub menus until appear Parking Display Monitor
(Figure 4).

A hundred RFID Card move nearby to RFID Box Reader and will be detected their identity. The detected identity is unique number of the card and then added with data of the card

owner. Result of input data process can be displayed such as figure 9.

4. AKNOWLEDGEMENT

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