AN ANDROID BASED SECURITY TOURING SYSTEM

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BORANG PENGESAHAN STATUS LAPORAN
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Tajuk Projek : AN ANDROID BASED SECURITY TOURING SYSTEM

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Supervisor's Name : EN.VIGNESWARA RAO

Date : .....

To My Loving and Caring Family

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ABSTRACT

Nowadays, employee safety has become a popular topic to be discussed. Android phone and NFC tags can help in creating a better security touring system. In this project, NFC tags act as checkpoints for the touring system and Android phone as a scanner. An Android application has been developed for user verification and recording purpose. The Android phone will record real-time attendance when the user reached the checkpoint. Furthermore, this system can help increasing user safety by sending an alert message including user GPS location to the administrator via SMS and email when the user failed to reach the next checkpoint. The recorded information is stored in the MySQL database and can be viewed using the .exe program developed using Visual Studio. The developed system can be used to enhance security patrolling performances as well as increase their safety.

ABSTRAK

Pada masa kini, keselamatan pekerja telah menjadi satu topik popular yang akan dibincangkan. Telefon Android dan NFC tag boleh membantu dalam mewujudkan sistem rondaan yang lebih baik. Dalam projek ini, NFC tag digunakan sebagai checkpoint untuk rondaan dan telefon Android sebagai pengimbas. Aplikasi Android telah diciptakan untuk pengesahan pengguna dan tujuan rakaman. Telefon Android akan merekodkan kehadiran masa apabila pengguna mencapai checkpoint. Tambahan pula, sistem ini boleh bantu dalam keselamatan dengan menghantar mesej amaran termasuk lokasi GPS pengguna kepada admin melalui SMS dan e-mel apabila pengguna gagal mencapai checkpoint seterusnya. Maklumat yang direkodkan akan disimpan dalam database MySQL dan boleh dilihat dengan menggunakan program .exe yang diciptakan dengan menggunakan Visual Studio. Sistem ini digunakan untuk meningkatkan prestasi dan keselamatan mereka.

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LIST OF ABBREVIATIONS

NFC	-	Near Field Communication
GPS	-	Global Positioning System
SMS	-	Short Message Service
GUI	-	Graphical User Interface
RFID	-	Radio Frequency Identification
RF	-	Radio Frequency
ID	-	Identity
PC	-	Personal Computer
GSM	-	Global System for Mobile Communication
NDEF	-	NFC Data Exchange Format
URL	-	Uniform Resource Locator
SIM	-	Subscriber Identification Module
IDE	-	Integrated Development Environment
SQL	-	Structured Query Language
API	-	Application Program Interface
STL	-	Standard Template Library
JSON	-	JavaScript Object Notation
XML	-	EXtensible Markup Language
IP	-	Internet Protocol
NAT	-	Network Address Translation
HTTP	-	Hypertext Transfer Protocol

CHAPTER 1

INTRODUCTION

1.1 Background

The number of robberies is increasing by day thus it is very crucial to have a security touring system in every place. Most of the current market-ready security guard touring system is not a cost-efficient and real-time data recording system. Guards can easily manipulate the security touring system by skipping the checkpoints, or by manually transferring the data from the checkpoints because most of the guard touring system is not real-time data recording. Besides, if robbers attack the guard during the patrolling period, the person in main control center unable to detect it earlier and give immediate help to the guard. This system can send data captured from the NFC tag at the checkpoint and GPS current position that is latitude and longitude to the personal computer at the main control center.

1.2 Problem Statement

The security guard might go missing when it is his/her turn to patrol. Nobody knows what route he/she takes when patrolling or whether he/she is doing his/her job properly. Their unfaithful action might cause selected area not to be patrol and might give a chance for the intruders to pass through or any dangerous activity to occur. So an android application with NFC feature is developed to capture the log time of the checkpoints in the particular area. This system makes sure the security guard to patrol the area at the given time. And to make sure the safety of lone guard, a GPS tracker will determine his/her location at a given moment if he/she failed to scan the next checkpoints. The guard may encounter with problem and accident when they are patrolling. So, a notification such as SMS or email will be sent to the administrator in the main control center to alert them about something has happened to the security guard.

1.3 Objectives

The purpose of this project is to create an Android-based security touring system. The goals of this project are:

1. To create an Android application that can log time attendance using NFC tag.
2. To create an Android application that will notify others through SMS or email.
3. To create a database that can store security guard attendance in the database.
4. To create a GUI for admin to access the local database and display the data on the interface

1.4 Scope of Project

This project will focus on the development of Android application using Android Studio. This application is capable of creating a simple login system. After user logged in, it can record the tagged time, longitude and latitude when scanned with checkpoint (NFC tag). The first scan will activate the countdown timer in the Android application. The Android app will save the records in a server database which can be displayed. When the countdown timer reached zero, notifications such as SMS and email will be sent to notify the administrators in the main control center. The message includes the username, email, longitude and latitude of the user. The administrator can insert the longitude and latitude values obtained into Google Map for a more detail location. Next, a simple GUI will be created using Visual Studio 2015. The GUI must be able to prompt a simple register system which is for user registration and admin registration so that they can login into the Android application. Besides that, the developed GUI must be able to display information recorded from the database. The GUI includes string, date, and time search button so that user can filter all the extra information.

1.5 Structure of Project

This paper consists of five chapters which are an introduction, literature review, methodology, result, and analysis, plus conclusion and recommendation of the project.

The introduction of this project discusses the background of the project, objectives and scope of the project to let the reader understand the limitation and purpose of the project. The problem statement is also stated to let the reader understand the intention of doing this project.

In the literature review, relevant works and projects of other researchers are studied and examined. Comparison between projects is made to show the strengths and weaknesses among them so that it can improve this project in the future.

Methodology discusses the methods and tools used to complete this project. This chapter includes the brief introduction of software and hardware which are used to develop the security touring system. Besides that, flow charts and block diagram are listed in this chapter to help readers understand the movement of the entire system more easily.

Next, result and analysis will discuss the result of software and hardware and also analyze the result according to the objective of the project. The function of the attendance system regarding real-time attendance record and SMS or email notification are tested. After that, the project outcome that achieved the objectives is shown and explained in details.

Finally, conclusion and recommendation conclude the overall of the project to make sure that it meet the requirement and scope of the project. Besides that, the recommendation part discuss the future development that can be implemented in this project so that future researcher can make an improvement to this project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, basic knowledge about NFC and attendance system will be discussed. Besides, reviews from other projects will be considered, explained and discussed. Finally, the comparison between these projects is made using a table to differentiate which one is better.

2.2 NFC

Near field communication (NFC) is a group of protocols that enable two electronic devices to exchange information. Two NFC devices can establish radio data communication in a range of 10cm from each other. An NFC-enabled device can read

information stored in electronic tags. When the device integrates with apps, they allow applications such as a stock ticket, payment readers, and access control.

A passive device owns the characteristics in such a way that NFC tag possesses likewise, consists of readable information but unable to read any information itself. NFC tag is different from the other devices such as smartphones as NFC tag does nothing except for transmitting information to devices.

Whereas, what kind of duty an active NFC device such as smartphones can perform? That could be reading and sending information. They are capable of collecting information from NFC tags and share or exchange information with compatible devices. Not only that, it could even change the information on an NFC tag when admin gives authorization. [3]

2.3 Attendance System

Attendance system is used to record the time of employees start and stop working in an organization. It is important to have an attendance system because it keeps the records of employees who are not working. Attendance system can keep detailed records such as sick leave, take leave or late in. An attendance system provides benefits to organizations. It allows an employer to have full control of all employees working hours. To control labor costs, implementing new attendance system is capable of cutting down unnecessary overpayments because it can reduce several human errors such as transcription error, interpretation error and intentional error as what conventional system does. Furthermore, manual and maintenance process will be eliminated.

Compared with the conventional method of recording working hours, attendance system proposed implements the use of electronic tags, barcode badges, magnetic stripe cards, fingerprint touch screen and biometrics. Unlike the previous conventional method of recording attendance which makes use of paper cards where employees touch or swipe

as they check-in or check-out from the working area. With the attendance system, data and information recorded are sent to the computer automatically. The data are then processed and calculated to generate reports and graphs which used for analysis. Unlike the conventional attendance system, the automated attendance system helps in reducing errors or risks and increase workers performances to be more productive.

2.4 Review of Relevant Work

Based on the study and review of attendance system, there are numerous of projects have been done before that pertinent to this project. The difference between these projects is the method they used to record the attendance.

2.4.1 Bluetooth Based Attendance Management System

This project relies on RFID and Bluetooth application. This project is developed to take attendance at a particular location. The RFID reader gets the information through matrix card and sent the information to the computer in that given area. After that, the admin needs to connect to PC using Bluetooth to check the attendance. Also, this system will send attendance details to admin via email after the working hour. [16]

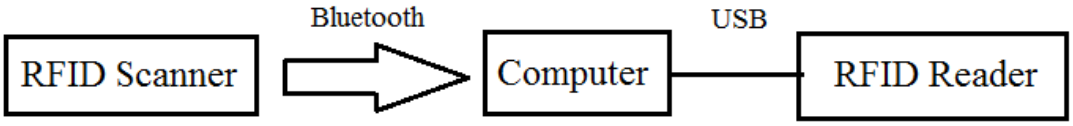

Figure 2. 1: Bluetooth Based Attendance System

2.4.2 Wireless Attendance System based on Iris Recognition

This project proposes a design and implementation of a wireless iris recognition attendance and management system. This system uses an application of radio frequency (RF) wireless and iris recognition. One of the main features of this method is capturing iris image. The image is then extracted and stored in the program. The program embedded inside the system, so the process of matching iris recognition needs no computer to operate. [18]

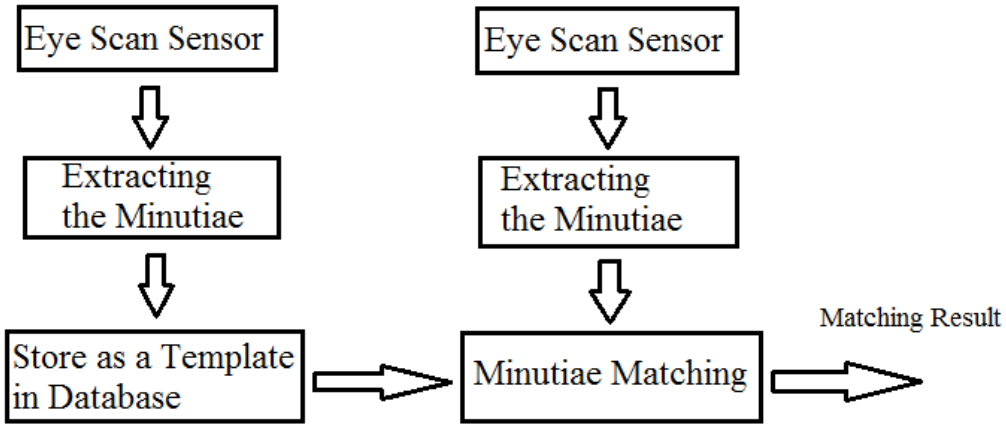

Figure 2. 2: Iris Recognition Verifying Process

2.4.3 Attendance Monitoring System Using Fingerprint Identification

For this project, fingerprint verification method is used to build the attendance system. This system captures a fingerprint and creates a feature set. When a user scans his/her fingerprint again, stored templates are retrieved. Finally, the system compares the fingerprint feature set and fingerprint templates stored in the database. [17]