SOCIAL NETWORK APPLICATION FOR FRIENDING ON ANDROID

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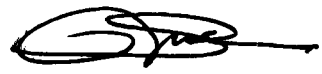

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หัวข้อโครงงาน	แอพพลิเคชั่นเครือข่ายสังคมเพื่อหาเพื่อนบนระบบปฏิบัติการแอนดรอยด์
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บทคัดย่อ

ในการดำเนินชีวิตที่เร่งรีบในปัจจุบันทำให้บุคคลต่างๆเผชิญกับเหตุการณ์ที่ไม่ได้คาดไว้ล่วงหน้า ซึ่งบางกิจกรรมอาจต้องการเพื่อนมาร่วมทำกิจกรรม ณ ขณะนั้น แต่เป็นการยากที่จะหาเพื่อนที่อยู่ใกล้เคียงได้ทันที ปัญหานี้จะถูกแก้ไขหากบุคคลใดๆสามารถค้นหาเพื่อนในสถานที่ที่ต้องการเมื่อใดที่ต้องการ ทำให้เกิดเป็นแนวคิดในการพัฒนาแอพพลิเคชั่นบนระบบปฏิบัติการแอนดรอยด์ที่สามารถช่วยผู้ใช้ให้สามารถค้นหาเพื่อนในบริเวณหนึ่งๆ และติดต่อให้เพื่อนมาทำกิจกรรมร่วมกันได้ แอนดรอยด์เป็นระบบปฏิบัติการสำหรับอุปกรณ์พกพาแบบสัมผัสที่มีจำนวนผู้ใช้มากที่สุด และมีความสามารถในการปรับแต่งได้ตามความต้องการของผู้ใช้งาน อีกทั้งมีการสนับสนุนในการสร้างแอพพลิเคชั่นของผู้พัฒนา โครงการนี้เป็นแอพพลิเคชั่นเครือข่ายสังคม ที่นำเอาความสามารถของ Mobile Web Application และ Native Application เข้าไว้ด้วยกัน ผู้ใช้จะสามารถทราบได้ว่าเพื่อนคนใดอยู่ในบริเวณที่ต้องการ และสามารถค้นหาผู้ใช้อื่นๆ ผ่านการเปิด ใช้งาน Location-based services ซึ่งในอนาคตสามารถทำการขยายจำนวนผู้ใช้แอพพลิเคชั่นได้ด้วยการพัฒนาแอพพลิเคชั่นบนระบบปฏิบัติการอื่นโดยใช้แนวคิดเช่นเดียวกัน

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ABSTRACT

In these busy days, people always involve unexpected situations. Some situation might need friends to join activity at the time. However, it is not so easy to find nearby friends that can join an activity at the moment. This problem can be solved easily if one can find nearby friends anywhere and anytime. This becomes an inspiration to develop an Android application that assists the user to find friends in the area and contact with them to join an activity. Android is an operating system for touchscreen devices with the largest share in the market. It is customizable and supports developers to create applications. This project is the Social Network Application that combines Mobile Web Application and Native Application capabilities. By using this application with location-based services, user will know which friend is in the area and able to find other users. In the future another mobile platform application can be created by the same development concept.

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Chapter 1
INTRODUCTION

In chapter 1 discusses the necessity for having an application with methodologies, scopes, and expected outcome.

1.1 Background

Nowadays, people's lifestyle, especially in Bangkok, always involves traveling to many places. These travels may or may not be planned beforehand depending on the situation.

For example, there is an unplanned situation that might need some friends to join activity and want to find friends at the time. In this case, social network sites might be used for share status to find friends, but it may or may not have a response for that. The nearby friend may not see the status posted to the site. Some friends might leave comments in an unrelated topic. Alternatively, to call some friends to go with, how to find out which friend is available to go? That friend may be far away.

Another example situation is, supposed there is an appointment to see a movie with a friend, everything is planned and the ticket is bought. Unfortunately, that friend is sick and therefore, cannot make the appointment. Finding someone to go within a limited time is almost impossible. Calling another friend may not be a good option.

From the two examples, the problem can be easily solved if one can find friends in the nearby area on the spot. This becomes a motivation to create an application that any user would be able to find nearby friends doing activities together.

1.2 Objective

Social Network Application for Friending on Android is developed with the following objectives:

1. To design an Android application.
2. To develop an Android application.
3. To design a Mobile Web application.
4. To develop a Mobile Web application.
5. To develop a social network application for finding nearby friends in the area.

1.3 Methodology

Social Network Application for Friending on Android is developed with the following methods:

1. Study Android application architecture and its development.

2. Study social network applications and application components.
3. Analyze and Design system requirement.
4. Develop the application according to the design.
5. Do the system verification and validation.
6. Finalize and implement the application.

1.4 Scope

Social Network Application for Friending on Android is developed for finding nearby friends in the area, with the following scopes;

1. Study Android application architecture and the methodology of social network application development.
2. Design the system component as studied.
3. Develop the application for sharing current location of the user and finding nearby friends.
4. Develop a safe social network for finding friends.
5. Develop user review function.
6. Add functions to increase privacy for application's user.
7. Finalize and evaluate the application.

1.5 Expected outcome

1. Knowledge of Android application development.
2. An application that can be deployed for real usage.
3. Users are able to find nearby friends as needed.
4. Users are able to find friends safely.
5. The application can be a prototype for mobile application development on other platforms.

In this chapter is about background problems, objectives for developing, methodologies, scope of project, and expected outcome of the project. In next chapter will discuss about related theories of the project.

Chapter 2

BACKGROUND THEORY

This chapter provides relevant information on technology and background theory necessary for the development of the project.

2.1 Java

Java is a general-purpose, concurrent, class-based, object-oriented computer programming language that is specifically designed to have as few implementation dependencies as possible. It is intended to let application developers, meaning that code that runs on one platform does not need to be recompiled to run on another. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of computer architecture[1].

Java Technology consists of:

1. Java Virtual Machine (JVM) interprets Java Bytecode into machine language. Since Java Bytecode is platform independent so developers can use the same Java Bytecode in any platform and compile with JVM installed in that platform.
2. Java Runtime Environment (JRE) runs Java programs such as Java Application and Java Applet. JRE has JVM and Java Application Programming Interface (Java API) that contains necessary classes and interfaces.
3. Java Software Developer Kit (JDK) is a development kit includes JVM, Java Compiler and tools for development and other APIs. JDK is in Software Development Kit (SDK) and does not editor to write source code or run program, developers can use general text editor programs.

Java language and Java technology are the major tool to develop the Android application using the Android software development kit (SDK) and other development tools.

2.2 PHP

PHP (Personal Home Page) is an open source script language executed at the Server-side and forward results to client-side via web browser [2]. The major capability is to create dynamic content, in other words, interactive website, with Object-Oriented Programming, Database Management System, Security, Cookies, Session and so on. PHP is embedded to HTML for display results. Since PHP is a script language so it can be inserted in anywhere in HTML tags. Web server interpreter interprets PHP into HTML language on client-site. Moreover, PHP provides many protocol supports, many libraries and flexibility. Since PHP is easy to use and works efficiently, PHP becomes popular. PHP syntax is human-friendly that is

easy to understand. By using PHP, first is create PHP file (.php) instead of ordinary HTML file (.html) then insert tag <?php...?> where it necessary as an example in figure 2.1. PHP tag is inserted only for the echo line because the other line is only HTML code.

```
<html>
        <body>
        <?php
        echo "This is an example";
        ?>
        </body>
</html>
```

Figure 2.1 Example of PHP language

In any PHP function must be under tag <?php…?>, if PHP code is placed outside PHP tag the result will display as HTML file.

In this project, PHP is used for connecting MySQL Database. By using PHP, user location that is indicated from Android device can be updated to the server, as well as in Mobile Web application; information come from MySQL database and can be updated to the server.

2.3 JavaScript

JavaScript is a scripting language runs on client-side. Even though it seems to similar with Java language but it completely unrelated and have different syntax and semantics. JavaScript is developed for dynamic webpages, changeable by conditions, increase interact with users because original HTML language provide static webpage, static content, cannot interact with users. JavaScript can easily create a simple program for webpage. It often use for webpage display and interact with users such as when user pressed button to submit form, JavaScript will primary check the accurate input before forward to server.

To use JavaScript is place JavaScript code between <script> tags as an example in figure 2.2.

```
<html>
    <body>
        <script type="text/javascript">
            document.write("This is JavaScript");
        </script>
        <noscript>
            JavaScript is not supported;
        </noscript>
    </body>
</html>
```

Figure 2.2 Example of JavaScript code

As shown in figure 2.2, tag <noscript> is uses if user's browser does not support JavaScript or disabled it. To add external JavaScript code, for an example Script.js file using code in figure 2.3. In any page can add more than one JavaScript file by using the same syntax.

```
<script type = "text/javascript" src = "Script.js"></script>
```

Figure 2.3 Add external JavaScript file

In this project, JavaScript is used in Mobile Web application, working with other technologies such as PHP, AJAX, jQuery and JSON to request server for contents and get the response, then display contents in the application.

2.4 Structure Query Language (SQL)

Structured Query Language (SQL) is special-purpose programming language for Database Management. SQL is the standard language of relational database system and open system, which means SQL can be used in any database [3]. By using SQL on server, program runs faster than using tables. It can be classed into two categories:

2.4.1 Data Definition Language (DDL) is use for manage table, view and index structure. The most basic commands are shown in figure 2.4.

```
CREATE – creates a table in database
ALTER – modifies the table structure
TRUNCATE – removes all data inside table, not the table
DROP – deletes table
```

Figure 2.4 DDL commands

2.4.2 Data Manipulation Language (DML) is use for manage data in table. The most basics commands are shown in figure 2.5.

```
SELECT – gets specific data from table
INSERT – adds row of data into table
UPDATE – modifies data in table
DELETE – removes data in table
```

Figure 2.5 DML commands

2.4.3 Data Control Language (DCL) is use for manage data in table. The commands are shown in figure 2.6.

GRANT – authorizes user to perform an operation on some object
REVOKE – eliminates grants

Figure 2.6 DCL commands

There are numbers of Database Management System support SQL: Oracle, DB2, MS-SQL, MS-Access. SQL often uses together with other programming language like Java, C, C++, Visual Basic.

2.5 AJAX

Asynchronous JavaScript and XML (AJAX) is a group of interrelated web development techniques. A web application with AJAX can send and receive data asynchronously from server via AJAX Engine or known as XMLHttpRequest, without reload webpage. When users request to server, XMLHttpRequest will connect and send or receive data with server. XMlHttpRequest always connect server for any request at any time, different from past, HTTP or synchronous connection has to wait for server process requests and return results every time that user request. AJAX technology is created for solving the slow response problems. In spite of the name, XML might not be used and use JavaScript Object Notation (JSON) instead, and the request can be synchronous or asynchronous. JSON is a human-readable language. As shown in figure 2.7 an object contains string, number and object of address. It is language-independent that can parse to many languages. JSON is much like array data type that usually used for transfer data between server and client. In this project, AJAX is used for requesting data to display in an application and sending data to store in database, and using JSON to transmit data.

```
{
    "Firstname": "Adam",
    "Lastname": "Smith",
    "Age": 99,
    "Address": {
            "State": "Miami",
            "Country": "USA"
    }
}
```

Figure 2.7 JSON data example

In this project, AJAX is used to send and receive asynchronous data from server without reload pages. For example, when user enters friend's name in the input box, AJAX connects with the server and display friends' name that matched criteria. AJAX works with JSON to send and

receive JSON object between forms and pages, in Native application using JSON object to get data as well.

2.6 jQuery

jQuery is JavaScript Libraries include functions for developers to use by writing short program without creating whole function. jQuery can work with AJAX, create event listeners and can compatible use with CSS. jQuery has many plugins to use [4]. Major characteristics of jQuery are small file size, support three versions of CSS, and can display on every browser. jQuery has many plugins for developers, for examples are checking form formats, calendar plugin, or working with XML or JSON.

jQuery Mobile, a touch-optimized web framework for developing mobile application, creating user interface with HTML, JavaScript, CSS and using programming language in application such as PHP and ASP.Net. To use jQuery, for instance jQuery.js, insert <script> tag in a HTML file. Then use <script> tag to call JavaScript function as displayed in figure 2.8.

```
<script src = "jQuery.js"></script>
<script>
// JavaScript Function
</script>
```

Figure 2.8 JavaScript function calling from file

In other ways, using Google's CDN (Content Distribution Networks) to load the jQuery core file instead of created JavaScript file as shown in figure 2.9.

```
<script src="http://ajax.googleapis.com/ajax/libs/jquery/1.5/jquery.min.js">
</script>
```

Figure 2.9 JavaScript Function calling via CDN

In this project, jQuery is used to create functions in the application, for example, from checking, data loading, and data updating.

2.7 HTML5

HTML (Hyper Text Markup Language) is programming language for displaying webpage. HTML is written in form called HTML tags, usually come in pairs, opening tag and closing tag, for instance,

<html>....</html> use for start and end of web pages, other tags must be inside these tags.

Some html tags come in single tag, called empty elements, such as

 use for line breaks

HTML5 is the fifth version of HTML standard. The significant changing is new specific elements. The major characteristics are Geolocation, Multimedia, Offline Storage and new input type. Geolocation provides geolocation function such as get current location. Graphics Displays are elements for drawing or editing image without flash or any plugin. Multimedia is elements for video and audio without plugin. Offline Storage provides better support for local offline storage. New input type such as search, number, range, color, url, email, date, datetime, etc [5].

HTML5 integrated five HTML versions, CSS, and JavaScript APIs together. HTML5 is developed by people in technology world; Microsoft, Apple, Mozilla, IBM, HP, Adobe, etc. corporate with Universal Browser Standards increasing HTML5 efficiency. However, HTML5 is not formally standardized and browsers still not completely support for HTML5.

Examples of HTML5 using in this Project is get the current user location in coordinates, latitude and longitude, to find nearby friends or to get nearby place data.

2.8 Cascading Style Sheet 3 (CSS3)

Cascading Style Sheet 3 (CSS) is a style sheet language used for efficient manage looks and formatting on website. Developer is able to create format, called Style, easily. In common, used for specify content format, for examples background, font style, font size, etc. Style separates formatting from HTML content for easy use. Any pages use the same style will have the same format. Current version of CSS is CSS3 with more abilities than CSS2 [2].

For using CSS3 in HTML web pages, developers can do in three ways:

1. Inline style: CSS can be inserted into HTML tag by using style attribute as shown in figure 2.10. This style loses advantages of style sheets by using style in content separately.

```
<p style = "color: blue">This is an example</p>
```

Figure 2.10 Inline style example

2. Internal style sheet: this method is to insert <style> tag inside <head> tag. As displayed in figure 2.11, it might be used when a document has a unique style from other pages in website, only this file has this style.

```
<head>
        <style type  = "text/css">
        p{ color : #FFFFFF; }
        </style>
</head>
```

Figure 2.11 Internal style sheet example

3. External style sheet: developers can create external style sheet file (.css) for using in the whole website as the code in figure 2.12.

```
p{ color : #FFFFFF; }
```

Figure 2.12 Create CSS for website

Assume that the previous style has been saved in the name style.css; this style sheet file can be attached to the HTML file in the <head> tag by using code in figure 2.13.

```
<head>
        <link rel = "stylesheet" href = "style.css" type = "text/css />
</head>
```

Figure 2.13 Attach style to HTML file

In every page that use this style has the same format as defined in style sheet file. The major advantage is style can be managed by a single file.

This project uses external style sheet CSS, so every pages in the application have the same style defined by CSS.

2.9 Android

Android is an operation system designed for touchscreen devices, mobile phone and computer tablet, developed by Android, Inc., which is bought by Google in 2005. Android is free software, allow developers to use or adjust as needed by Java language, and control device by Java libraries released by Google. Android is an open source that capable with many devices so it gains market shares quickly. Developers are able to view or modify android source code. Android can work with hardware, database management, GPS system, Bluetooth transceiver, Camera, and graphic designs [6]. Android architecture consists of Application, Application framework, Libraries, Android runtime and Linux kernel as shown in figure 2.14.

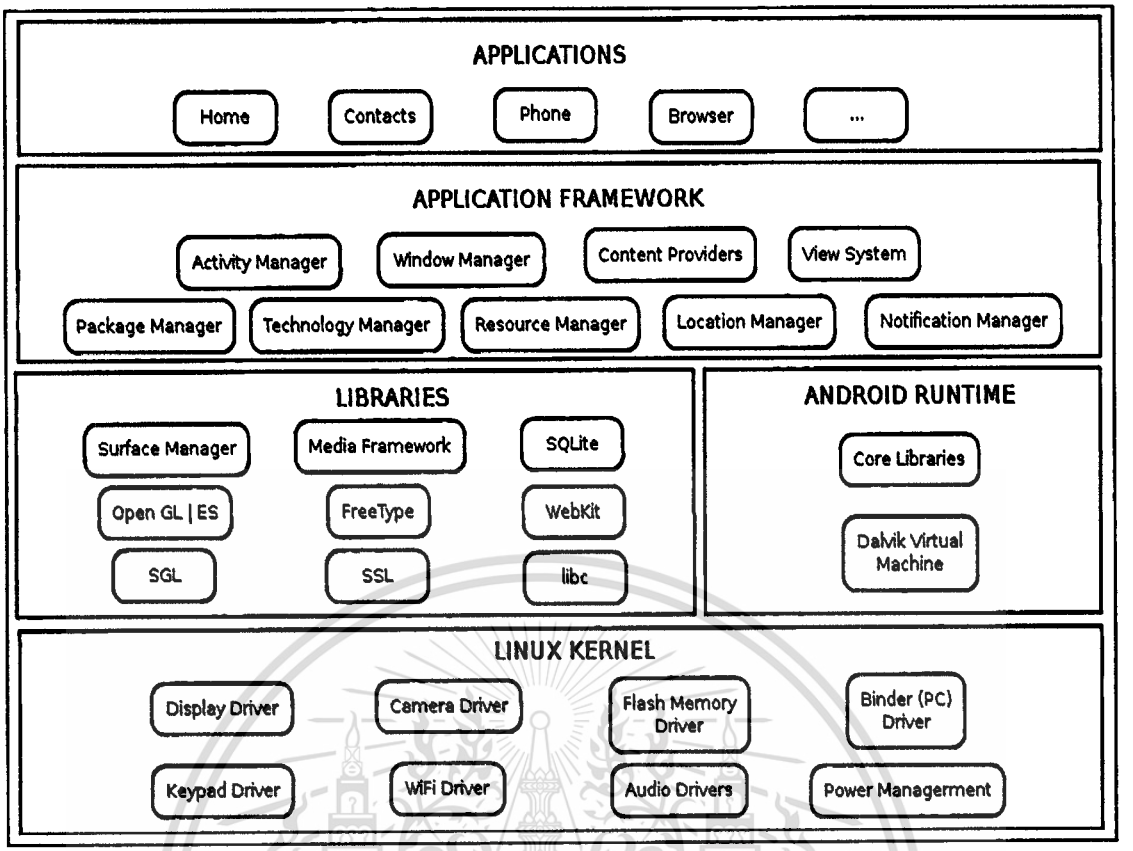

Figure 2.14 Android architecture

1. Application is program that comes with the operation system or users install them in their devices.
2. Application framework is where developers can use for develop application easily by using Java programming language via API. For example, Activity Manager manages activities of application. View System manages views and layouts of user interfaces. Resource Manager manages and access resources in device such as texts or photos. Location Manager locates device's geographic location
3. Libraries are the utilities for developer, developed by C or C++. For instance, Media framework uses for managing pictures and audios. SQLite is used for manages local database embed in devices. OpenGL (Graphic Library) is an application program interface (API) uses for producing 2D or 3D graphics. Secure Sockets Layer (SSL) manages Internet security.
4. Android Runtime – uses Darvik Virtual Machine for run program, developed for using on handheld devices. Core Libraries include necessary commands written by Java language.
5. Linux Kernel manages and controls operation system kernel, work with other subsystem such as security system and memory system.

Before create an application, there are some program must be installed; IDE Eclipse, Java JDK, Android SDK, Android ADT, these software are free for Android developers.

Android Software Development Kit (Android SDK) is developed by Google Inc. includes a set of development tools: debugger, libraries, emulators, documents, sample code and tutorials. Developer can download for free. Android SDK can be installed in two ways: from IDE Eclipse or directly downloaded at http://developer.android.com/sdk/index.html and install ADT Plugin to finish preparation of Android development.

Android Development Tool Plugin (ADT Plugin) is a plugin of IDE for developing mobile application, which is a part of Android SDK. ADT Plugin increases Eclipse performance for easily creating Android application. It also creates application user interface, debug application with Android SDK tool, and export a signed or unsigned application file (.apk) for installation in Android device. ADT Plugin can be installed from Eclipse in menu Install New Software.

2.10 Mobile Application Development

Mobile Application Development is the process in developed application for handheld devices. Mobile application is different from desktop application that users can touch to interact. Since each device has different screen size and resolution, the major concern is an application display and limited capability of each platform. Android devices are divided into three categories of pixel density, low, medium and high. There are two type of mobile application include Native Application and Mobile Web Application.

Native Application is any application only runs on mobile device, which be installed directly on device after downloaded from provider or developer. Develop methodology is depends on mobile operation system and platform, in Android is using Java. The obvious pros is works fast than Mobile Web Application, but because users have to install directly on devices, when developers create an update version and users do not install and update may cause effect on new function. Furthermore, developers must concern about different resolutions on different devices.

Mobile Web Application is an application that connect Internet and use some mobile device function, using app on web browser on mobile, does not need to install into device before used. Developers create an application once, independence from device platform. Users have the same version of application that has been updated at server-side. But the limitation is cannot use some native functions.

This project developed in hybrid, most function developed in Mobile Web Application, using Native Application function for access to hardware and data in the device.

2.11 IDE Eclipse

IDE (Integrated Development Environment) is a software application assists developers with useful facilities. In general, IDE consists of source code editor, compiler and debugger. The main purpose of using IDE is to reduce numbers of development tools. By using IDE, developers can use features of authoring, modifying, compiling, and debugging in single software.

IDE Eclipse or Eclipse is a software development environment with workspace and extensible plugin system. It can be used to develop an application in Java and many languages plugin including C, C++, Python and Pearl. Because Eclipse is free software that developed for developers, the numbers of users rise fast.

Users can increase its abilities by installing plug-ins for Eclipse Platform such as development toolkits for other programming languages. If developer want Eclipse do another function, he can develop plug-in for that purpose and install plug-in to Eclipse. Plug-in that attached with Eclipse Downloading is Java Development Toolkit (JDT) use for debug java application

Eclipse is easily install by extracting downloaded file and place to anywhere you want, support many languages, can work on many operation system including Windows, Linux, and Mac.

2.12 Social network

Social network is a social structure including people, relationships, behaviors, actors, and every about human. Social Network sites have increased in popularity such as Facebook, Twitter and YouTube, or can be called virtual communities. By using social network sites, one can have the opportunity to know friends of friends, and know friends of their friends, and know others in future, causes the fast growth in social network sites users. The reason that people uses social network sites is from human needs, they may want acceptance of others, expectations, share feelings with others. Social network can be categorized in many ways, it is possible to categorize in the purpose of use, as followed:

1. Identity Network is where users can create their own identity in sites, sharing their stories, may be in texts, photos or video. They can also create groups of friends for their own. For example, Facebook and Twitter.
2. Creative Network is where users are able to present their own creativities, video, music, and picture, such as YouTube, Flickr.
3. Passion Network is where users can share their favorites for others to see, sharing the same interested, and rating contents. Zickr is one of this social network types.
4. Collaboration Network is the sharing knowledge and idea networks for continuous improvement. Users can enter sites for create, edit, or comment on these sites, such as Wikipedia, Google Maps, or some Webboards.

5. Virtual Reality is where users can create the virtual characters and live in sites, something cannot be done in real life. Most of these sites are games, for example SecondLife and World Warcraft.
6. Professional Network uses for finding jobs, careers, or employees. Users can use social network capabilities to create their profile, portfolio, or even online resume.
7. Peer-to-Peer (P2P) is where users directly connect each other, for sharing information or data, for examples Skype and BitTorrent.

Social Network Application for friending on Android is in the first category, for sharing users' activities and searching for friends in area, sharing their activities on the application.

2.13 Geolocation

Geolocation is the identification of real-world geographic location of objects like mobile phone or handheld devices that can connect Internet. Geolocation is a point that can be identified by Latitude and Longitude [7].

Latitude is an angle that ranges from 0-degree at the equator to 90-degree north at North Pole and 90-degree south at South Pole. Line of constant latitude, parallels, is the horizontal line that runs east to west as circles, parallel to the equator. A distance of each degree is about 111 kilometers.

Longitude is an angle that ranges from 0-degree at Prime Meridian (Greenwich Meridian) to +180-degree east and -180-degree west. Line of constant longitude, Meridian, is the vertical line that runs from North Pole to South Pole, as it is, a distance of each degree is 111 kilometers at the equator and 0 kilometers at poles.

The degrees of latitude and longitude are broken down into degrees, minutes and seconds. Every degree is 60 minutes and every minute is 60 seconds [8]. For an example the approximate coordinate of Bangkok is 13° 45' 0" N, 100° 31' 0" E means 13 degrees and 45 minutes north of the equator and 100 degree and 31 minutes east of the Prime Meridian. In general, coordinates founded in decimal degree by the calculation in figure 2.15.

Calculate the total number of seconds;
45' = 45 * 60 = 2700.
Take this total and divide it by 3,600;
2700 / 3600 = 0.75.
Add this fraction to the whole number of degrees;
13 + 0.75 = 13.75.
If the coordinate is a South latitude or West longitude, negate the result;
The result is still 13.75 as it is North of the equator.

Figure 2.15 Calculate coordinates into decimal

Since the spherical geometry is different from Euclidean geometry, in other words globe is not a symmetric sphere, in the distance calculation cannot use the simple distance calculation between two points on sphere which is the length of a strength line from one point to the other. There is a formula called Great-circle distance or orthodromic distance, the shortest distance between two points on sphere's surface.

2.14 Google Maps API

Google Maps is an application on Google sites that provide services for searching maps or places that users want. It revolutionized the static maps on webpages by letting user interact with it. User can drag the map to navigate the map. Google Maps is now available on both website and mobile application. Google Maps is HTML, CSS and JavaScript working together. When users navigate the map, the API sends the new coordinates and zoom levels of map in AJAX calls that return images.

Application Program Interface (API) is the way to use program function via interface provide by the provider. Developers do not have to learn all functions in program for using it, all they have to do is using via that interface.

Google Maps API is one of Google services that developers can use Google Maps data provided by Google on their own application for free. Google Maps API consists of JavaScript files contain classes with methods and properties can be used. In this project, Google Map API is use to display maps in application, routing, searching place, calculating distance, and making personal map. The current version is Version 3, which the most significant change from version 2 is no need to use API key. It also changes the script-written style to be more object-oriented, some interface change such as marker icon and polygon drawing [9].

2.15 Location Based Services

In this mobile Internet era, people can access Internet at anywhere and anytime via mobile devices. To obtain real time information, location based services have become necessary for getting an exact place in the exact time. Location based services (LBS) are information services accessible with mobile devices through the mobile network and utilizing the ability to make use of the location of the mobile device. LBS consist of three technologies, New Information and Communication Technologies (NICTS) such as mobile telecommunication system and mobile devices, Internet and Geographic Information Systems (GIS). These technologies usually provide one way communication, for instance, Internet provides information that user requested, GIS provides map that user searched. LBS give two way communication and interaction between user and provider. User gives provider the context such as place name. Provider responses by giving place information that matched criteria. LBS

difference from GIS that GIS usually work on tremendous computer system which require much resources while LBS run on limited resources like mobile phone.

LBS compose of five components: mobile devices is used for requesting information user needs, communication network that transfer request and response, positioning component to specify the location, service and application provider, data and content provider that store base data for provide information user need. Positioning component indicate user position by using mobile communication network or Global Positioning System (GPS).

Location based services can be classified as user-requested services (pull services) and triggered services (push services). In a pull service, information delivered when user requested, user decides when to retrieve location. For instance, user uses a service to find the current location when got lost. In a push service, information delivered when user might not directly requested. For examples, user makes a phone call to an emergency center that can trigger a location automatically. Advertisement messages send to users who are in the shopping area.

LBS usage can be classified in 5 categories. To locate user or place, for instance, where the user is. To search for persons, places or events, such as where the nearest Japanese restaurant is. Navigating to somewhere, for example, how to go to shopping mall from the train station. Identifying from the searching criteria such as user searching for convenient store in the area. Checking for events at nearby or that location. Information that need for searching, identifying and checking are static information and topical information. Static information is not change over the time like place name. Topical information may change when user moves or time passing such as weather forecast or traffic information. The examples of LBS application: car park guidance, travel guides, product tracking, games, emergency calls, advertisement, road tolling, friend finder, instant messaging, and so on.

The different of LBS from other Internet based media is the context awareness. Context is information that used to characterize the situation of entity, which is a person, place or object. Context can be the identity of user such as age and gender, location, time, orientation, navigation, purpose of use, social and cultural situation, physical surrounding, and system properties. The difference context will cause different response. For an example, if user often searches for shopping mall, an application might suggest a nearest shopping mall before other place. To response to context can be done in four levels: information level is to filter information for user before display, technology level is for difference devices that have difference screen size and resolution, user interface level, and presentation level. Using LBS services, privacy must be concerned. Since user location can be tracked or user previously action can be analyzed, users should concern about their security and privacy.

The example of using LBS: User would like to search for the near place and get a route to that place. After user search for a place by mobile phone, it sends the request information through gateway contains search criteria and user position that obtained from GPS or a network

positioning service. Gateway is the communication networks that exchange message and store requested information. The application server processes the request and forwards the information that user need, which includes place information and calculated route. The application displays list of places and distance [10].

To send requests or retrieve data, mobile devices are used to access location based services such as portable navigation devices (PNDs), Personal Data Assistants (PDAs), laptops, or mobile phones. Location based services is usually software developed by provider, downloaded and installed in user's mobile devices. Because of the limited memory and battery capacity, the application must be lightweight and battery saving. Location bases services applications does not require manual input for location but using some technologies such as satellite positioning, cellular network positioning or WLAN stations. Service providers process service requests and send back responses. In Android devices, GPS is built in GPS receiver and system is responsible for updating location change. Android devices have advantages of being an open source, supported by many hardware manufactures, have number of users and third party development is encouraged [11].

Location that provides by GPS is more accurate than which is from Cellular Network but it has limitation in some area such as indoors. Android indicates user's location by using Android component called LocationManager, LocationListener, and Location. LocationManager is class for access location system services in Android device. LocationListener is an interface that gets data from LocationManager when location is changed. Location is class for display geolocation. After created LocationManager instance, technology for locate user's position must be specified such as GPS or Cellular Network. This technology selection is effect to the accuracy and power requirement. GPS provides more accurate location than Cellular Network but it consumes much battery power. This application set criteria in Criteria class to set fine accuracy and require low power. Then select the best provider from these criteria, for example using GPS to provide location if GPS function is on and has more accuracy than Cellular network or using location provided by Cellular Network if it is better. The LocationListener interface receives notifications when location has changed and update current location to online database with minimum time between updates and minimum distance change before updates [12].

2.16 Location based service application

As the previous discussion, there are many location based service applications. In this section is going to discuss on four interesting applications that related to this project.

2.16.1 Foursquare is an application that user can share and save the visited place. User can use the application for find recommendation to do next that personalized by user location, friends and previous usage. User can use Foursquare on Foursquare application, mobile web, or any application that can connect

Foursquare. User receives points on each check-in and sometimes badges. Another interesting feature is if a user has checked-in to a place more than any user in 60 days, that user will be crowned mayor in that place. In figure 2.16 is an example of map that shows nearby friends [13].

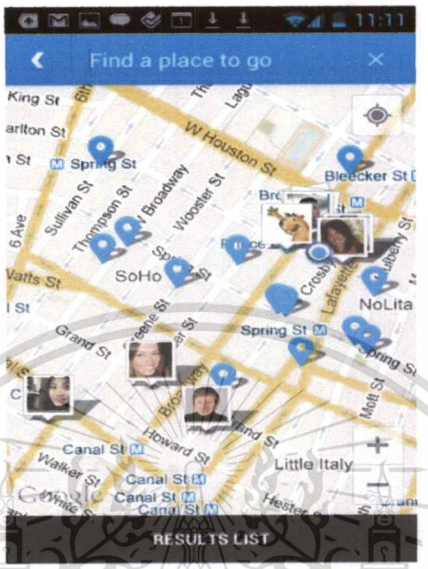

Figure 2.16 Nearby friends in Foursquare application

2.16.2 Find My Friends is an application on iOS devices. User can share location with the selected people using GPS. This application synchronizes with other iOS application such as Contacts and Maps. User can get the distance between user and friend after that friend has accepted request to follow location. In iOS6 it has location-based alerts that notify when friends leave or arrive the area. In figure 2.17 shows nearby friends and distances [14].

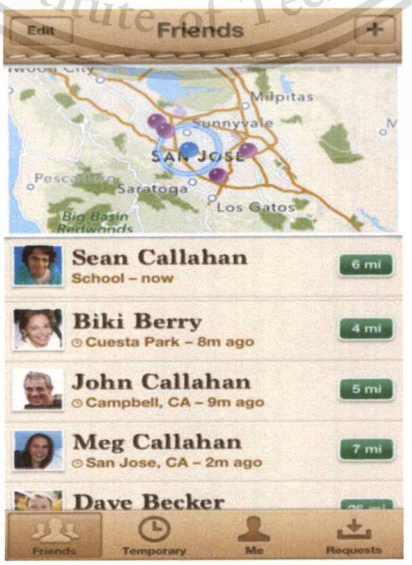

Figure 2.17 Nearby friends in Find My Friends application

2.16.3 WhosHere is an application that use location based service with social network to interact with people in the area. This application can display other users in area and distances and send friend request to make friends. This application can connect to Twitter account, make profile to display to others, view nearby friends, view other user's profile, add friends, and send gifts. In profile setting is some personal detail and user's interests. It allows users to send a message, pictures or call via VoIP as shown in figure 2.18 without enclose any personal information. This application is available on iOS, Android, and also on website. [15].

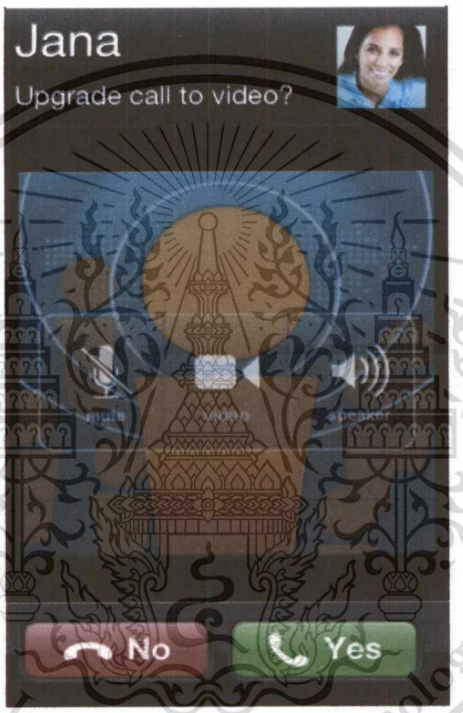

Figure 2.18 VoIP call in WhosHere application

2.16.4 Friendthem is a mobile application on iOS devices and Android devices. It allows user to connect with other people nearby via Facebook or Twitter. It brings the two most social networks together and connected it. User can sign in to this application by using Facebook account, Twitter account or both. Friendthem concerns about privacy so user can decide what information to share. User setting displayed in figure 2.19, set to show picture and hometown from Twitter, show education from Facebook. If user does not want to use data from these two applications, user can customize it. In hiding spots configuration is to set location that user does not want share location automatically. In nearby function shows people nearby, their locations, Facebook or Twitter account, and mutual friends [16].

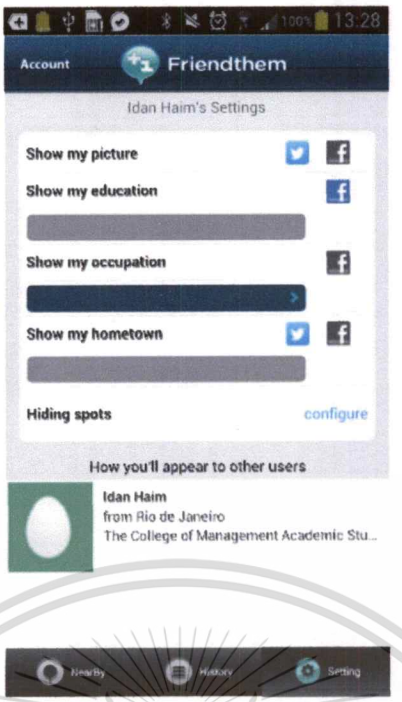

Figure 2.19 Privacy setting in Friendthem application

In chapter 2 informs the necessary theories to understand and develop this project. Next chapter will discuss about the analysis and design of system.

Chapter 3

SYSTEM ANALYSIS AND DESIGN

In this chapter discusses about analysis and design of the system consists of user requirements analysis and system design. User requirement is the users' expectation from this application. System design is the detail of architecture, components, functions, interfaces and data in the system.

3.1 User requirement

Social Network Application for friending on Android is developed for searching for friends in area to do activity together and make an appointment with time and place for the incoming events. The major characteristics of applications are:

1. Create new activity with specify date and time.
2. Searching nearby friends and invite them to join user's activity.

3.2 System design

3.2.1 System Architecture

According to the figure 3.1, this system consists of user side and server side

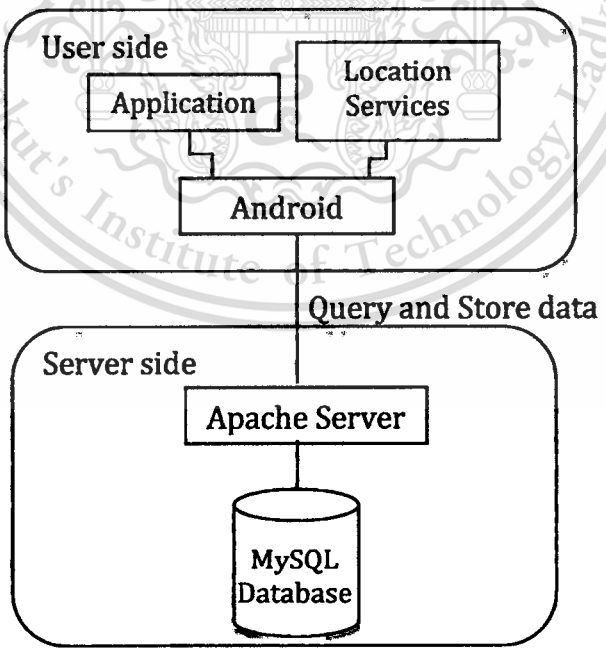

Figure 3.1 System Architecture

At the user side, user has to install program in their devices, turn on location function, and connect the Internet before use. Application will display information from online database.

After created an account for the first time, user will be able to view information such as user's activities and friends' activities, create new activity, send an invitation to friend to joint an activity, search nearby friends and other users in the area, or view and response requests of activity invitation and friend request.

At the server side, use Apache server to connect MySQL for managing database. Information displayed in the application in user side is from MySQL database and when any user interacts with the system, data will store in the database, including user current location, which automatically update to the server.

3.2.2 Use Case Diagram

In this application have ten major activities that user can interact with the system as shown in figure 3.2.

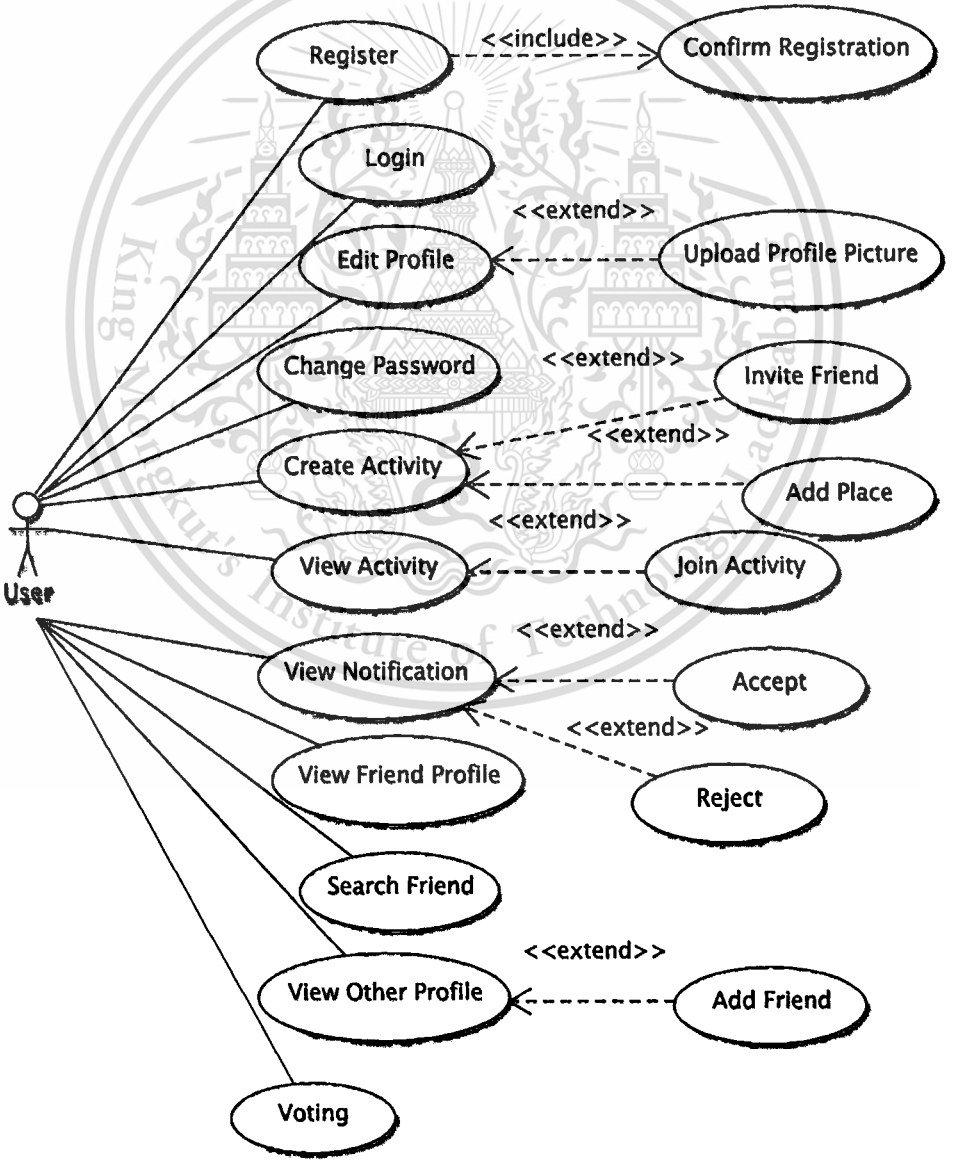

Figure 3.2 Use Case Diagram

3.2.3 Activity Diagram

Activity diagrams present the work flows of activities that exist within the system, which are Registration, Login, Edit Profile, Change Password, Create Activity, View Activity, View Friend Profile, View Notification, Search Friend and View Other Profile.

3.2.3.1 Registration activity happened first time when the user uses the application. Before using it user must create an account by using email and password, email that can be used is the unregistered email in the system. System works is shown in figure 3.3 to check email and password format and check if the email is existed within the system. If the email that has been entered exists within the system or user input is incorrect format, user must re-enter data.

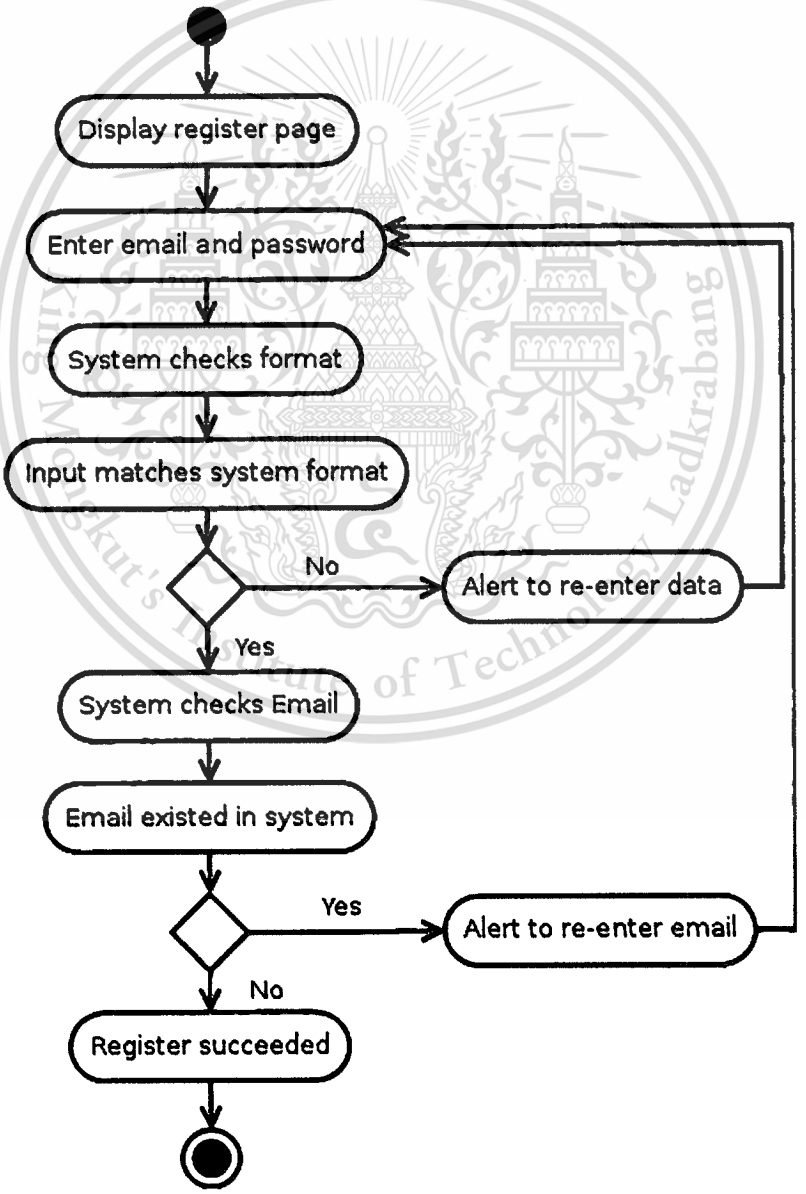

Figure 3.3 Registration activity

3.2.3.2 Login activity happened when the user does not logon in the system but already has an account. User then uses email and password for logging follow by the sequence as displayed in figure 3.4, system will check correctness of username and password and logon to the system. After the user entered email and password, system then checks the correctness and alert to re-enter data if the email and/or password is incorrect.

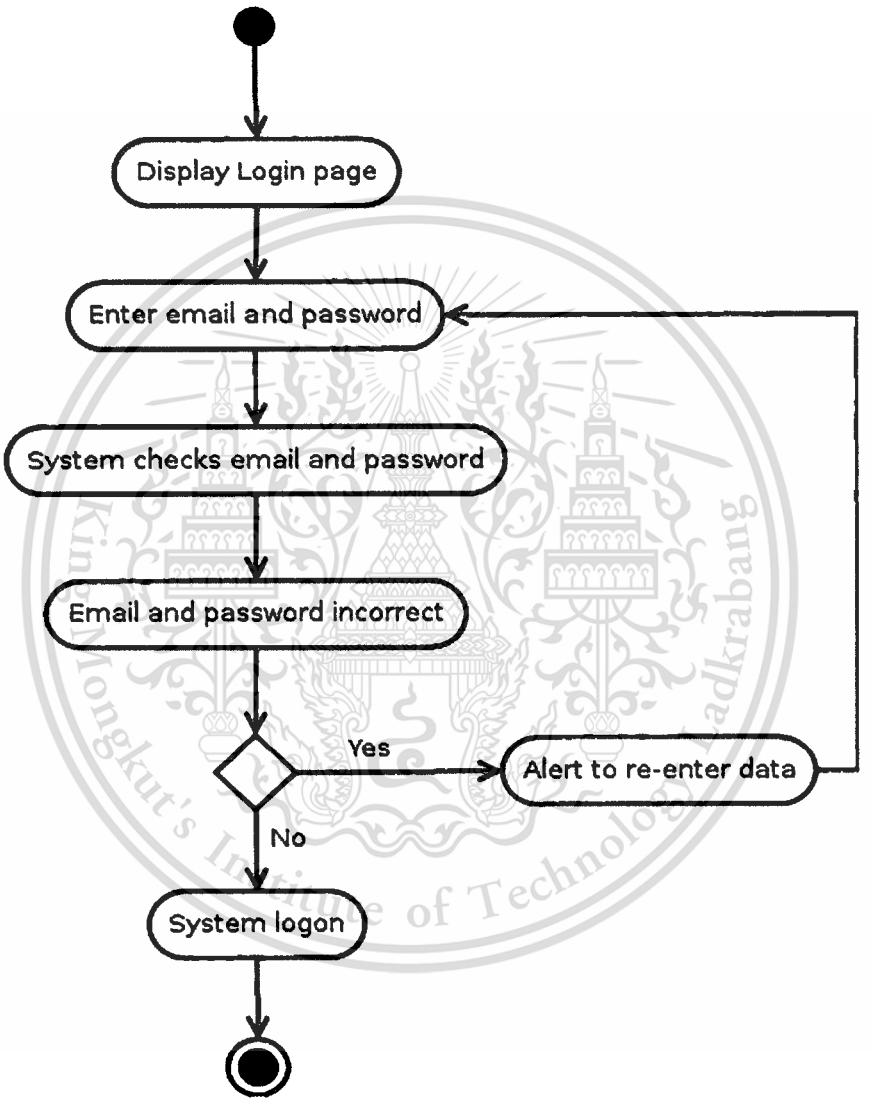

Figure 3.4 Login activity

3.2.3.3 Edit profile activity is happened when the user first creates an account and later when the user wants to change profile. As displayed in figure 3.5, user has to enter the correct format data to edit profile.

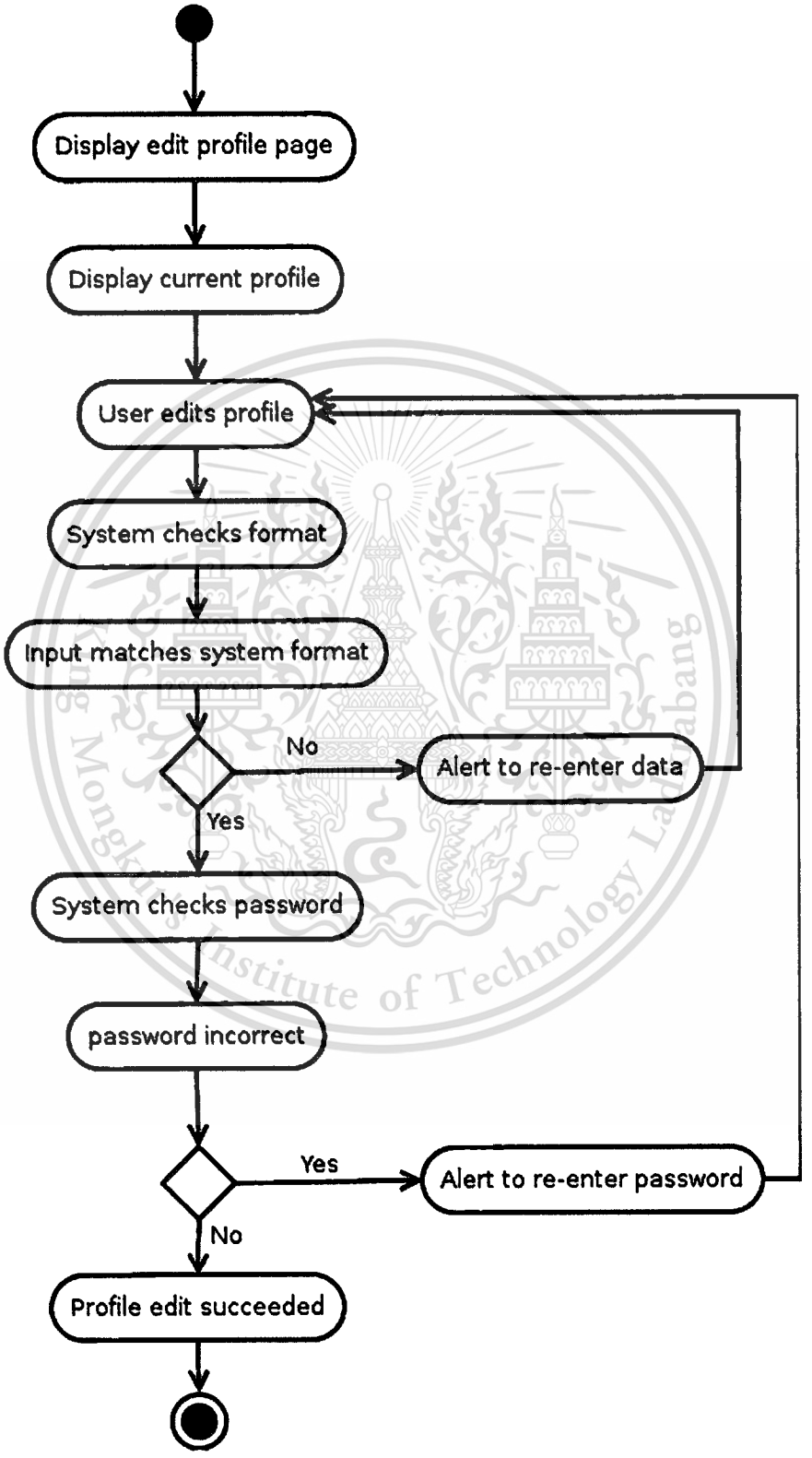

Figure 3.5 Edit profile activity

3.2.3.4 Change password activity, if the user wants to change password, user must enter a new password in the correct format with a correct old password to complete changing password as in figure 3.6.

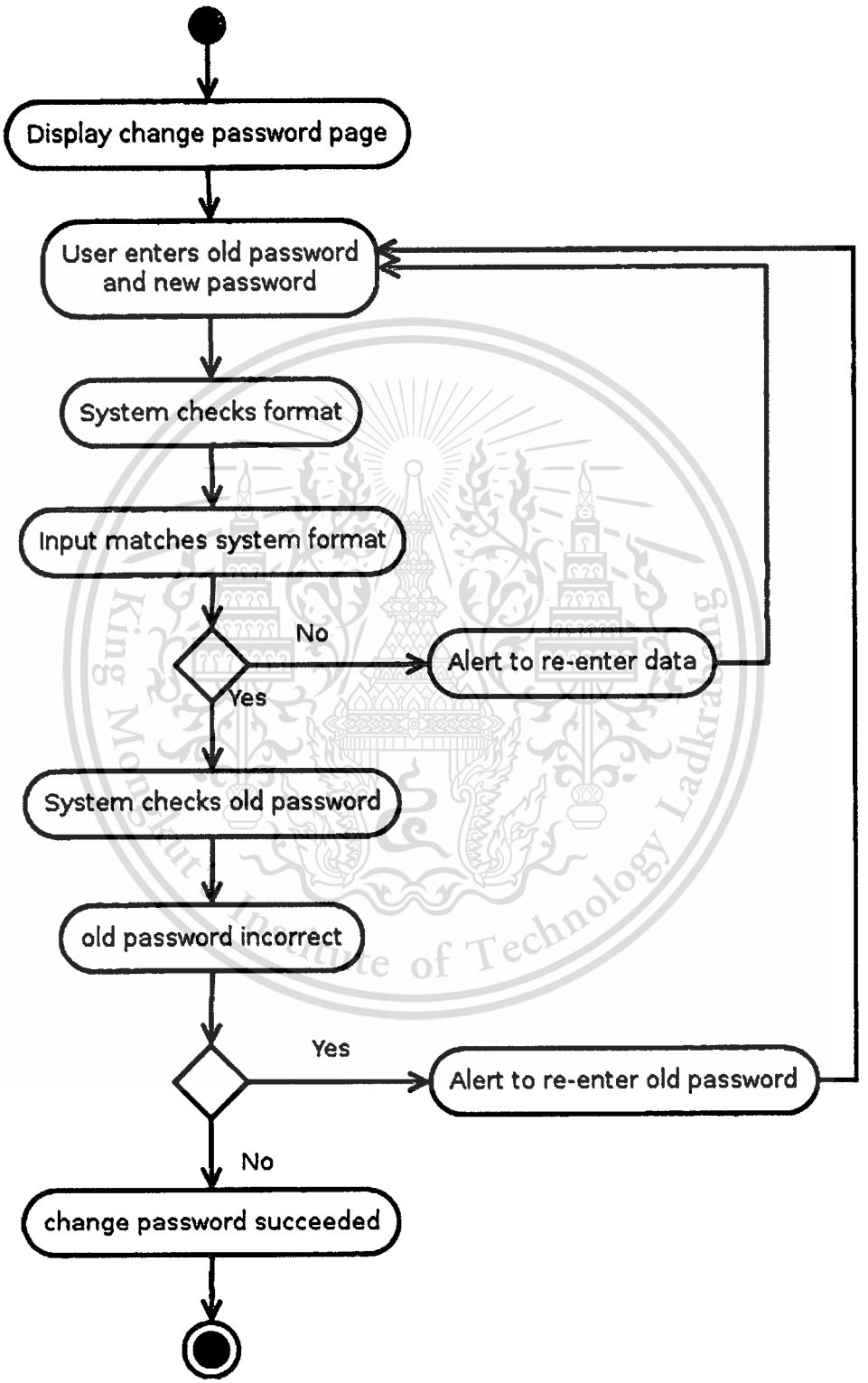

Figure 3.6 Change password activity

3.2.3.5 An activity of create activity, system will display nearby place data in the system for user to select or user can create new place data for that time as shown in figure 3.7.

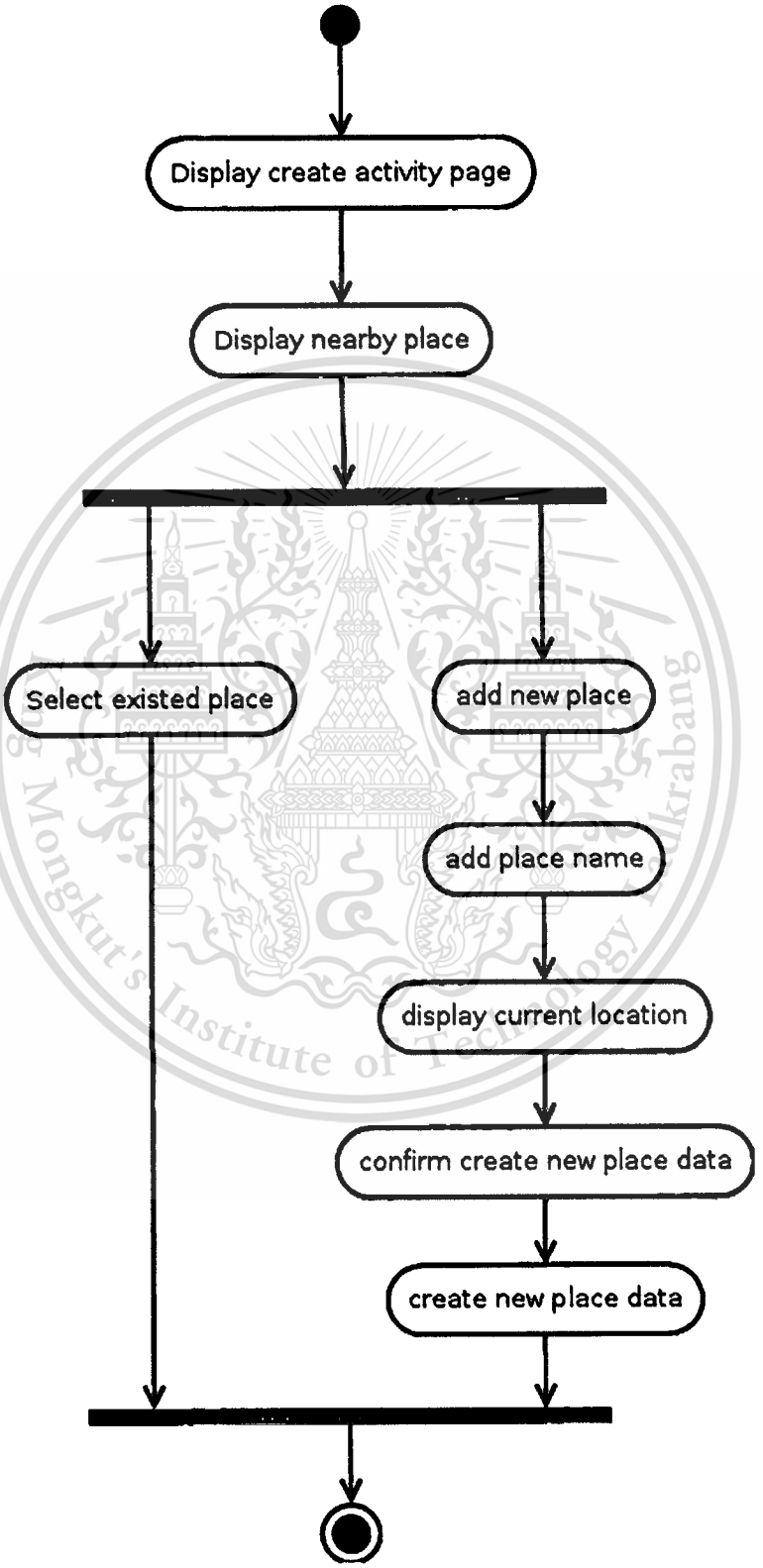

Figure 3.7 Create activity

3.2.3.6 An activity of view activity is the activity when the user is in feed page. System works as figure 3.8 to display recent activities of user and friends. User can send a request to join any activity that friends have been created.

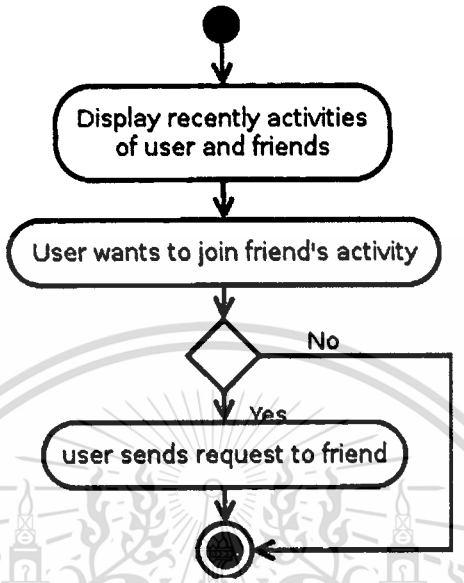

Figure 3.8 View activity

3.2.3.7 User can view notification activity in notification page. System displays notifications that user has not responded yet, which order by the latest notification. In figure 3.9, user can choose to accept or decline notification.

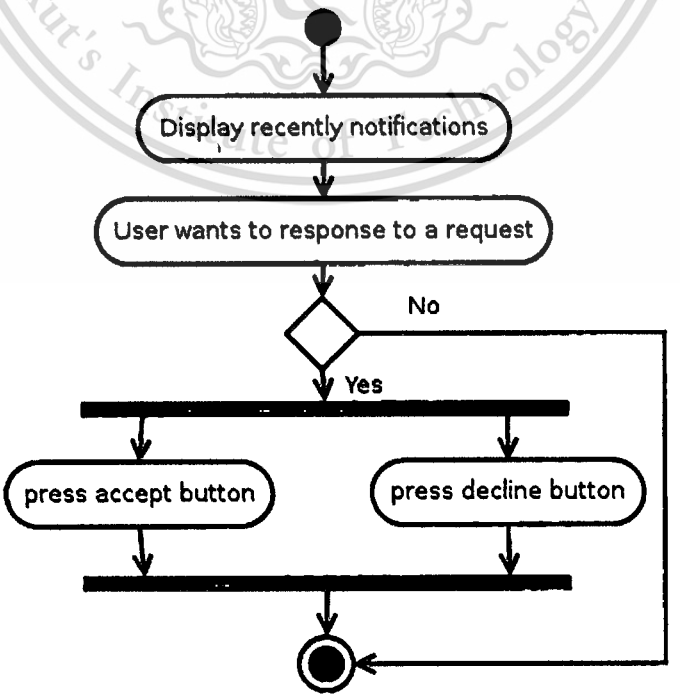

Figure 3.9 View notification activity

3.2.3.8 View friend profile activity in figure 3.10 is when user wants to view friend's profile, after listing user's friend and select a friend, friend's profile will be displayed.

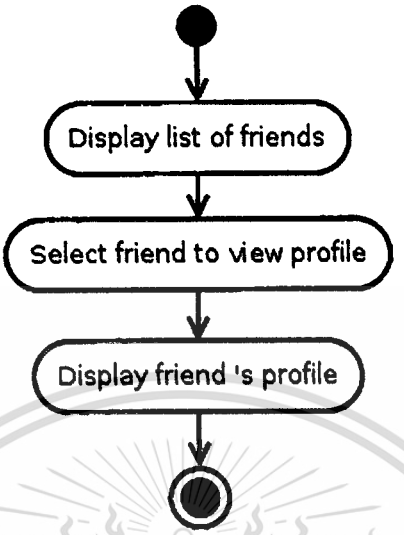

Figure 3.10 View friend profile activity

3.2.3.9 Search friend activity is a flow when the user wants to find friend, user enters name or email for searching and if data match any data in the system, data will display.

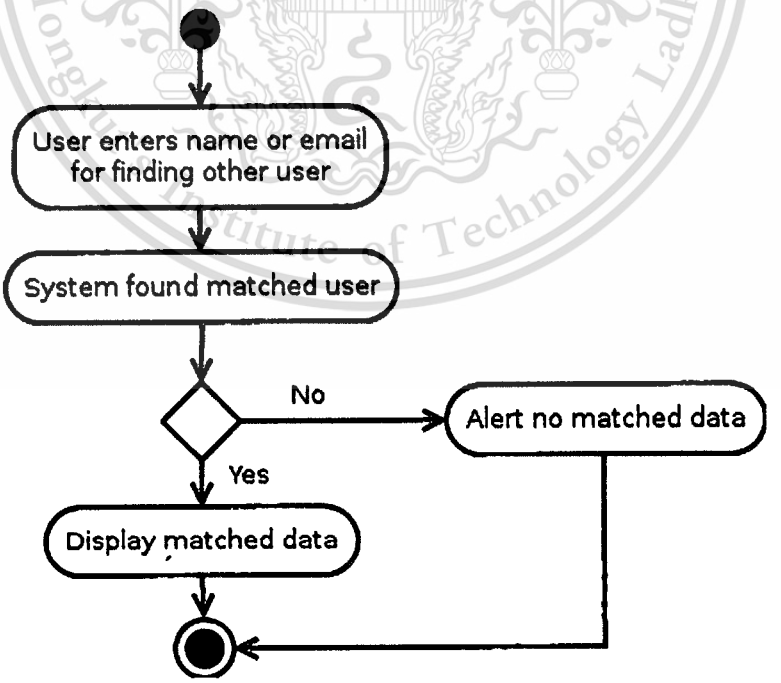

Figure 3.11 Search friend activity

3.2.3.10 View other profile activity is when user view non-friend's profile. If user wants to add that user to be friend, user can send a request.

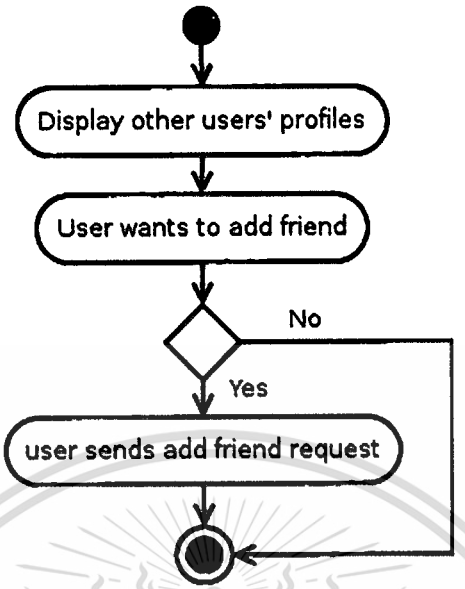

Figure 3.12 View other profile activity

3.2.3.11 Voting activity is when the user views non-friend's profile. If the user wants to add that user to be friend, user can send a request.

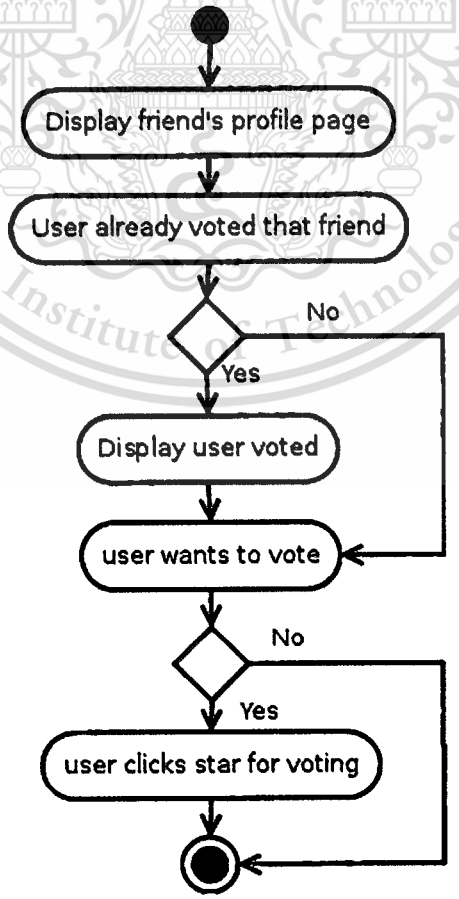

Figure 3.13 Voting activity

3.2.3 Class Diagram

Class diagram describes the structure of a system by presenting classes. Every class includes operations, attributes and classes' relationships. Operation or method is class function. Attribute is a data in class. Classes' relationship describes which class interacts to which class. In this project, Class design diagram consists of 7 classes as displayed in figure 3.14, which are UserProfile, User, Location, Activity, Place, ActivityGuest, and Notification. UserProfile class is an entity of user that store user personal data. User class is for use functions in application, Location class stores user's location and continuously updates location. Activity class stores activity data that happen in the application. Place class stores place data in the system. ActivityGuest class stores user that joins in activity. Notification class uses for store notification data and alert to notification receiver.

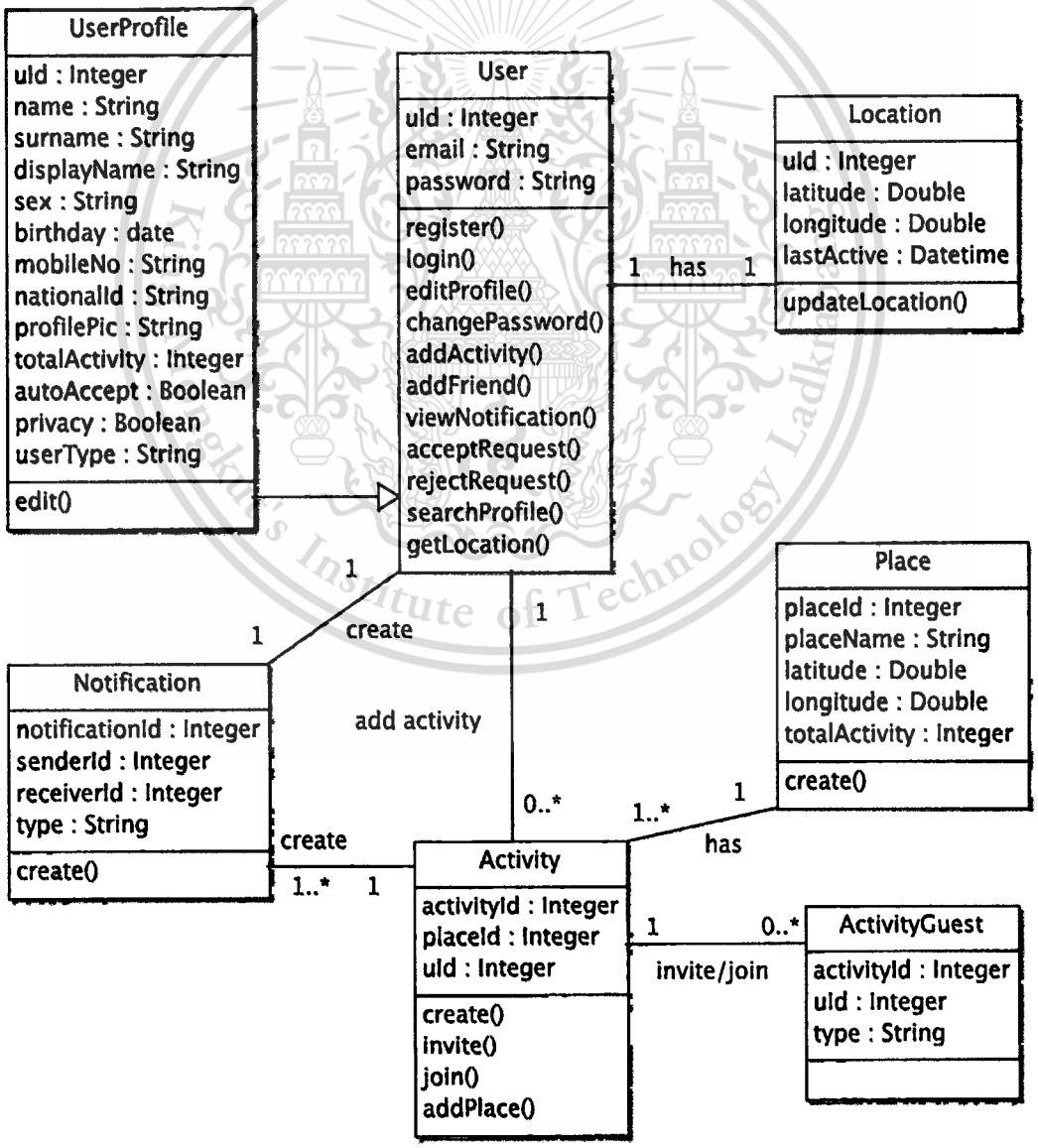

Figure 3.14 Class Diagram

3.2.4 ER-Diagram

ER-Diagram presents a database in the system composed of data in tables and relationship of data. There are eight tables in this database as shown in figure 3.15, consists of USER_DATA, FRIEND_REQ_NOTIFICATION, USER_LOCATION, ACITITY_NOTIFICATION, ACTIVITY_DATA, ACTIVITY_USER, PLACE_DATA, FRIENDSHIP_DATA, which are going to describe later.

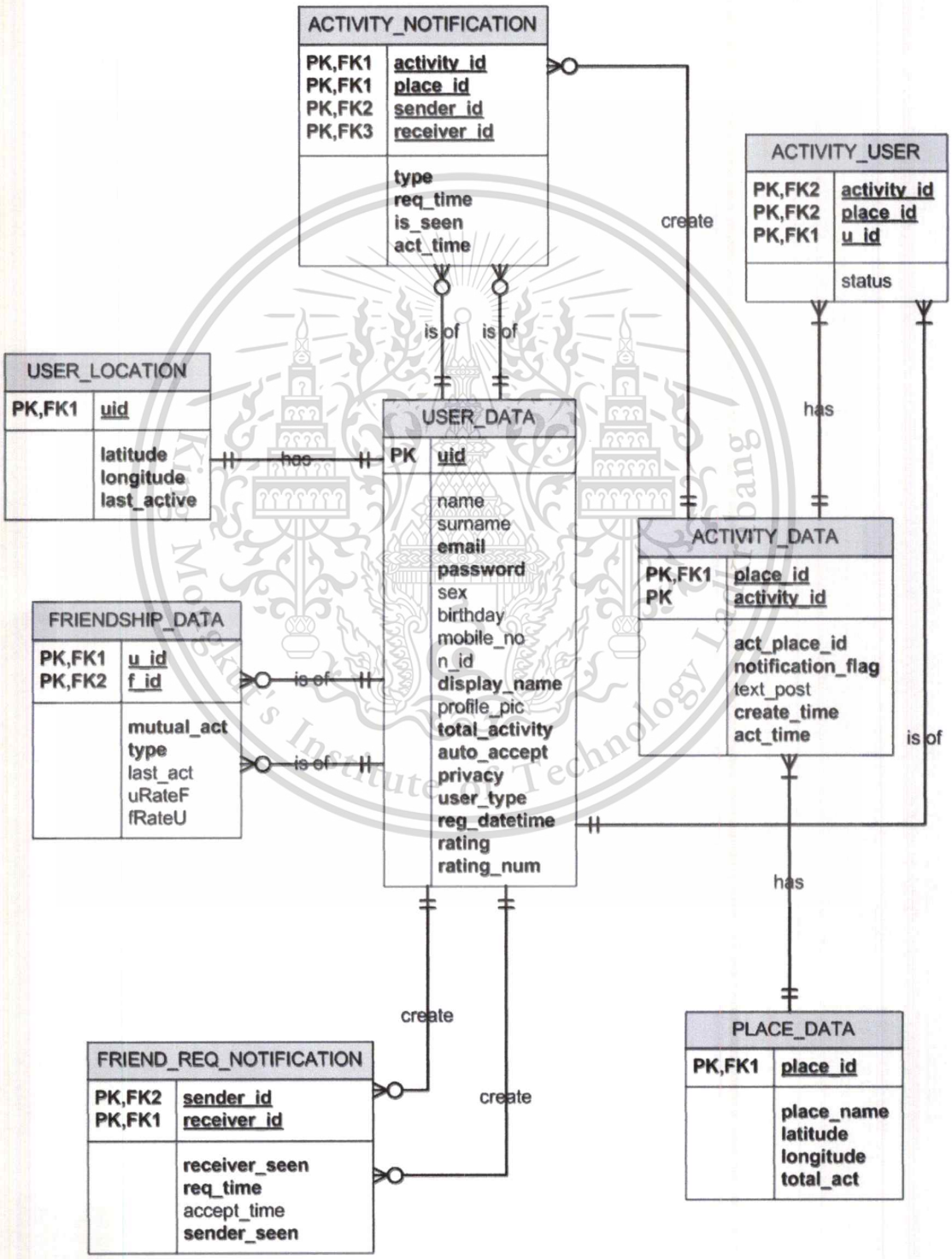

Figure 3.15 ER-Diagram

3.2.5 Data dictionary

Data dictionary describes database details in each table.

3.2.5.1 In table 3.1 presents all tables in the database with descriptions.

Table 3.1 Data Dictionary

Table Name	Description
USER_DATA	Table for user data
FRIENDSHIP_DATA	Table for user's relationship
FRIEND_REQ_NOTIFICATION	Table for notification of friend request
ACTIVITY_DATA	Table for activity data
PLACE_DATA	Table for place data
ACTIVITY_NOTIFICATION	Table for notification of activity
ACTIVITY_USER	Table for user id in activity
USER_LOCATION	Table for latest location of user

3.2.5.2 Table 3.2 describes USER_DATA table which is used for personal data of user to display in an application and application setting.

Table 3.2 Data Dictionary of Table USER_DATA

Attribute	Description	Data Type	Length	Key	FK
uid	user id	INT	5	PK	
name	user firstname	VARCHAR	20		
surname	user lastname	VARCHAR	20		
email	user email	VARCHAR	30		
password	user pasword	VARCHAR	20		
sex	user sex	VARCHAR	1		
birthday	user birthdate	DATE			
mobile_no	user mobile number	VARCHAR	10		
n_id	user national id	VARCHAR	13		
display_name	user display name	VARCHAR	20		
profile_pic	user profile picture	VARCHAR	100		
total_activity	user total activity	INT	5		
auto_accept	auto accept a request	INT	1		
privacy	user setting for make profile public or private	INT	1		
user_type	user system type	INT	1		

Table 3.2 (continued) Data Dictionary of Table USER_DATA

req_datetime	user registered date and time	DATETIME			
rating	rating given by friends	DOUBLE			
rating_num	total rating time	INT	5		

3.2.5.3 In table 3.3 presents FRIENDSHIP_DATA table that stored relationship between two users.

Table 3.3 Data Dictionary of Table FRIENDSHIP_DATA

Attribute	Description	Data Type	Length	Key	FK
u_id	user id of friend request sender	INT	5	PK, FK	USER_DATA
f_id	user id of friend request receiver	INT	5	PK, FK	USER_DATA
mutual_act	total activity together	INT	10		
type	type of relationship	INT	1		
last_act	together last activity	DATETIME			
uRateF	user with f_id rating given by user u_id	INT	1		
fRateU	user with u_id rating given by user f_id	INT	1		

3.2.5.4 In table 3.4 is FRIEND_REQ_NOTIFICATION that stored friend request data for notify user.

Table 3.4 Data Dictionary of Table FRIEND_REQ_NOTIFICATION

Attribute	Description	Data Type	Length	Key	FK
sender_id	user id of requestor	VARCHAR	5	PK, FK	USER_DATA
receiver_id	user id of receiver	VARCHAR	5	PK, FK	USER_DATA
receiver_seen	check if receiver has seen notification	INT	1		
req_time	notification created date and time	DATETIME			
accept_time	accept request date and time	DATETIME			

Table 3.4 (continued) Data Dictionary of Table FRIEND_REQ_NOTIFICATION

sender_seen	use to check if sender has seen notification	INT	1		

3.2.5.5 In table 3.5 is ACTIVITY_DATA table description using for store activity data when users create activity or to display in feed.

Table 3.5 Data Dictionary of Table ACTIVITY_DATA

Attribute	Description	Data Type	Length	Key	FK
activity_id	activity id of	INT	10	PK	
act_place_id	place id in activity	VARCHAR	20	FK	PLACE_DATA
notification_flag	use for alert notification	VARCHAR	1		
text_post	text for activity	VARCHAR	1000		
create_time	activity created date and time	DATETIME			
act_time	time activity date and	DATETIME			

3.2.5.6 In table 3.6 presents PLACE_DATA table that stored place data using for check-in by users.

Table 3.6 Data Dictionary of Table PLACE_DATA

Attribute	Description	Data Type	Length	Key	FK
place_id	place id	INT	10	PK	
place_name	place name	VARCHAR	100		
latitude	place latitude	DOUBLE			
longitude	place longitude	DOUBLE			
total_act	number of activity	INT	5		

3.2.5.7 In table 3.7 shows ACTIVITY_NOTIFICATION table description that use for notify users if they any request.

Table 3.7 Data Dictionary of Table ACTIVITY_NOTIFICATION

Attribute	Description	Data Type	Length	Key	FK
activity_id	id of activity	INT	10	PK, FK	ACTIVITY_DATA
sender_id	id of request sender	VARCHAR	5	PK, FK	USER_DATA

Table 3.7 (continued) Data Dictionary of Table ACTIVITY_NOTIFICATION

receiver_id	id of request receiver	VARCHAR	5	PK, FK	USER_DATA
type	type of notification	INT	1		
req_time	notification created date and time	DATETIME			
is_seen	use for check if user has seen notfication	INT	1		
act_time	date and time of activity	DATETIME			

3.2.5.8 In table 3.8 is ACTIVITY_USER table that stored user id that join activity.

Table 3.8 Data Dictionary of Table ACTIVITY_USER

Attribute	Description	Data Type	Length	Key	FK
activity_id	activity id	INT	10	PK, FK	ACTIVITY_DATA
u_id	user id	INT	5	PK, FK	USER_DATA
Status	status of user	INT	1		

3.2.5.9 In table 3.9 is USER_LOCATION used for track user location.

Table 3.9 Data Dictionary of Table USER_LOCATION

Attribute	Description	Data Type	Length	Key	FK
uid	user id	INT	5	PK, FK	USER_DATA
latitude	user latitude	DOUBLE			
longitude	user longitude	DOUBLE			
last_active	user last active in system	DATETIME			

In chapter 3 discusses about the analysis of user requirements and the detail of design. In next chapter will present the result of an experiment in this application.

Chapter 4

RESULT

This section discusses about the main functions in the application, includes create account, view activity, create activity, search nearby friends, and notification. The more information is in the appendix A including other functions details.

4.1 Create Account

Before using the application user must create an account by using email and password with some necessary information.

First, enter email that has not been used in the system and password as shown in figure 4.1 and click Register button to continue the registration.

Figure 4.1 Register

After an account was created, user has to enter some necessary information as shown in figure 4.2 (a) and (b) for completing the registration. This information can be modified later in setting menu. When the user finished, click Save button in figure 4.2 (b) to save user profile and complete registration.

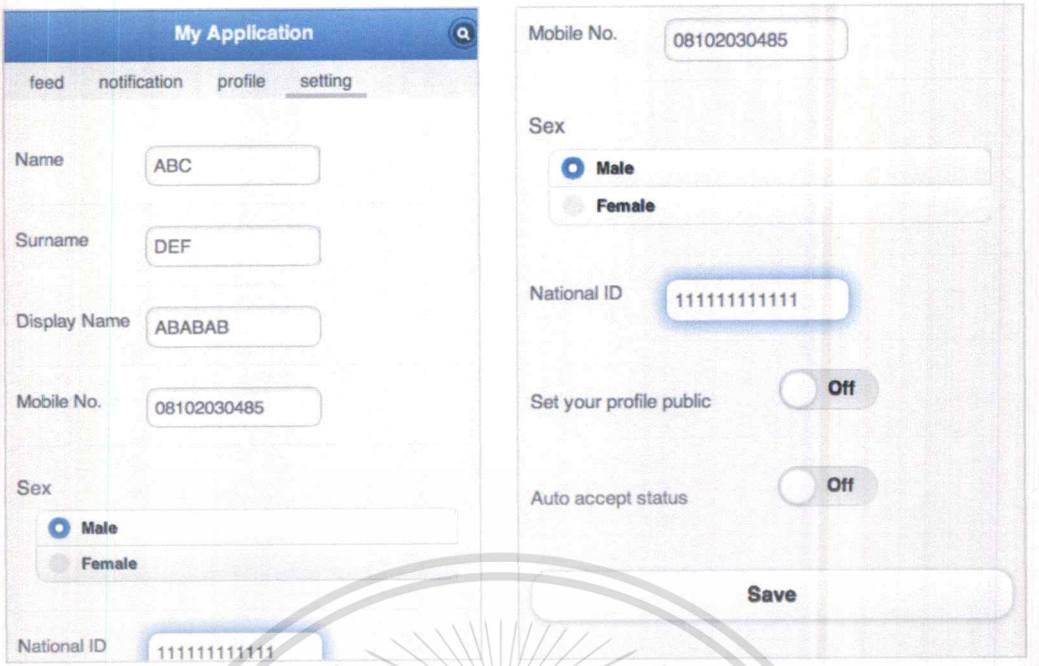

Figure 4.2 (a) Setting Page, and **(b)** Setting Page

4.2 View Activity

When the user completed the registration or using the application later, a page in figure 4.3 will be shown. Feed page shows user's activities and friends' activities.

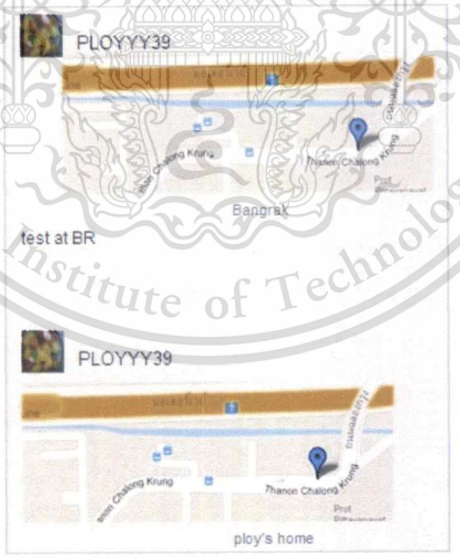

Figure 4.3 Feed page

In case the user wants to join any friend's activity, click on Join button to request to join friend's activity in Figure 4.4. This button will show only in friends' activities that user has not joined or sent a request yet.

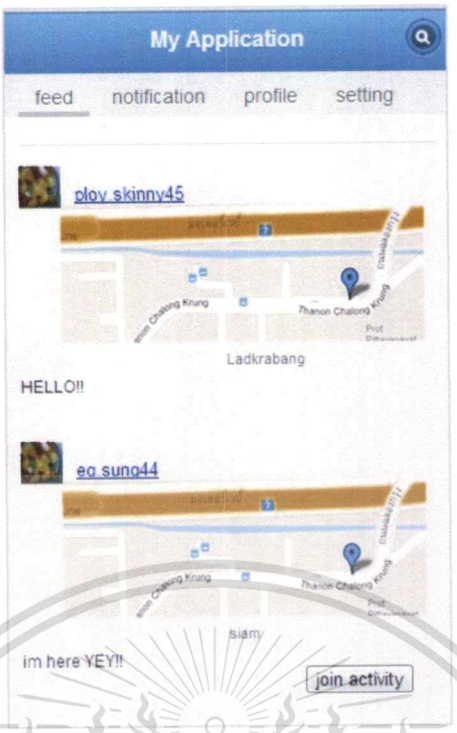

Figure 4.4 Join activity

4.3 Create Activity

To create an activity user has two options: check-in at that time and place and create future activity for inviting friends to join activity.

If the user would like to check-in then select Check-in button or select Plan Check-in to create future activity as shown in figure 4.5

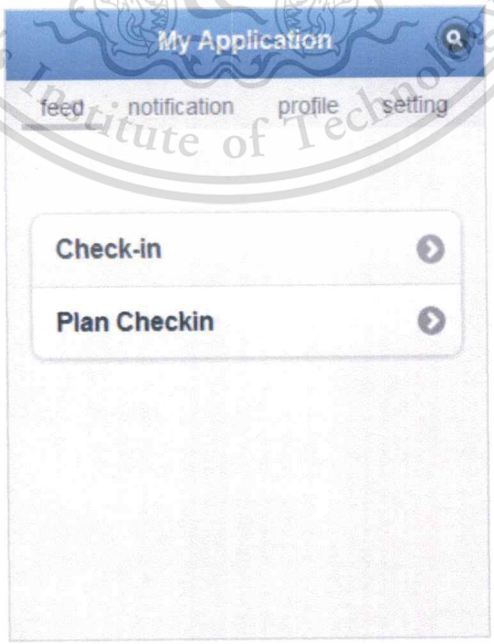

Figure 4.5 Create activity

If user chooses Check-in, user has to enter place and some message to display in feed in figure 4.6.

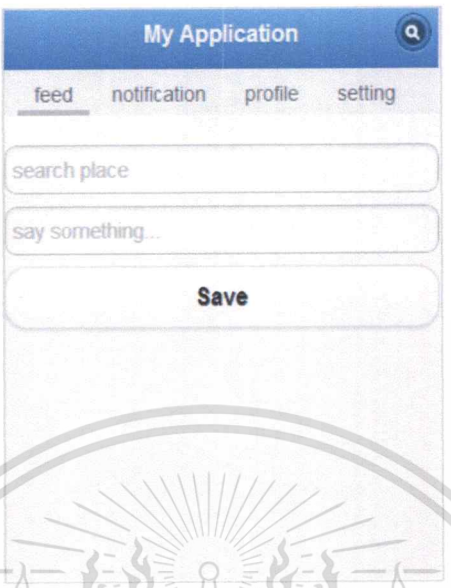

Figure 4.6 Check-in

If there is a place data in that location, map will be shown to be an alternative for user. If user does not want to check-in here, user can enter place name to create a new place on a map and click Save button in figure 4.7 to create new activity.

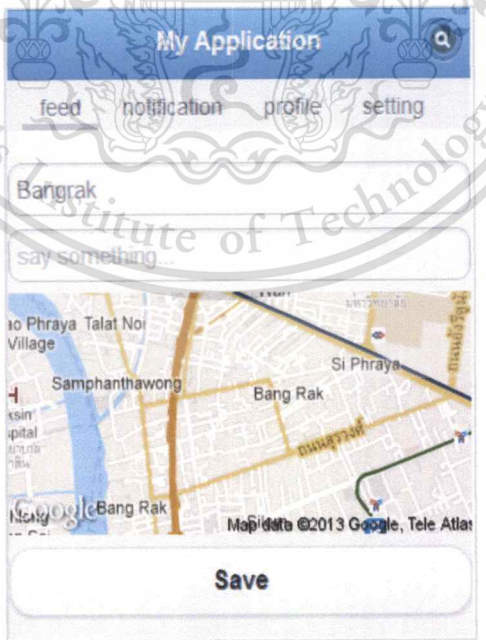

Figure 4.7 Show map

If user chooses Plan Check-in, user has to enter place and some message to display in feed in figure 4.8 with date and time of an activity. User then select friend to send a request for joining an activity.

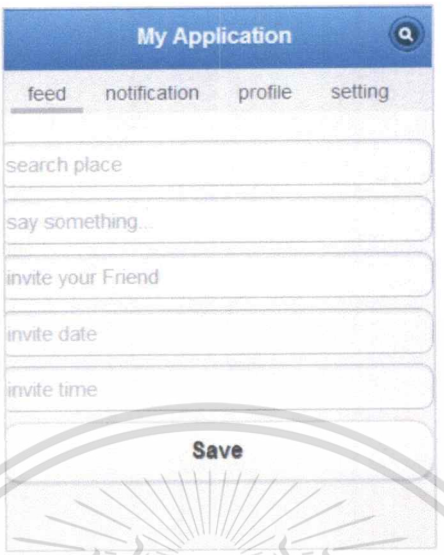

Figure 4.8 Plan Check-in

4.4 Search nearby friends

User click search button and choose search nearby friend as shown in figure 4.9

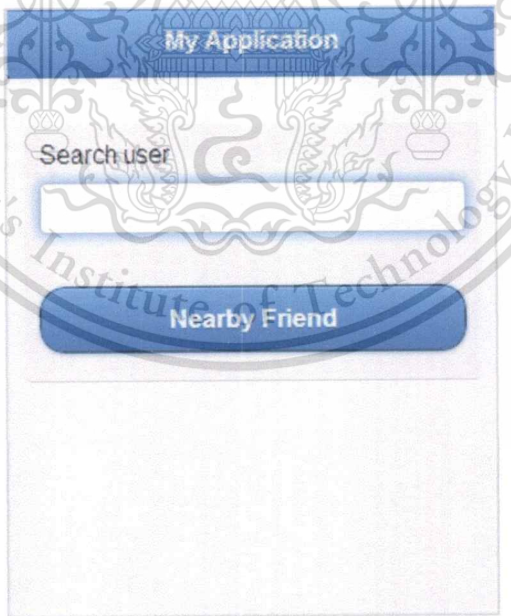

Figure 4.9 Search friend

Application will show list of a friend that nearby user in 10 kilometers and the last time that user's friend has logon as displayed in figure 4.10. Moreover, user can find other users, except friends, only if they set profile in public.

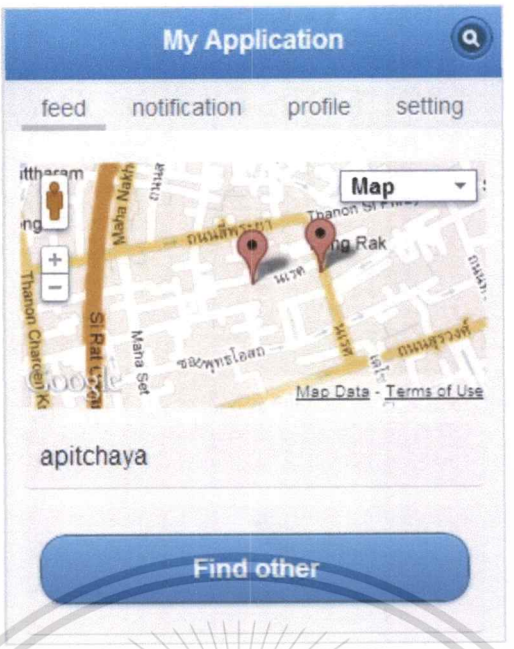

Figure 4.10 Nearby friend

4.5 Notification

Notification page will show all notifications such as a request for join activity, request for asking to be friend, notification when a friend accepts user's request. In each request user can choose to accept request or decline request as shown in figure 4.11.

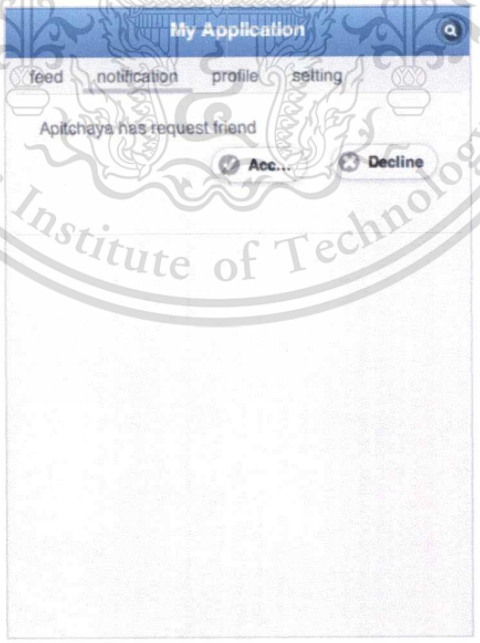

Figure 4.11 Notification

4.6 Other Functions

There are some support function discuss in an appendix. For instance, add friend function, search users function, and voting function.

In chapter 4; result, discuss about the main functions in the application; create account, view activities, create activity, search nearby friends, and notification. There are more functions that support the application discussed in an appendix. In next chapter will conclude the project suggest how to use this application well.

Chapter 5
CONCLUSION

5.1 Discussion

This application is a social network application that can use for finding friends in nearby area, users can share their locations in public or in private, as they would like. When the user goes somewhere, user can post a status on this application for friends to see or for other users. When others use this application, they can see other activities with their locations and able to ask to join those activities by sending an invitation to the owner. Users can create an activity in the future as the planned activity to send an invitation to friends. Using this application, users can decrease problems to find friends to do activity together. Generally, the application works automatically to share locations of users every an hour, unnecessary to share locations by themselves, so users can know others locations at the time. This application has a function for voting user so it provides safety for users when they would like to find some new friends in the area. This function helps users to decide easier before make an appointment with someone.

This application developed in hybrid, uses Native Application development for indicate user location from Android component, and user interface is developed in Mobile Web for connect database, display story in the social, and provide functions for using application. The major constrain of this project is the application based on location service technology. Since there is a possibility that the location service in the device cannot work a hundred percent precisely, application might not show the exact location of users or the distance between user and other friends. The application uses Android component to get the best provider to indicate location, which is, using GPS if it is possible because it gives more accuracy than cellular network but have the limitation because GPS function must be turned on and it waste much battery power. Even though this application shares users location and finds nearby friends in an area roughly, users still know where the others by the place name that users posted or created. Another problem is if users do not connect to the Internet, location cannot be updated to the database. Users have to use the application that supports location services and connect to the Internet.

5.2 Suggestion

Since this application is developed only on Android, other users in another operation system devices cannot use this application. This application is developed and tested on the mobile device with screen 3.3-inches with resolution 320*480 so if this application is used in different screen size may affect the displaying. In the future, application can be developed in other operation systems for expanding group of users and also make perfection on every

platform. Besides, to improve performance of database management, cloud database should be used instead of MySQL. Many social networks are now using cloud because there is much information sharing all the time and need minimum response time. Thus, if this application uses cloud database, it will increase application performance. Moreover, some function can be added, for instance, review users and their activities for helping other user to consider before add friend, or register confirmation using mobile phone number. Using some popular social network like Facebook account or Twitter account for login to use the application instead of register to the application directly and obtain some personal information for example, name, profile picture, and friend list.

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APPENDIX

APPENDIX A

User manual

There are 2 main sections in the user manual, which are account and functions. Account section describe about user account management. Functions section is about all functions in the application that user is able to use.

1. Account

This section discuss about what user can do with the account, includes create an account, login, edit profile, and change password.

1.1 Create an account

User must create an account before using the application follow by these steps.

1.1.1 Enter email and password, then click Register button as shown in figure A-1.

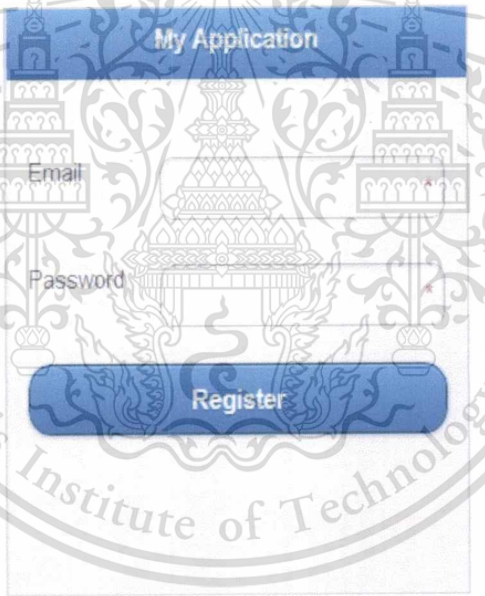

Figure A-1 Register page

1.1.2 If user enter wrong input format of email, system will alert to re-enter email as displayed in figure A-2 (a). Or if user does not enter email, system will alert to enter email as shown in figure A-3 (b).

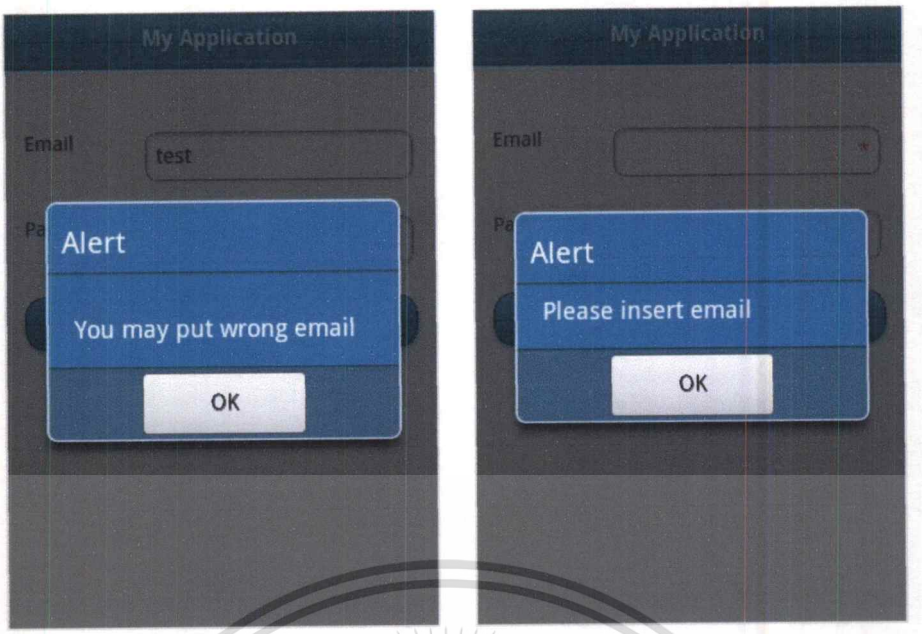

Figure A-2 (a) Wrong email input alert, and **(b)** Wrong email input alert

1.1.3 If the registration succeed, application will show edit profile page. User has to enter the required information as displayed in figure A-3 (a) and figure A-3 (b). If an option set your profile public is set to On other users will be able to see user's activity. If the option is set to Off as shown in figure A-3 (b), other users will not allow to see user's activity. Click Save button to complete the registration.

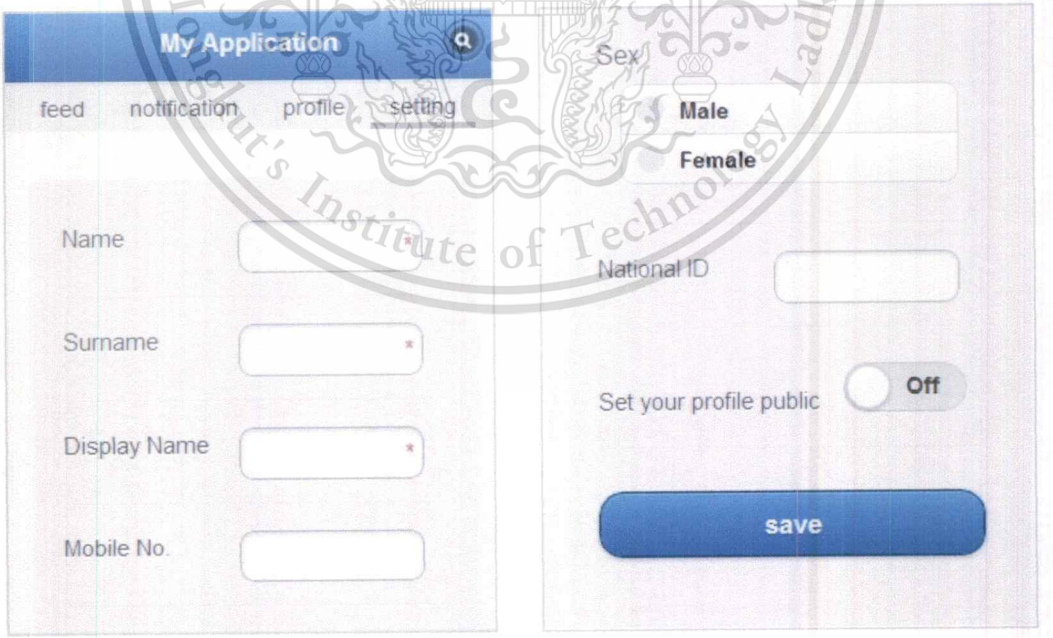

Figure A-3 (a) Edit profile page, and **(b)** Edit profile page

1.2 Login

If user used to register in this application, user can login by using email and password that has been registered.

1.2.1 Enter registered email and password. User then click Login button as displayed in figure A-4.

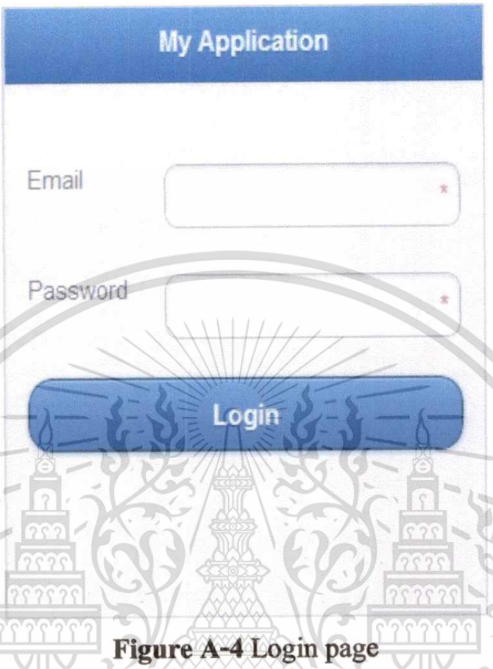

Figure A-4 Login page

1.2.2 If email and/or password is incorrect, system will alert to re-enter data as shown in figure A-5.

Figure A-5 Wrong login data alert

1.3 Edit profile

If user wants to edit personal data, user can do in Edit Profile function.

1.3.1 Click Setting button as displayed in figure A-6.

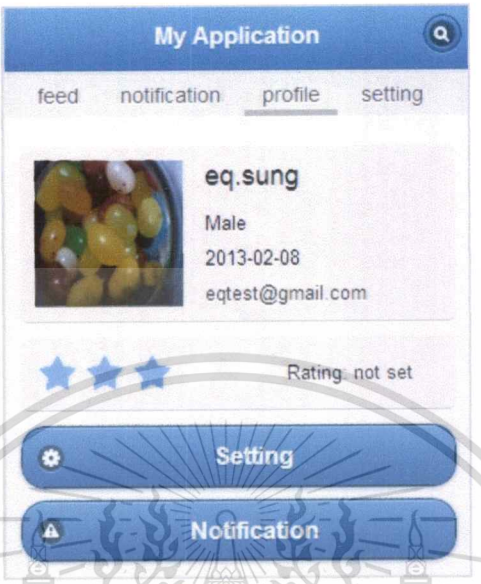

Figure A-6 Setting button

1.3.2 Change data as need and click Save button to save profile data as shown in figure A-3 (a) and A-3 (b).

1.4 Change password

If user wants to change password, user can do in Change Password function.

1.4.1 Click Setting button in figure A-6. Then click Change Password button as shown in figure A-7.

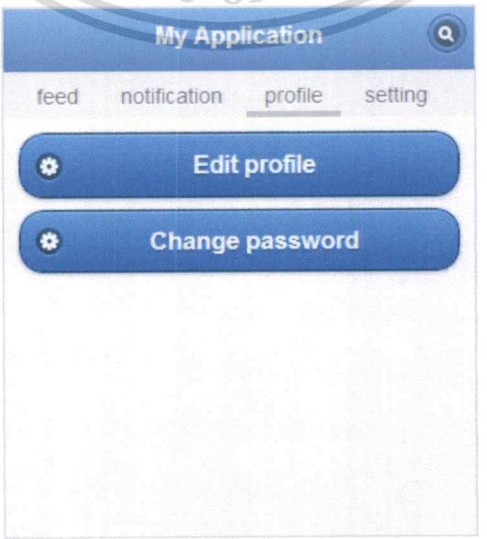

Figure A-7 Change password button

1.4.2 Enter old password and new password. Click save button to save new password as displayed in figure A-8.

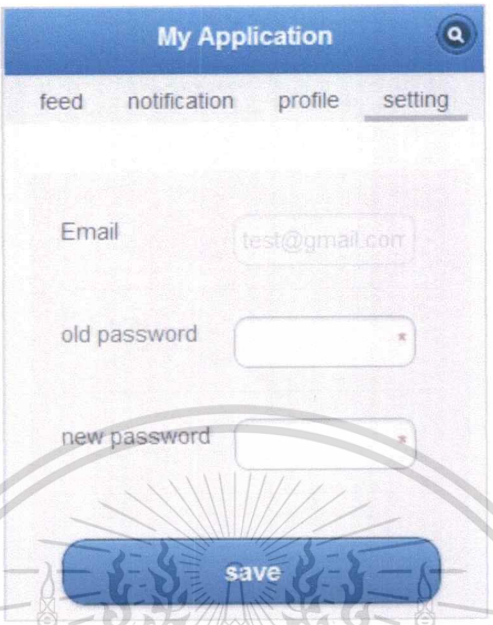

Figure A-8 Change password page

1.4.3 If new password is entered in the wrong format, system will alert to re-enter password as displayed in figure A-9.

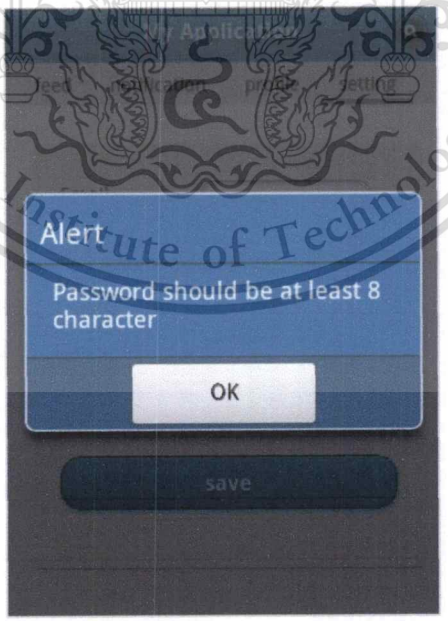

Figure A-9 Wrong password format alert

1.4.4 If old password is incorrect, system will alert to re-enter old password as displayed in figure A-10.

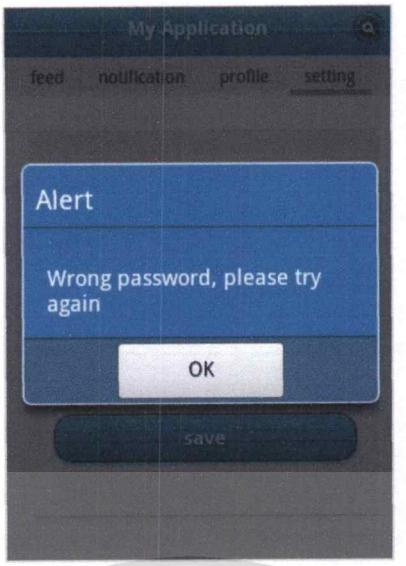

Figure A-10 Wrong old password alert

2. Functions

In functions section discuss about all functions of the application, purposes of use, sequences, and results. These functions include view feeds, create activity, find nearby friends, search user, notification, add friend, and voting.

2.1 View feeds

When user enters the application, feeds will be shown.

2.1.1 All user's activities and friends' activities sort by create activity date and time as shown in figure A-11.

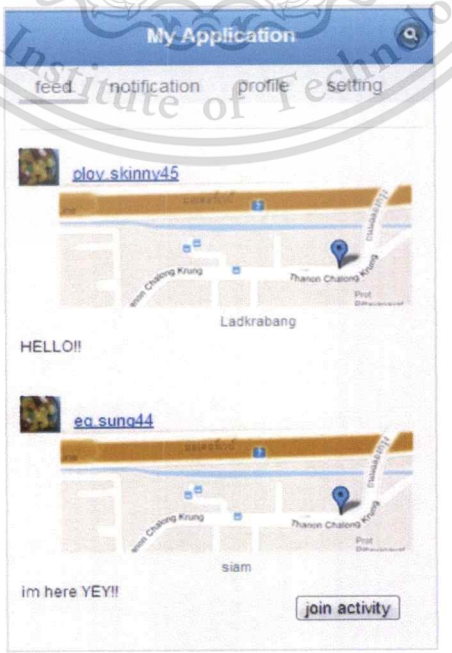

Figure A-11 Feeds page

2.1.2 At friends' activities that user has not join activity yet, Join button will be shown as displayed in figure A-11 and user is able to click to send a request for joining an activity.

2.2 Create activity

User can create new activity in 2 ways, check-in and plan check-in. Check-in is to create an activity at that time. Plan check-in is for create a future activity to invite friends to join.

2.2.1 Click Check-in button in figure A-12.

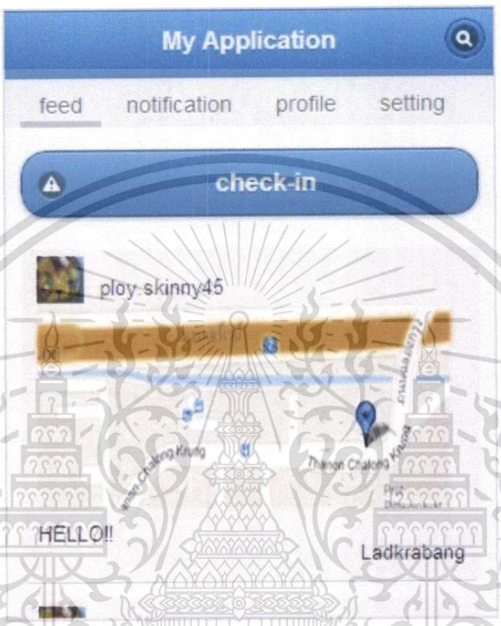

Figure A-12 Check-in button

2.2.2 Select check-in or plan check-in as displayed in figure A-13.

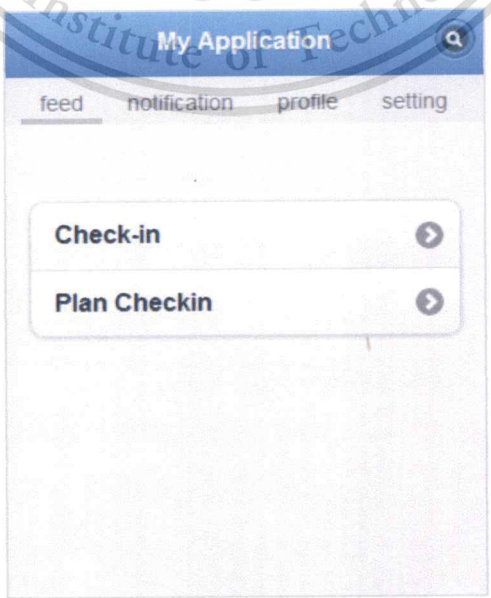

Figure A-13 Check-in menu page

2.2.3 If user selected check-in, user has to enter place data and message to post at the feed. Place names will show if there is any place data in the area as shown in figure A-14.

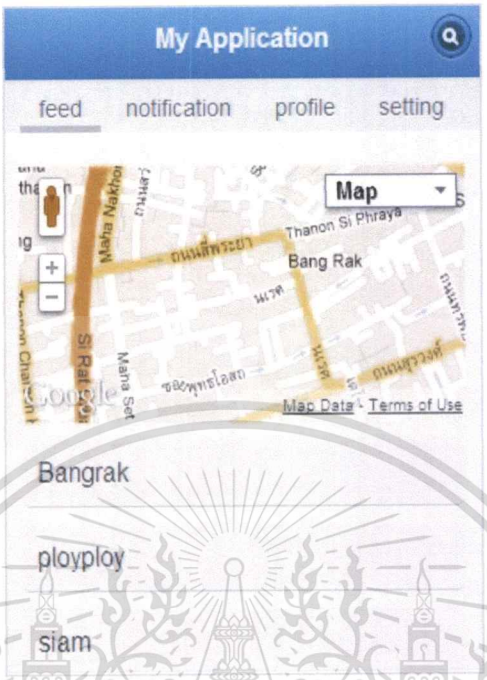

Figure A-14 Check-in page

2.2.4 If user want to select place name that not exists in the system, user has to create place data. User can create place data at that location and check-in as displayed in figure A-15.

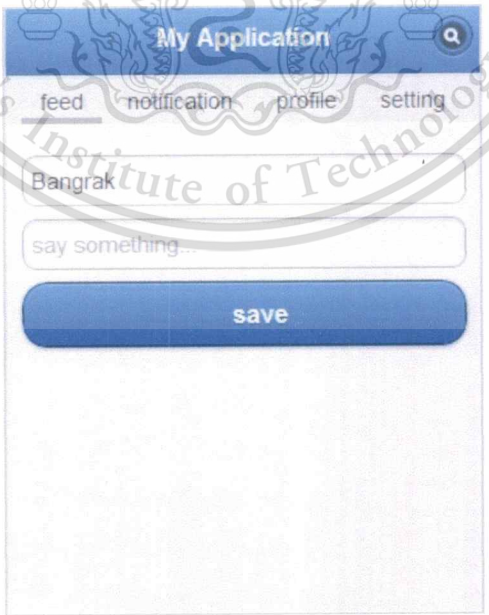

Figure A-15 Create place data

2.2.5 If user selected plan check-in, user has to enter place data, message, date and time of the activity, and friends that user is going to invite as shown in figure A-16.

Figure A-16 Future check-in page

2.3 Find nearby friends

User can find nearby friends at that location and able to find other user.

2.3.1 Click Search button at the top-right corner in figure A-15.

2.3.2 Click Nearby friends button as displayed in figure A-17.

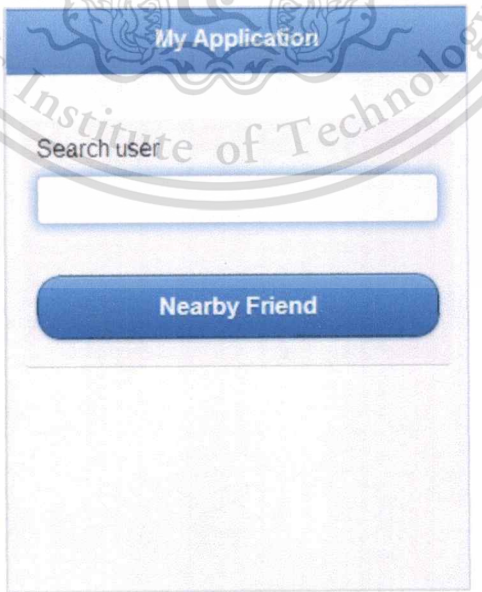

Figure A-17 Search page

2.3.3 Application will display user's current location and friends nearby in 10 kilometers as shown in figure A-18.

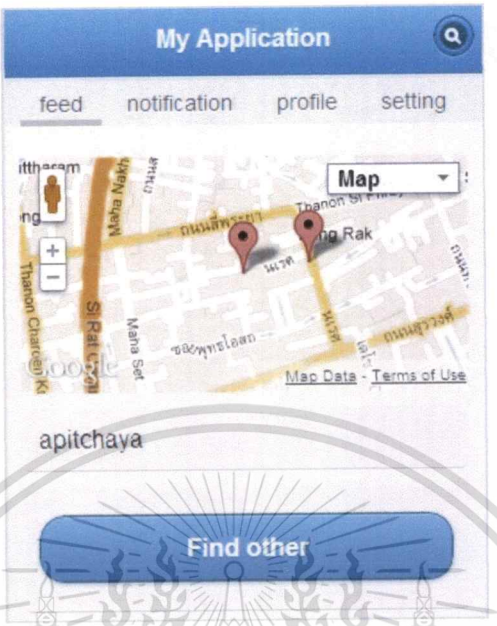

Figure A-18 Nearby friends

2.3.4 If user want to find other users in the area, click Find other button as displayed in figure A-18.

2.3.5 Application will display user's current location with other users' location in the area as shown in figure A-19.

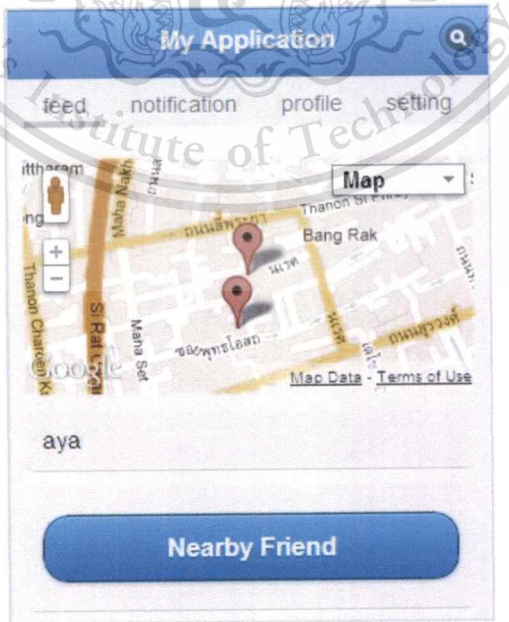

Figure A-19 Other users nearby

2.4 Search user

User can search friends or other users to view their profiles.

2.4.1 Click Search button at the top-right corner in figure A-15.

2.4.2 User can search friend by display name, name or email as shown in figure A-17.

2.4.3 Application will display users that matched criteria order by friends and other users as displayed in figure A-20.

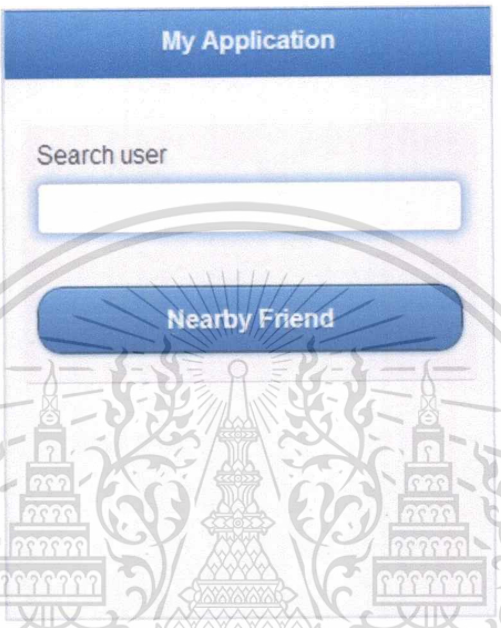

Figure A-20 Search user

2.4.4 User can click any user's name to view profile as shown in figure A-21

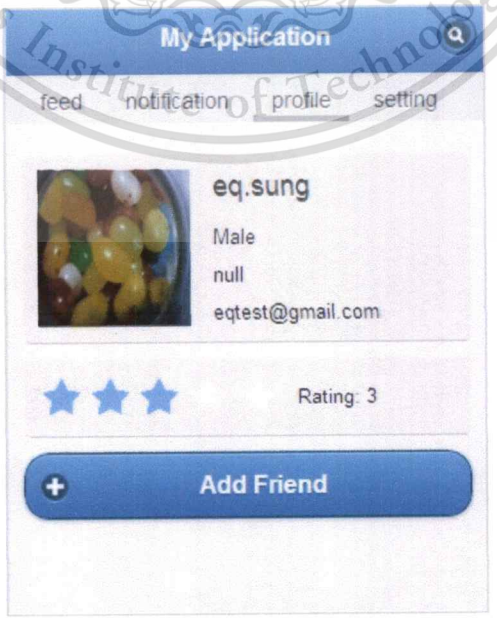

Figure A-21 Other user's profile

2.5 Notification

There are two types of notification, activity notification and friend request notification. Activity notification alert user when another user sends a request for inviting to join an activity or accept user's request. Friend request notification notify when user gets friend request from other user.

2.5.1 Activity notification

2.5.1.1 Click Notification button in any page then Activity button as displayed in figure A-22.

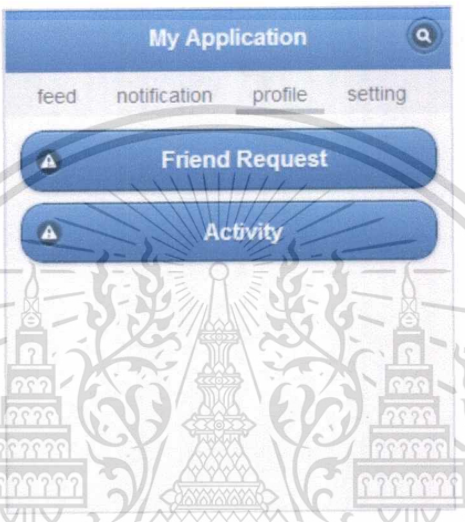

Figure A-22 Activity button

2.5.1.2 Application shows all notification that user has not responded order by recent notification. User click Accept button to accept the request or click Decline button to decline the request as shown in figure A-23.

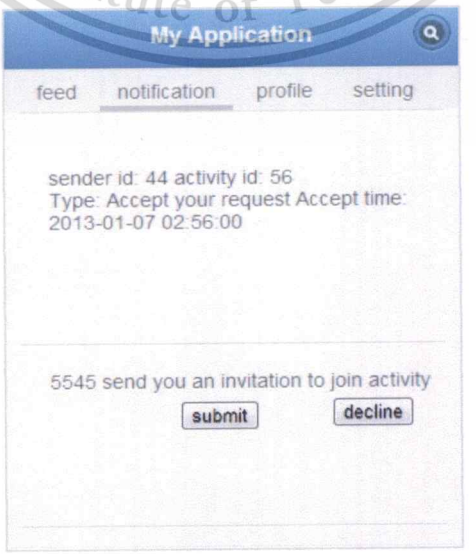

Figure A-23 Notification page

2.5.2 Friend request notification

2.5.2.1 Click Notification button in any page then Friend Request button as displayed in figure A-24.

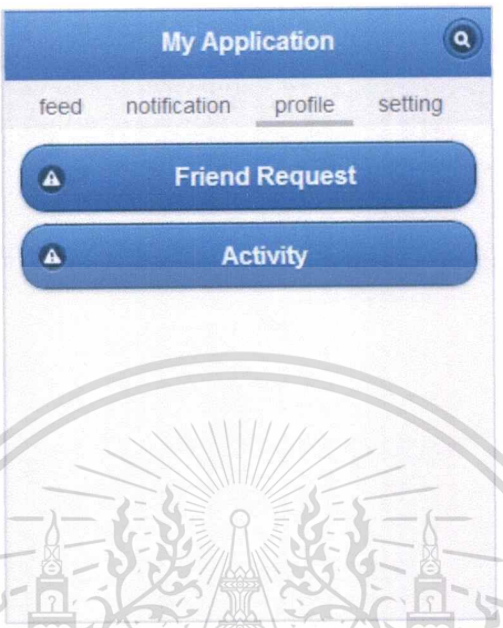

Figure A-24 Friend Request button

2.5.2.2 Application shows all notification that user has not responded order by recent notification. User click Accept button to accept the request or click Decline button to decline the request

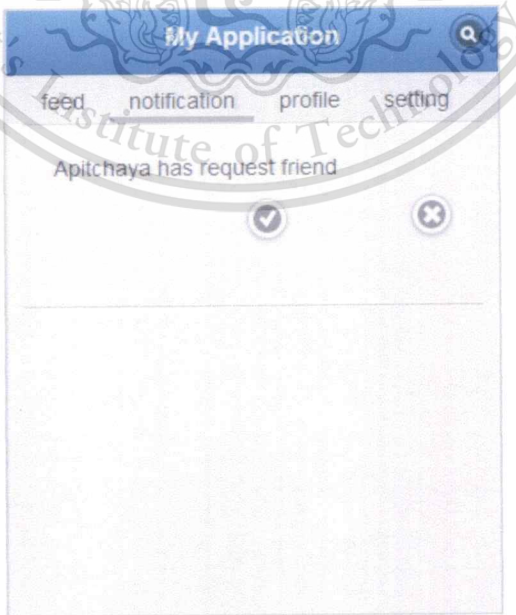

Figure A-25 Friend request notification

2.6 Add friend

2.6.1 Open other user's profile and click Add Friend button as displayed in figure A-26.

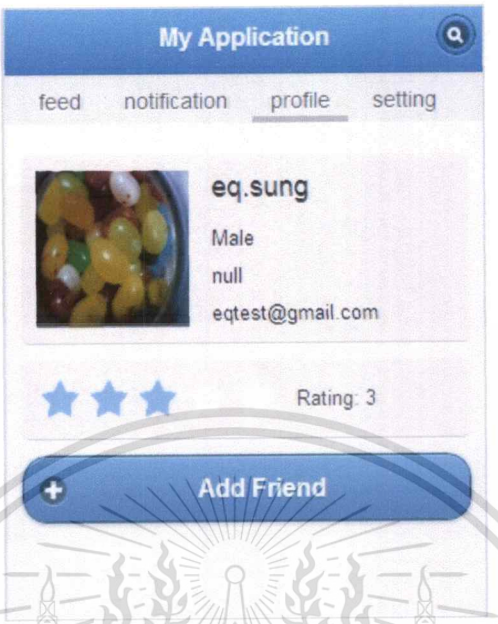

Figure A-26 Add friend

2.7 Voting

2.7.1 Open friend's profile. If user has not voted for that friend, empty star for rating view be shown as displayed in figure A-27.

Figure A-27 Unrated friend profile

2.7.3 Click star for vote, rating will show as displayed in figure A-28.

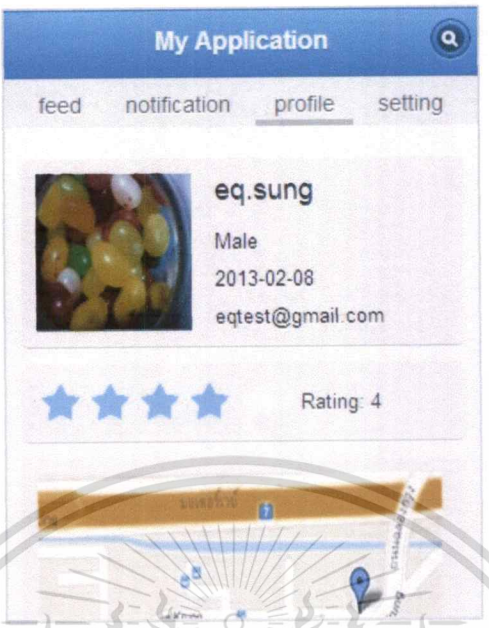

Figure A-28 Friend profile after voted

2.7.4 If user has voted for that friend, user's rating is shown as displayed in figure A-29.

Figure A-29 Voted friend profile

2.7.5 Click star for vote again, new rating will show as displayed in figure A-30.

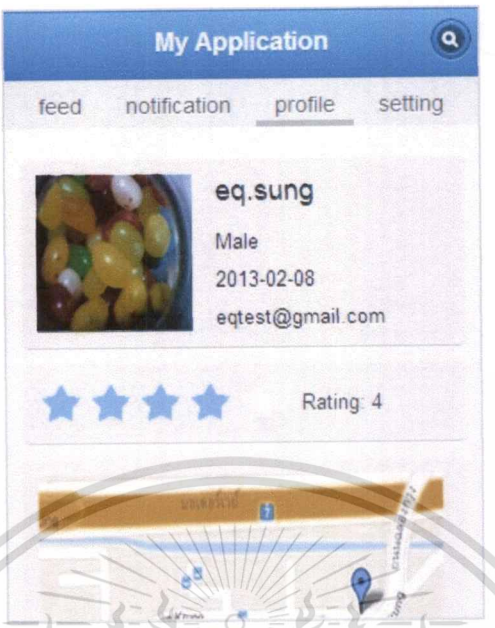

Figure A-30 Friend profile after re-voted

APPENDIX B

Installation

Before using this application, user has to download and install the application on a device, as the following steps:

1. Downloading an .apk file

Figure B-1 Downloading .apk file

2. Click on downloaded file

Figure B-2 Downloaded file

3. Click install

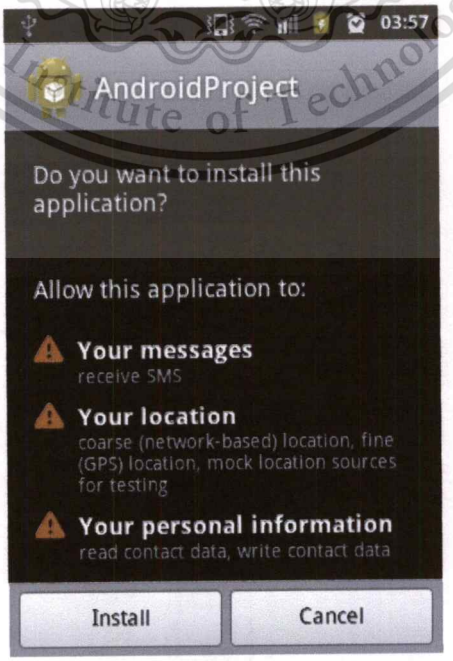

Figure B-3 Installation

4. Complete installation

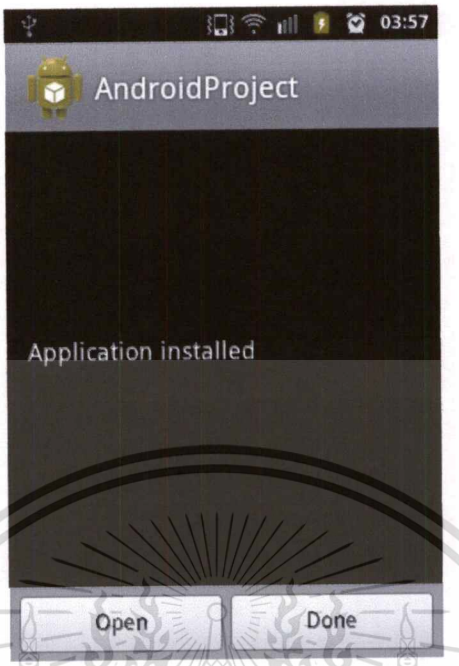

Figure B-4 Installation complete

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