Project Proposal

Title	An interactive guide to Naresuan University for the iOS platform (iPhone operating system)
Semester / Year	Semester 2 Year 2010
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For Seminar Course

Computer Science and Information Technology Department

Faculty of Science Naresuan University

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1. **Background** (ความเป็นมาและความสำคัญของปัญหา)

Nowadays, information and technology affects daily life. It has many benefits in education and has become more comfortable for working and learning.

If you are talking about an electronic devices that we use closely, one of the most important is the mobile phones. In addition to providing communication, the mobile phones have evolved into Smart phones with more functions. The smart phone can combine the abilities of the mobile phone and the PDA, but it can also install additional programs to give more functionality. The type of program depends on the mobile device and its operating system.

In this project we are interested in iOS[5], the operating system on Apple iPhone, because the iPhone can connect with many applications for example: education application, tourism, sports, business, medical science, e-book and games. Another reason we are focusing on the iPhone is because it is very popular and there are not many applications in Thailand yet. We choose to develop an application for daily life in Naresuan University. At our university there are many buildings, canteens, places and routes that are difficult to recognize all of them for staff, students or visitors. We want to navigate the route to the place you want to go, check the study schedule, update the university news. And, manage your activities scheduling for enjoy living in the university as well.

2. **Objectives** (วัตถุประสงค์ของการศึกษา)

1. To develop a mobile guide to Naresuan University on the iPhone, that helps staff, students and visitors around campus.

2. To study about programming on iPhone operating system and operation of GPS.

3. Scope (ขอบเขตการศึกษา)

The information that we are concerned with in this application is:

- Map and direction information of Naresuan University.
- Student timetable, Teacher timetable from Student Affairs Division Naresuan University.

The users who will use this application are:

- Staff, students and visitors who use the iPhone at Naresuan University.

The technology we are going to use is the iPhone.

4. Key terms (คำสำคัญหรือคำจำกัดความที่ใช้ในการศึกษา)

In this proposal, we should explain some basic vocabularies that related with iPhone programming as follows. Full descriptions available in [1] [2].

1) The iPhone is a line of internet and multimedia-enabled smart phones designed and marketed by Apple Incorporation[4]. The first iPhone was introduced on January 9, 2007. An iPhone functions as a video camera, camera phone with text messaging and visual voicemail, a portable media player, and an internet client with e-mail, web browsing and both Wi-Fi and 3G connectivity. The user interface is built around the device's multi-touch screen, including a virtual keyboard rather than a physical one. Third-party as well as Apple applications are available from the App Store, which launched in mid-2008 and now has well over 300,000 “apps" approved by Apple. These apps have diverse functionalities, including games, reference, GPS navigation, social networking, security and advertising for television shows, films, and celebrities.

2) iOS (known as iPhone OS) is Apple's mobile operating system[5]. Originally developed for the iPhone, the user interface of iOS is based on the concept of direct manipulation, using multi-touch gestures. Interface control elements consist of sliders, switches, and buttons. The response to user input is immediate and provides a fluid

interface. Interaction with the OS includes gestures such as swiping, tapping, pinching, and reverse pinching. Internal accelerometers are used by some applications to respond to shaking the device (one common result is the undo command) or rotating it in three dimensions (one common result is switching from portrait to landscape mode).

3). Objective-C is a reflective, object-oriented programming language that adds Smalltalk-style messaging to the C programming language[6].

Today, it is used primarily on Apple's Mac OS X and iOS: two environments based on the Open Step standard, though not compliant with it. Objective-C is the primary language used for Apple's Cocoa API, and it was originally the main language on NeXT's Next step OS. Generic Objective-C programs that do not use these libraries can also be compiled for any system supported by gcc or Clang.

5. Benefits (ประโยชน์ที่คาดว่าจะได้รับ)

1.To obtain an application for Naresuan University on iPhone.

2.To Study and improve skills in Objective C programming.

3.To distribute an application to students, staffs and other visitors.

6. Research (เอกสารและงานวิจัยที่เกี่ยวข้อง)

6.1 Related technologies

6.1.1 The Global Positioning System (GPS)

The Global Positioning System[7] is a space-based global navigation satellite system (GNSS) that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites (See Figure 1). It is maintained by the United States government and is freely accessible by anyone with a GPS receiver.

GPS was created and realized by the U.S. Department of Defense (USDOD) and was originally run with 24 satellites. It was established in 1973 to overcome the limitations of previous navigation systems.

In addition to GPS other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was for use by the Russian military only until 2007. There are also the planned Chinese Compass navigation system and Galileo positioning system of the European Union (EU).

Figure 1: conception of GPS Block II-F satellite in orbit

6.1.2 Position calculation introduction

To provide an introductory description of how a GPS receiver works, error effects are deferred to a later section. Using messages received from a minimum of four visible satellites, a GPS receiver is able to determine the times sent and then the satellite positions corresponding to these times sent. The x, y, and z components of position,

and the time sent, are designated as $[x_i, y_i, z_i, t_i]$ where the subscript i is the satellite number and has the value 1, 2, 3, or 4. Knowing the indicated time the message was received tr, the GPS receiver can compute the transit time of the message as $(tr - t_i)$. Assuming the message traveled at the speed of light, c, the distance traveled or pseudorange, p_i can be computed as $(tr - t_i)c$.

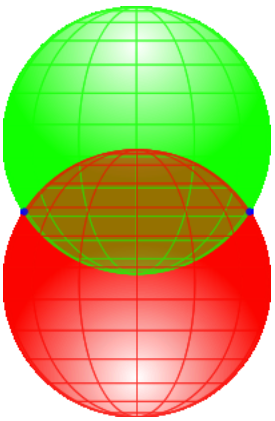


Figure 2: Two sphere surfaces intersecting in a circle

A satellite's position and pseudorange define a sphere, centered on the satellite with radius equal to the pseudorange. The position of the receiver is somewhere on the surface of this sphere (See Figure 2). Thus with four satellites, the indicated position of the GPS receiver is at or near the intersection of the surfaces of four spheres. In the ideal case of no errors, the GPS receiver would be at a precise intersection of the four surfaces.

If the surfaces of two spheres intersect at more than one point, they intersect in a circle. The article trilateration shows this mathematically. A figure, Two Sphere Surfaces Intersecting in a Circle, is shown below. Two points where the surfaces of the spheres intersect are clearly shown in the figure. The distance between these two points is the diameter of the circle of intersection.

The intersection of a third spherical surface with the first two will be its intersection with that circle; in most cases of practical interest, this means they intersect at two points. Another figure, Surface of Sphere Intersecting a Circle (not a solid disk) at Two Points, illustrates the intersection. The two intersections are marked with dots. Again

the article trilateration clearly shows this mathematically. For automobiles and other near-earth vehicles, the correct position of the GPS receiver is the intersection closest to the Earth's surface. For space vehicles, the intersection farthest from Earth may be the correct one. The correct position for the GPS receiver is also the intersection closest to the surface of the sphere corresponding to the fourth satellite.

6.2 Related work

Three examples of similar applications are described below.

6.2.1 Central Park

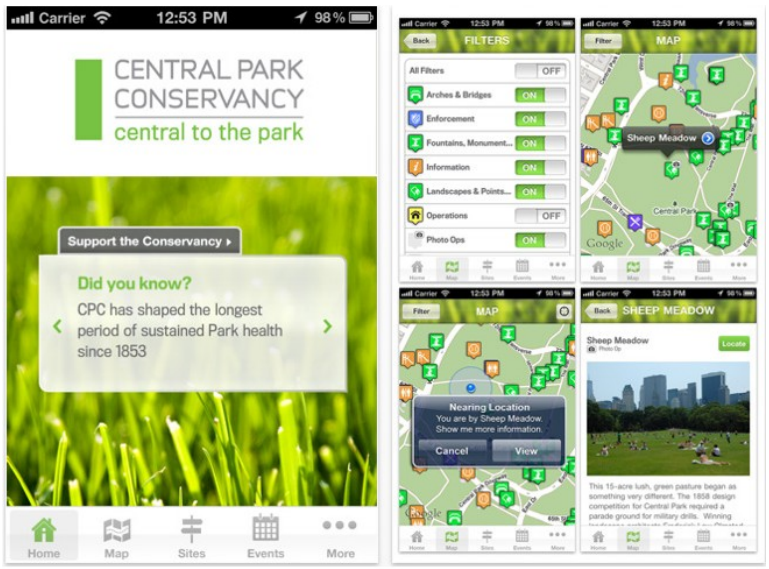


Figure 3: Central Park application screenshots

The official app of Central Park provides everything you ever wanted to know about the Park. This is the guide for everyone from first time visitors to native New Yorkers[8].

It features:

- An interactive map (See Figure 3)
- GPS location technology.
- Set up your notifications and let your phone alert you when you approach any of the Park's hundreds of landmarks.

6.2.2.iWarwick

iWarwick is an essential application for any member of Warwick University to help them follow news and events on campus[9].

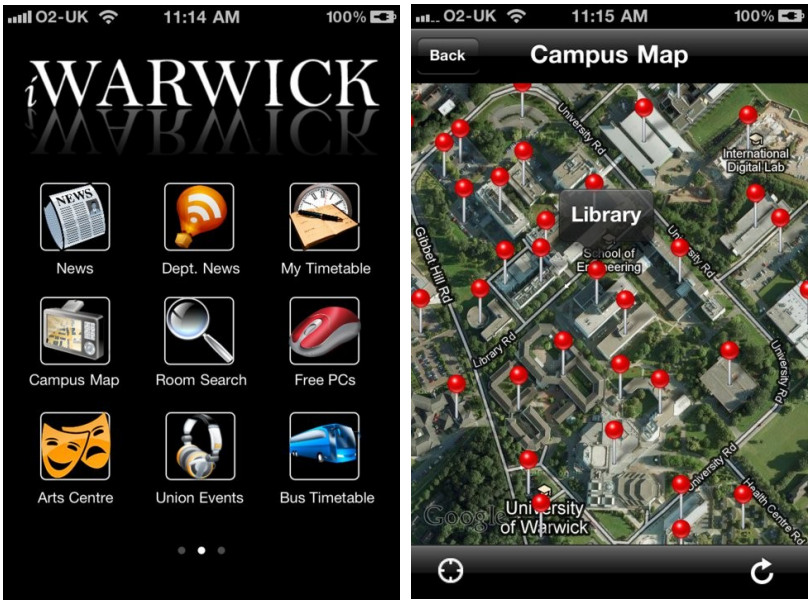


Figure 4: iWarwick application screenshots

It features:

- My Timetable feature
- Live bus time table
- Students Union events
- Warwick Arts Centre event listings
- List of daily events on campus
- Numbers of free PC workstations in public computer areas
- University news feed
- Campus map with GPS (on supported devices) (See Figure 4)

6.2.3.iThai

Figure 5: iThai application screenshots

"iThai - Thailand Official Guide" for iPhone and iPod Touch is the official guide to Thailand[10]. The application – almost offline – is an exhaustive and updated source of travel information about the country, its culture and the amusement it offers to the tourists. For every city, the guide presents a large selected list of hotels, restaurants, pubs, spas, nightlife, beaches and fun, routes, sport centers, transportation and emergency services. All the information include descriptive card and photos: you connect the websites and have the email contact and locate the addresses on an interactive map.

It features:

- List of hotels, restaurants, spas, pubs and bars (See Figure 5)
- Attractions and adventure
- Fun and Nightlife
- Addresses, telephone numbers, websites
- Tourism services
- Transportation

7. Tools (อุปกรณ์)

7.1 Tools and development tools.

7.1.1 Hardware

1). An Apple personal computer capable of running Mac OSX

- CPU Intel version Core 2 Duo 2.4 GHz
- DDR RAM 2 GB
- Hard disk 320 GB
- VGA Card NVIDIA GeForce 320M

2). Printer

3). iPhone

7.1.2 Software

1). Operating System

- Mac OS X Snow Leopard Version.10.6.4

2). IDE (Integrated Development Environment)

- Xcode Version 3.2

3). Other software

- Microsoft Office 2007

8. Methodology (วิธีดำเนินการศึกษา)

In this project we have chosen "Scrum Process" to manage our development. **Scrum** is one of the implementations in Agile Software Development. Scrum Process is like a habit of scrum in rugby (See Figure 6), where the whole team "tries to go the distance as a unit, passing the ball back and forth. Scrum process consist of 3 concepts

1.Role

2. Process

3. Demonstration and Evaluation

Figure 6: A habit of scrum in rugby

Role

In role topic are compose of:

Scrum Team is a team that made up of 5-9 workers, each one has not specify of their work and can be replace. Design a model and architecture of the system.

Product Owner is representative of product owner.They are manage product backlog; thinking, collect and distribute the product backlog and also write the user's story.

Scrum Master is the person who take care of the team like a coach, and take responsibilities in quality of product, rearrange the important of works, synthesize the task from user's story, lead the daily conference and make decision.

Process

In process topic consist of:

Backlog is the list of features it is also the request from customer, bug fix and product's specification. Backlog is produce by product owner, they manage and

arrange features by significant and make a user's story of each feature and input it to sprint to process.

Sprint phase is the iteration time, define in 30 days. Before start we have to rearrange the product backlog and then the scrum team will separate to the task and estimate time of each task and list it.

Daily scrum like the standup meeting, everyday scrum master and team will have a short meeting for all day have done. Then consult of what they need to do today. In the meeting will have discussion for resolve problems and assign works for team.

Demonstration and Evaluation, the strong point of Scrum is can evaluate the result by burn-down chart which we can see how is the process going by create the graph, y-axis is count of the remain tasks and x-axis is daily of sprint. In daily we will update the graph for we can see the progress and we can see the problem by looking at the anomaly of the graph interval.

By the principle of Scrum Process we can explain our process as follows:

1. Define a problem, scope the problem and set objectives of program.
2. Collect data, feasibility study and research theory about GPS and Objective C programming.
3. Get the requirement from people to collect data, and set a priority for each step of backlog.
4. Plan meeting to predict a project duration in each step.
5. Develop a proposal and start programming for possible to use.
6. When a part of program is finished, collect the data from user again, to describe a plan or overall image of program.
7. Start the process to complete and have a short meeting with user every week.
    - 7.1 Design and develop prototype.
    - 7.2 Design final version and develop program.

8. Testing program.

9. Assess and improve program. If detect mistakes, make improvement until the program can be the most effective.

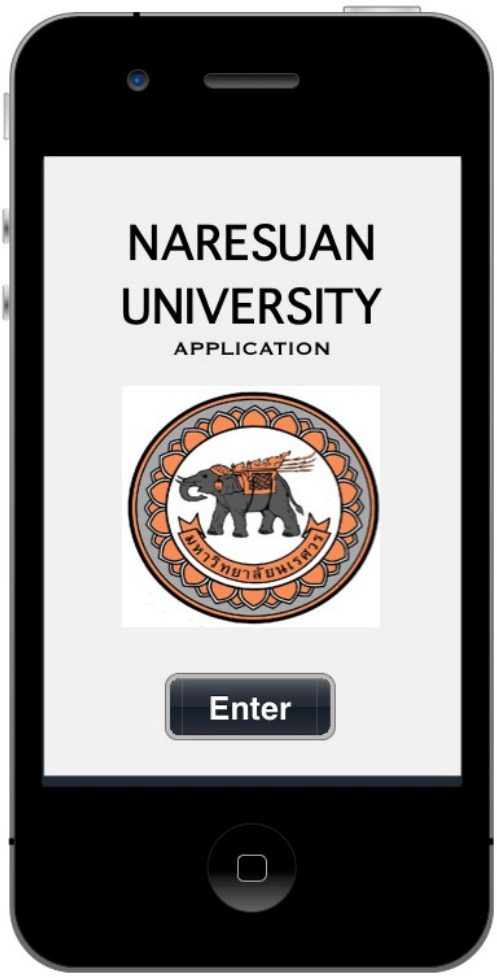
10. Write documentation.

9. **Project plan** (แผนการดำเนินงาน)

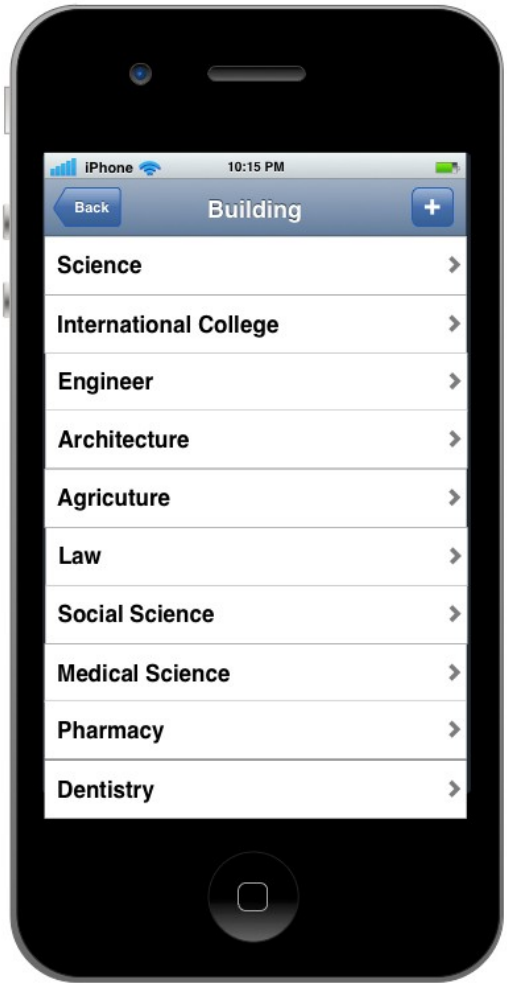
Process	2010		2011								
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1. Define a problem, scope the problem.	↔										
2. Collect data, feasibility study	↔	↔									
3. Get the requirement from people to collect data.		↔	↔								
4. Planning Meeting to predict a project.		↔	↔	↔							
5. Develop a proposal and start programming.			↔								
6. We have to collect the data from user.				↔	↔						
7.Start the process to complete and have a short meeting with user.					↔	↔	↔				
8. Testing program.								↔			
9. Assess and improve program. If detect mistakes								↔	↔		
10. Write documentation.									↔	↔	

10. Initial design

Here are some screenshots of the initial design.



Welcome Screen



Building List Screen

Map Screen

Timetable Screen

11. References (บรรณานุกรม)

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[3] iOS Dev Center, URL : http://developer.apple.com/devcenter/ios/index.action

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[5] iOS(Apple), URL: http://en.wikipedia.org/wiki/IOS_(Apple)

[6] Objective-C, URL: http://en.wikipedia.org/wiki/Objective-C

[7] Global Positioning System, URL:http://wn.wikipedia.org/wiki/Global_Postioning_System

[8] Central Park, URL: http://www.centralparknyc.org/

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