

Project description:

Where R U?

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1 Introduction

Mobile phones and devices has become an important part of our everyday life. The ability to be able to stay in touch with other people all the time is something that most of us now take for granted. In later years the typical mobile phone has become more advanced, enabling the users to do more then just call and send SMS messages. When the devices get more advanced, so does the services and applications that run on these devices. Examples of this might be to surf the internet, or play games on the phone. Some phones make use the the bluetooth technology that enables the phone to communicate with other devices supporting bluetooth, such as most new laptop computers, and GPS receivers among others. Developers can take advantage of this to make advanced and useful applications for these phones and devices.

This article will describe a project called Where R U?¹ that enables users with location aware devices to share information about their whereabouts with eachother. This can be done using a mobile phone with bluetooth support running on the Series 60 platform. The phone will connect to a portable GPS receiver using the bluetooth specification to gather information on its whereabouts. The next paragraph shows an example on the use of the Where R U? project.

User A is interested in the whereabouts of his/her friend, User B. User A sends an SMS to User B containing some special instructions. The phone that User B has will then receive this SMS, and when it sees that the message contains these instructions, it will act upon them. The phone will connect to a portable GPS, fetch the position of the device, and send this information to a server, along with the original instructions from User A. The server that receives the information from User B will then use a web service to generate a map pinpointing the location of User B. This map will then be sent in a format that is explained in the original message that User A sent. This might be an MMS message, mail or some other format.

The above paragraph explains the main idea behind Where R U?. The rest of this article will include more detailed information on how the application

¹The name of the project is written using the textual language that is often used when writing SMS messages.

work, and on which devices it will work on. The next paragraph shows how the rest of this article is written.

Chapter 2 of this article goes into detail on the methods and technology used in this project. It also contains information on the documentation used when developing the project. Chapter 3 will include some of the results of the project followed by chapter 4 that goes into further discussion about what might be done different. Chapter 5 ends this article with a short conclusion.

2 Methods

This chapter provides information on the different technical parts of the project, and the methods that will be used. Most of the work done in this field is very experimental, and there is not much earlier work to refer to. Because of this there are references to online discussion boards, and other online resources.

2.1 Location Aware Systems

Systems that behave differently depending on their location/context is called Location Aware Systems. An example of a Location Aware System is a Global Positioning System (GPS). A GPS receiver fetches information from satellites that contains the position of the GPS receiver. This project will use a GPS connected to a mobile phone using the bluetooth specification, to get the position of the mobile phone. After the Where R U? application that runs on the phone receives the position data, it can act on these, making it location aware.

2.2 Smartphones

A smartphone is an electronic handheld device that integrates both the functionality of a mobile phone, personal digital assistant (PDA) or some other information appliance. Some of the most popular PDA functions include address books, calendars and task lists.

One of the most important features of a smartphone is the possibility to install additional software. This enables developers to write their own software for the smartphones. The most common operating systems that run on these devices are Symbian, Palm OS, Windows Mobile, BREW and Linux [1]. Since smartphones include more advanced features they tend to be more powerful than regular mobile phones. Because of this, developers can come up with more advanced features in their software. Handling graphics (i.e. Digital Maps) and audio/video is no longer that hard to do because of increased performance of the devices.

2.3 The Nokia S60 platform

Nokia S60(formerly Series 60) is a software platform for smartphones with advanced data capabilities and is optimized for the Symbian OS. It is developed primarily by Nokia. A set of standard applications and libraries is what makes the S60 platform. Some standard applications are for instance: telephony and PIM tools. According to [2], Nokia S60 is amongst the leading smartphone platforms in the world.

Nokia S60 has been implemented on many mobile phones, and some of them are: Panasonic X700, Nokia 6620, Nokia 6680 and Nokia N70. These are a small sample of the phones that support this platform.

Developers can work in C++ (using Symbian OS' native APIs), the Java language, or Python. The latter is the language of choice for this project.

More than 25 million S60 platform devices had been shipped by May 2005 [3].

2.3.1 Python for Series 60

Python for Series 60 is an implementation of the 2.2.2 version of the Python interpreter. The implementation includes a selection of the standard Python modules, a shell for launching Python scripts, a variety of native extensions, and a Python Console for interactive development.

At this moment no MMS module exist in the Python for Series 60 project, so sending MMS messages from mobile phones can not be done using Python. The Where R U? project was originally supposed to be able to send MMS messages directly from the phone, but since the project uses the Python language, this had to be done in a different way. The main reason for that the MMS module is not yet implemented is that the developers of Python for Series 60 has given other modules higher priority [4]. Python for Series 60 is now open source, so developers can easily write their own modules for Python for Series 60 using the native Symbian OS C++ APIs, but developing an MMS module for the Where R U? project was not an option.

The Nokia 6680 phone, as shown in figure 1, will be used for developing and testing in the Where R U? project. The phone uses Nokia S60 2nd Edition, Feature Pack 2 (Version 2.6) and uses the 8.0a version of the Symbian OS.



Figure 1: Nokia 6680 mobile phone

2.4 Developing and testing

Most development is done on the Windows platform using a regular text editor to write code in, and using the Symbian OS emulator to test the applications. It can save developers a lot of time if they use the emulator for testing instead of transferring their applications to a mobile phone to test it there. There are some parts of testing in the emulator that might be a bit tricky, for example getting the bluetooth GPS receiver to work together with the emulator.

2.5 Available Documentation

2.5.1 Books about programming in Python

There are many books about the Python programming language on the market, but two were used in the project, mainly because the author already had these books when starting the project. Since the Python for Series 60 interpreter uses regular Python, one does not need to learn a "new Python" language.

The two books used are Learning Python [5], and Programming Python [6]. Experienced Python programmers would not need to use books on Python, but rather concentrate on the modules that exist in Python for Series 60.

2.5.2 Online discussion boards

Nokia provides developers with online discussion boards that enables them to exchange information and knowledge. This can be very helpful when dealing with new technology. Users can search the forums for information they want, and if it can not be found, one can simply post a question there and wait for other users to answer.

The developers of Python for Series 60 at Nokia also use the discussion boards. They have made some posts asking other developers which features they would like to be included in the next version of Python for Series 60. Some of the wishes that other developers have mentioned has become available in newer versions of Python for Series 60. The inbox module that will be discussed in chapter 3 is an example of this. This is a great opportunity for the developers at Nokia to see what other developers want, so they can make Python for Series 60 a better platform.

3 Results

The results of the project has been accomplished by using several smaller goals. Most of the technology used in the Where R U? project was new to the author when starting it, and because of this it would be very hard to set timelimits for bigger goals. The different goals that was set up made more and more progress. and most of them built on eachother.

The first goal was to simply make a computer ready for developing software for the Nokia S60 platform. This was done by installing the software available at Nokias developer site [7]. All software needed for this is free and easy to install.

The second goal was to have a simple application running on the Nokia 6680. Most projects start off with a simple Hello World application, and so did the Where R U? project. After the Hello World application was done, some more advanced goals could be set that was relevant to the project.

The first goal after getting the Hello World application up and running was to connect the Nokia 6680 to a GPS receiver and read information from it. The GPS receiver used in the Where R U? project is made by Holux and is called GPSlim 236, and can be seen in figure 2. The type of the receiver is not that important since most receivers deliver position data in a standard way. This means that users who want to test Where R U? does not need to have the same GPS receiver that is used for developing and testing. This goes for the mobile phone as well. The requirement is that the mobile phone is running the Nokia S60 platform.



Figure 2: Holux GPSlim 236 GPS receiver

After obtaining GPS position data, the next goal was to let the mobile phone send an MMS to another mobile phone using Python for Series 60. After consulting the documentation, it showed that another approach was necessary because Python for Series 60 did not have support for sending MMS messages.

It was then decided that the mobile phone was to send information to a server that would send the MMS messages. This meant that the phone had to do less, and send less information, which was positive, since sending much information from a phone to another might take a while. This is because of the limitations of the protocols that the mobile phones uses when transferring data.

After the decision to use a server for the sending, other goals was set. To send the information from the phone to the server, the phone could connect to the internet and send an XML-RPC message to the server. The server needed to support this standard, so goals concerning this was set as well.

Since the mobile phone should be able to do this without bothering the user too much, a method of listening to the inbox was used. When the project started in January 2006, this was not possible, but shortly after Nokia released a new version of Python for Series 60, and one of the new modules was a module called Inbox. This module could do exactly what was needed.

The rest of the goals which is yet to be reached includes defining a format for the message to be sent to the mobile phone that tells the phone what to do (i.e. what format to answer a request, size of map to be sent and so forth). The server needs to understand the XML-RPC message that comes from the phone, and be able to generate maps, MMS messages and emails among other formats.

Some of the last goals includes letting other users test the system to see that it works as intended, and maybe test it on different mobile phones to ensure that it works not only on the Nokia 6680, using the Holux GPSlim GPS receiver.

4 Discussion

4.1 Other programming languages

As stated before there are other programming languages developers can use to make applications for mobile phones using the Nokia S60 platform. Developers can program in C++ using the native Symbian OS API, or with the Java language using MIDP 1.0 or MIDP 2.0 with a range of additional Java Specification Requests (JSRs).

The author had some experience with C++, but after consulting the Symbian OS APIs, it was obvious that it would be too cumbersome to do this project using the C++ language. One can achieve much more control over the mobile phone using C++, but the timeframe of the project would not be long enough.

The last opportunity was to use the Java language, and the author did not have too much experience with that language, so that was out of the question. One might also achieve more control using Java, but then again, the time it would take to learn the language would be too long. The Location Aware Systems course that this project is a part of is not really about learning new programming languages, so using Python seemed like the best solution for this project, since this was the programming language that the author has most experience with.

4.2 Personal rights

When developing an application like Where R U? one needs to take a look at the personal rights aspect. A system where person A can gain information on where person B is located without person B knowing about it might not be too popular amongst all people. This however shows how advanced the devices we walk around with every day has become. Most people might be afraid of others gaining access to their personal computers, but they might not think the same of their mobile phones.

5 Conclusions

The project so far has been very interesting, and many exciting goals is yet to be reached. To see how the developers at Nokia works with other developers is inspiring. Many of the technologies used in the Where R U? project are fairly new, and good help is sometimes hard to find. When the ability to get help from the developers at Nokia, along with other talented developers, the whole process of making applications for Nokia S60 phones is a lot more comfortable.

Since the tools that is being used in this project is under constant development, the features of Where R U? might become more advanced as more advanced features is included in the platforms that Where R U? is built upon.

All in all, being able to use interesting technologies such as digital maps, smartphones and other devices is very exciting. Staying motivated to make good applications is not that hard when one can gain help from other talented developers when one gets stuck. The Where R U? project might be of good use for other developers that is trying out these new technologies, and some might even take the Where R U? application and make their own expansions and implement new exciting features.

A Technical terms and abbreviations

API

Application Programming Interface.

Bluetooth

An industrial specification for wireless personal area networks.

C++

A general-purpose computer programming language.

Extreme programming (XP)

A software engineering methodology for the

GPS

Global Positioning System.

Java

An object-oriented programming language.

JSR

Java Specification Request.

MIDP

Mobile Information Device Profile.

MMS

Multimedia Messaging Service.

OS

Operating System.

PDA

Personal Digital Assistant.

PIM

Personal Information Manager.

pys60

Python for Series 60.

S60

Series 60.

SMS

Short message service.

W3C

World Wide Web Consortium.

WAP

Wireless Application Protocol.

Web service

W3C defines a Web service as a software system designed to support interoperable machine-to-machine interaction over a network.

XML-RPC

XML-RPC is a remote procedure call protocol which uses XML to encode its calls and HTTP as a transport mechanism. development of software projects.

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