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Date : 29 APRIL 2009
BLUETOOTH CONTROLLER FOR COMPUTER SYSTEMS AND APPLICATIONS

TEOH SU KEONG

A thesis submitted in fulfillment of the requirement for the award of the degree of Bachelor of Science (Computer Science)

Faculty of Computer Science and Information System
University Technology of Malaysia

APRIL 2009
“I declare that the content of this thesis is my original with the exclusion of references that has been appropriately acknowledged.”

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To my beloved family…
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ABSTRACT

This project is mainly about the development of a new application tool using Bluetooth technology. This tool uses the Bluetooth enable mobile phone manufactured by most of the mobile phone companies. This tool provides user’s mobile phone with new functions for example controlling the media player some of the system utilities. Bluetooth today still lacks of variable function other than to replace LAN cables. Therefore, not many people realize that this kind of technology has a lot of benefits to offer humankind. First of all, objective of this project is to review the Bluetooth technology and the remote control function using mobile phone. Then develops a Bluetooth remote control which enables user to operate and control their computers from a few meters away without touching his or her computer. Lastly, to implement this tool into a real mobile phone in order to test this tool usability. This application is created according to evolutionary prototyping where the initial product is being remodel until it fulfills the user requirements. The system design is also being included in this project where the designs are being represented in Unified Modeling Language (UML) language. The end product of this project is to provide flexibility and convenience for user that uses this tool.
ABSTRAK

Secara umumnya, projek ini adalah mengenai pembangunan suatu system aplikasi yang mengambil kebaikan daripada teknologi bluetooth dan mengembangkan kebolehannya kepada suatu tahap yang lebih tinggi lagi berbanding masa kini di mana pengguna Bluetooth hanya manggunakan teknologi ini untuk bertukar data seperti gambar dan fail muzik. Pada masa ini, tidak banyak perkembangan mengenia teknologi Bluetooth ini malah berita tentang penggunaan Bluetooth dalam aplikasi yang berlainan juga tidak kedengaran. Ini disebabkan kebanyakan para pembangun menetapkan bahawa teknologi Bluetooth ini tiada lagi ruangan untuk pembangunan yang lebih mencabar lagi. Ini adalah tidak benar kerana Bluetooth boleh menjadi pelbagai kegunaan selain daripada menggaitikan LAN kabel data. Oleh itu objektif project ini adalah untukmenengali dengan lebih mendalam tentang kebolehan teknologi Bluetooth. Selain itu, objektif kedua adalah membangunkan satu aplikasi remote control secure Bluetooth yang membolehkan pengguna mengawal computer mereka dari jarak jauh. Selain daripada objektif, methodology yang digunakan adalah prototaip evolusi yang mana ia menggunakan applikasi yang telah dibangunkan pada mulanya dan mengubahnya sehingga mencapai matlamat pengguna. Matlamat projek ini adalah untuk memberi lebih banyak kemudahan dan kesenangan kepada pengguna yang menggunakan applikasi ini.
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<th>REAL MEANING</th>
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<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>ASF</td>
<td>Advanced System Format</td>
</tr>
<tr>
<td>CDC</td>
<td>Connected Device Configuration</td>
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<tr>
<td>CLDC</td>
<td>Connected Limited Device Configuration</td>
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<td>IDE</td>
<td>Integrated Development Environment</td>
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<td>J2ME</td>
<td>Java™ 2 Micro Edition</td>
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<td>Java™ Application Descriptor</td>
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<td>JAR</td>
<td>Java™ Archive</td>
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<td>JDK</td>
<td>Java Development Kit</td>
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<td>JVM</td>
<td>Java™ Virtual Machine</td>
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<tr>
<td>KVM</td>
<td>KJava Virtual Machine</td>
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<tr>
<td>MIDP</td>
<td>Mobile Information Device Profile</td>
</tr>
<tr>
<td>MIDPEG</td>
<td>Mobile Information Device Profile Expert Group</td>
</tr>
<tr>
<td>OS</td>
<td>Operation System</td>
</tr>
<tr>
<td>PC</td>
<td>Personal Computer</td>
</tr>
<tr>
<td>PIN</td>
<td>Personal Identification Number</td>
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<tr>
<td>RAD</td>
<td>Rapid Application Development</td>
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<td>SDLC</td>
<td>Software Development Life Cycle</td>
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<tr>
<td>UUID</td>
<td>Universally Unique Identifier</td>
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<td>Unified Modeling Language</td>
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CHAPTER 1

INTRODUCTION

1.1 Introduction

Bluetooth wireless technology was born in 1994 when Eriksson Mobile Communication decided to investigate the feasibility of a low-power, low-cost radio interface between mobile phone and their accessories. In 1998, Ericsson, IBM, Intel, Nokia, and Toshiba formed the Bluetooth Special Interest Group consortium to develop a royalty-free, open specification for short-range wireless connectivity. Since then, more than 2000 companies have joined the Bluetooth SIG, including virtually all manufacturers of phone, computer, and PDA equipment. The original plans were to use Bluetooth as to replace cables for short distance connections to connect two devices for the purpose of data transferring and many more. In this case, the radio technology showed the possibilities to become a universal bridge to existing data network, a peripheral interface, and a mechanism to form small private ad of groups of connected devices away from fixed network infrastructures. One of that many opportunities is the ability to act as a remote controller to control specific devices or software in user computer.
Today in the world of mobile phone, Bluetooth technology has being introduced into almost every mobile phone from each company such as Nokia, Sony Ericsson, Samsung, Motorola, LG, etc. Therefore, to prove the many ability of Bluetooth, a type of mobile phone has being introduced to turn a Bluetooth mobile phone with specific platform such as Nokia S60 Symbian OS with java MIDP 2.0 and Java JSR-82 Bluetooth API enabled technology into a remote controller to control customized jobs in a media player when the phone is connected to a certain computer. The function include basic control such as play, pause, stop, next, back, volume up and down. Not only that, this controller can also download the current files that are being played on the player at that time into user mobile. However, user can choose to do file transferring the from their mobile phone and play it concurrently after the transferring is finish to their computer in which it will play the file if player recognize the file type. If the users choose to disconnect the Bluetooth connection, this however would not interrupt the current files that are being played. Furthermore, user can choose to resume back to use their mobile phone as a remote controller by reconnecting their mobile phone to the current computer using Bluetooth thus resuming its functionality as a remote controller for the media player. This method is proposed just to keep in mind that by prolong the Bluetooth connection; they consume a lot of energy. Therefore, by this method user can save their battery power for other purpose.

Windows Media Player is now one of the most used media player among computer user. The player was included inside the Microsoft windows product when user purchased and installed it into their computer. Therefore this player will be the common player used to complement the Bluetooth controller software as to test the usability of the Bluetooth remote controller application.
1.2 Problem Background

The most annoying things that often occurred is that user sometimes cannot be too far separated from their computer while playing their favorite movies or listening to their songs on the computer because they need to control the button using mouse or shortcut keys. This condition is quite uncomfortable sometimes because most computer user would choose a better spot such as sitting on the couch while leaving the computer on the table and watch movies two meters away from each others. Not only that, teachers that uses movie clips to teach their student also finds it annoying if they keep moving back and front just to choose which clip they need to play during class hour.

Bluetooth remote controller on mobile phone is not well known to public because it lack publicity and some of the current controller are not that user friendly. The fact is, they need to configure most of the key setting themselves because of the many features which enables user to control multiple applications on their computer. Furthermore, there has not yet been any news for about Bluetooth remote controller opened to public for those who use S60 platform with Symbian based operating system mobile phone.

1.3 Project Aim

The main target of this project is to create a user-friendly remote controller that can control some specific application such as media player, PowerPoint, as well as system utilities on user’s computer using a mobile phone with Java MIDP 2.0 and also JSR-82 Bluetooth device so that user can control these utilities and application remotely using user’s mobile phone.
1.4 Project Objective

The main objectives of this project are as follows:

i. To review the Bluetooth technology and the implementation of remote control function using mobile phone.

ii. To develop an application tool that can let the user’s mobile phone to act as a remote control.

iii. To test the remote Bluetooth controller tool by installing it into a mobile phone.

1.5 Project Scope

The scope of my project include as the following:

i. This tool was being developed tested under Bluetooth enabled Windows Vista based operating system

ii. This tool is most suitable running under Windows Vista operating system.

iii. Secondly the environment for the application to act as a Bluetooth remote control installment must be in a Bluetooth enabled Java MIDP 2.0 mobile phone.

iv. The tool control list used to control the application is stored in an .XML file.

v. This tool objective is to control the shortcut key provided by each of selected application on user’s computer.

vi. This tool is to provide the flexibility of controlling application such as Windows Media Player and PowerPoint by remote using user’s mobile phone.

vii. It also provides the control of some system utilities such as shutdown, standby, lock window and also controls the system volume.
User can also send simple text message from mobile phone to user’s PC.

User is able to transfer a file from his or her PC to other mobile phone.

1.6 Importance of the project

This project is important because a lot of people can learn about the method to create a Bluetooth remote controller using MIDlet, but also gain knowledge regarding Bluetooth technology knowing this technology can have many more usage other than replacing LAN cables. People should realize that Bluetooth technology can be enhanced and improved into something new and useful to humans, thus creating a new opportunities for the Bluetooth technology.

1.7 Summary

As a summary, the main purpose of this tool is to open and venture into another path of Bluetooth technology to find more opportunities and options for this kind of technologies in our current high demanding markets.

This application true function is to turn a selected kind of Nokia S60 Symbian OS Bluetooth enable platform mobile phone into a remote controller to control a specific program, media player on a Bluetooth enable computer. The remote controller can be activated when two devices are connected and the application is started on the
phone. The key configuration must be made for first time user to configure their mobile phone into a Bluetooth remote control because user need to customize their phone’s key setting to enable its functions as a remote controller.

This application is supposed to be user friendly and brings benefits to current user by giving him or her more freedom while playing the movies or song they like.