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Android Application: Smart Controller

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Abstract— In Smart Controller project, we aim at developing software application and mobile application, which allows control/operate laptop/pc through smart phone. In addition, it allows user to play games on their laptop/pc through smart phone. The main aim of this project is to utilize the features of smart phone. In this paper, the phones used as the games controller for multiplayer games shown on external displays and, in particular, large public screens. Using a large screen offers a number of benefits: it frees the games developer from constraints of the limited graphics capabilities of the mobile screen, enables a greater amount of movement to the participating players, provides a rich social atmosphere and affords an opportunity for rich social interaction in a variety of urban landscapes.

Keywords— Laptop/PC, Wi-Fi technology, Controller, Games.

I. INTRODUCTION

The Smart Controller project allows the user to control games on laptop via smart phone using wireless technology like Wi-Fi. It is a very well known fact that for gaming fanatics, ergonomic controls is the need of the hour and is very expensive; hence, the project aims in utilizing our smart phone to work as ergonomic control and can customize it according to our comfort. This would mean the optimum utilization of resources available with us and in the best possible way. The project will consist of two applications: a) Application for desktop b) Application for Android Smart phone. Gaming Control will provide support for motion gaming through Smartphone accelerometer & normal directional key control. The controls provided will differ from game to game. This feature will be the highlight of our project, which will allow us to utilize the resources available with us in the optimum manner with focus on the ergonomic part

Rise of Smart phones: Meanwhile, the portable phone age was brewing. In 1973, Martin Cooper, of Motorola, demonstrated a 2.2-pound self-contained cell phone. This

technology was packaged as a car phone (later a bag phone), and the mobile was born in the 1980's. [1]Cellular infrastructure changed from operator-driven radio to dialed service using analog and then digital service during the 80's and 90's. In this 1980's early Dynamic Time Warping (DTW)-based speech, recognizers were developed for car phones. Two examples are the car phone dialer produced by Interstate Electronics, and another by AT&T called the Victory Dialer. By the mid 1990's the US was entering the digital cellular era.[1] Cell phones dropped to a few ounces in weight, and computing increased from abacus-like to processors running at a few Megahertz with some tens of thousands of bytes of memory. The author owned a Motorola Star Tac, a very early flip phone. It had SMS messaging and an internal phone book that would hold 2880 names (more than a typical cell phone today). It weighted 3.1 ounces, and was nearly indestructible. The Star Tac came many versions, and its six-year lifespan covered the conversion from the analog AMPS analog cellular system to TDMA and CDMA digital service in the United States.

Role of Android: Android consists of a kernel based on Linux kernel version 3.x(version2.6prior to Android 4.0 Ice Cream Sandwich),with middleware, libraries and APIs written in C, and application software running on an application framework which includes Java- compatible libraries based on Apache Harmony. Android uses the Dalvik virtual machine with just-in- time compilation to run Dalvik 'dex-code'(Dalvik Executable), which is usually translated from Java byte code. The main hardware platform for Android is the ARM architecture. There is support for x86 from theAndroid-x86 project, and Google TV uses a special x86 version of Android. In 2013, free scale announced Android on its i.MX processor, i.MX5X andi.MX6Xseries. In 2012, Intel processors began to appear on more mainstream Android platforms, such as phones. [2]

Features of android:

- Messaging: SMS and MMS are available forms of messaging, including threaded text messaging and android Cloud to Device Messaging (C2DM) and now enhanced version of C2DM, Android Google Cloud Messaging (GCM) is also a part of Android push Messaging service. [12]
- Multiple language support: Android supports multiple languages.[4]
- Java support: While most Android applications written in java there is no Java Virtual machine in the Platform and Java byte code is not executed. Java classes are compiled into Dalvik executable and run on Dalvik a specialize virtual machine designed specifically for Android and optimized for battery-powered mobile devices with limited memory and CPU. J2ME support can be provided via third-party applications.[12]
- Storage: SQLite, a lightweight relational database, is used for data storage purposes.[12]
- Streaming media support: RTP/RTSP streaming (3GPP PSS, ISMA), HTML progressive download (HTML5 <video> tag). Adobe Flash Streaming (RTMP) and HTTP Dynamic Streaming are supported by the Flash plug-in[5] Apple HTTP Live Streaming is supported by RealPlayer for Android,[6] and by the operating system since Android 3.0 (Honeycomb).[13]
- Multi-touch: Android has native support for multi-touch, which was initially available in handsets such as the HTC Hero. The feature was originally disabled at the kernel level (possibly to avoid infringing Apple's patents on touch-screen technology at the time).[10] Google has since released an updated for the Nexus One and Motorola Droid which enables multi-touch natively.[11]
- Connectivity: Android supports connectivity technologies including GSM/EDGE, Wi-Fi, Bluetooth, LTE, CDMA, EV-DO, UMTS, NFC, IDEN and WiMAX.
- Bluetooth: Supports voice dialing and sending contacts between phones, sending files (OPP), accessing the phone book (PBAP), A2DP and AVRCP. Keyboard, mouse and joystick (HID) support is available in Android 3.1+, and in earlier versions through manufacturer customizations and third-party applications.[12]
- *Multitasking*: Multitasking of applications, with unique handling of memory allocation, is available. [15]

Existing scenario: In existing scenario, we use standard input devices (i.e. keyboard, mouse) and some gaming fanatics use joysticks (while gaming) for controlling laptop. With the help of this project, we are introducing the concept of using Smartphone instead of standard devices for providing controls like typing using Smart phones keypad, controlling mouse pointer and playing games on laptops. Now THE gadget of the decade (along with its successor, tablet) but most of us fail to optimally use this promising gadget to the full of its core. Our project will focus to explore the features of smart phone like Accelerometer and (of course) its mobility

Problems in existing Scenario: The frequent movement from keyboard to mouse and back could cause carpal tunnel syndrome. If you cannot touch type, it can be time consuming to enter the data-using keyboard. Disabled people often find keyboards difficult to use. Keyboard usually makes more noise, like a typewriter. Keyboard weights more. Mouse needs a flat surface to be used. Mouse cannot be easily used with a laptop.

Proposed system: Our project will allow the user to control games on laptop via Smartphone using wireless technology like Wi-Fi. It is very well known fact that for gaming fanatics, ergonomic controls is the need of the hour. Instead of wasting money in buying new (comparatively expensive than ordinary controls) ergonomic controls we can use our Smartphone and all the controls which we want to use (while gaming) can be customized according to our comfort. It will also provide facility to the user to provide an input through their smart phone i.e. user can have complete control of laptop/pc via Smartphone through this application. This would mean the optimum utilization of resources available with us and also in the best possible way. It will also provide keyboard on smart phone screen, enabling user to type from mobile and keyboard signals will be sent to laptop through Wi-Fi connection between smart phone and laptop/pc. It will provide support for motion gaming through Smartphone accelerometer and normal directional key control. Controls provided of playing games will differ from game to game. Users can also customize these controls according to their need. This feature will be highlight of our project which will allow us to utilize the resources available with us in the most optimum manner with focus on the ergonomic part.[3]

II. METHODOLOGY

Problem statement: In current scenario, we use standard input devices (i.e. keyboard, mouse) and some gaming fanatics use joysticks (while gaming) for controlling laptop. With the help of this project, we are introducing the concept of using Smartphone instead of standard devices for providing controls like typing using Smartphone keypad, controlling mouse pointer and playing games on laptops. Now days, Smartphone has become the gadget of the decade (along with its successor, Tablet) but most of us fail to optimally use this promising gadget to the full of its core. Our project will focus to explore the features of Smartphone like Accelerometer and (of course) its mobility.

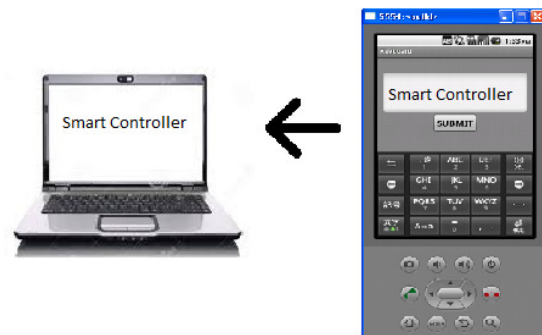


Figure 2: Editing Notepad

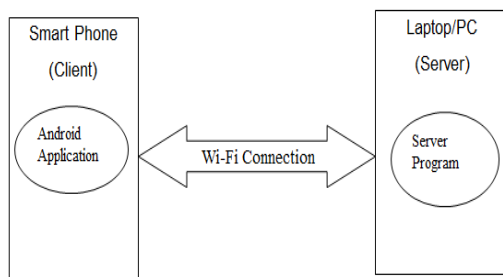


Figure 1: Architecture of the proposed system

Client server communication: As our mobile devices become increasingly connected, client-server communications are also becoming increasingly necessary. This application is a simple client-server application, which has an Android mobile client, and java server, which is run on the machine. In this example, client is run on the Android emulator and the server is run on the local host. This application allows typing a text message on a text field and when the send button is press, the message is sent to the server. Server continuously listens to the port. When there is an incoming message server read it and shows it on the standard output. [7]

Phone controller communication: This proposed system is the perfect companion for anyone who is always using their computer. Phone to Computer is an application that will allow your phone and your computer interact over your cell phone's wireless plan or by Wi-Fi. This application allows your phone to control, send data to your computer. Your computer must have an internet connection for this to work. This allows you to open a file on your computer from phone, view properties of the files, and delete a file on your computer from your phone.

Basically this application consists of major two parts. The first one is application which you will install on your android devices and the second part is the server application for your computer or laptop (the devices you want to take control over) it has full control of texts. You've got controller in hands now. It is really a great application to control your computer via your Android devices. It really helps a lot as a controller of your PC. You can control your computer with this application and it is great alternative to your mouse and keyboard. All you need to have is just an android device and you're ready to go for it.

User experience: Generally, games are played using standard input devices like keyboard and mouse, but it has a limitation as it is wired so there is distance constraints, messy wires, and limited user control. This product will consist of an Android application on smart phone which will allow the user to play game using Smartphone feature like accelerometer and gives user an overall new experience. Based on the type of games, different controls will provided. User can also customize these controls and look and feel of the screen according to their need. It will also provide keyboard on smart phone screen, enabling user to type from mobile and keyboard signals will be sent to laptop through Wi-Fi connection between smart phone and laptop.

User characteristics:

The user of this software would be processor of Android mobile phones with Wi-Fi enabled. Desktop users need to have Wi-Fi drivers on their PC. Users will experience the functionality to type and scroll the cursor on laptop/pc screen by just typing or scribbling on smart phone touch screen. It will thus provide the user wireless connectivity and easily control the cursor or type even from certain distance .It will provide an overall new experience to the user to play games by connecting laptop to smart phone through Wi-Fi and use smart phone as an input device.

Benefits of smart controller: PowerPoint control, Wi-Fi supported, Game controller-you can create your own custom remote, Click or type messages, or execute special key combinations (macros) on your computer directly from your phone, Touch screen mouse control with multi-touch support, Keyboard control. Simple text entry, a user-friendly phone application, Easy server and application setup

Scope:

- ‘Smart Controller’ does a very smart job by providing users to control their laptop/PC through Smart Phone.
- It allows users to operate laptop being at distance, as it uses Wi-Fi for connection between laptop/PC & Smart Phone.
- Allows user to play games on laptop/PC.
- All types of users - naïve users, students, executives, etc, will benefit from this software

Hardware requirements:

- Processor: Core2Duo or higher
- Hard Disk: 2GB
- RAM: 1GB
- A Wi-Fi and GPRS enabled Smartphone for application testing

Software requirements:

- OS: Windows7
- Android SDK
- Eclipse IDE
- Rational Rose for designing.

Software process model: The “Incremental Model” will be followed during our project development, which states that the phases are organized in a linear order. A project begins with feasibility analysis. On the successful demonstration of the feasibility analysis, the requirements analysis and the project planning begins. The design starts after the requirements analysis is done and coding begins after the design is done. Once programming is completed, the code is integrated and testing is done. On successful completion of testing, the system is installed. After this the regular operation and maintenance of the system takes place. The following figure demonstrates the steps involved in incremental model.

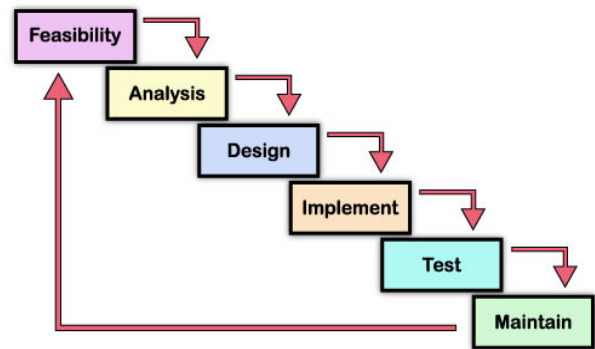


Figure 3. The incremental software development life cycle model

Advantages:

- Generates working software quickly and early during the software life cycle.
- More flexible – less costly to change scope and requirements.
- Easier to test and debug during a smaller iteration.
- Easier to manage risk because risky pieces are identified and handled during its iteration.
- Each iteration is easily managed milestone.

Assumptions:

- The team has no human resources other than the members of the group for project development.
- The development will make use of academic knowledge in Android Application development guide from references mentioned to complete the project.
- The development team will learn and work together to meet the deliverables of this project.
- The team will respond in a timely manner to all questions and requests for information.

Constraints:

- All activities of the project & the respective complexities can be upheld or down held keeping in consideration the time constraints.

- Deadlines will be given utmost importance throughout the development process.

Technological Aspects:

- We will use the Android platform which is an open source platform.

Technologies used:

- Eclipse → An Integrated Development Environment.

Overall description:

Product Perspective: Generally, games are played using standard input devices like keyboard and mouse, but it has limitation as it is wired so there is distance constraint, messy wires, and limited user control. This product will consist of an android application on smart phone which will allow the user to play game using Smartphone feature like accelerometer and gives user an overall new experience. Based on type of game, different controls will be provided. Users can also customize these controls & look and feel of the screen according to their need. It will also provide keyboard on smart phone screen, enabling user to type from mobile and keyboard signals will be sent to laptop through Wi-Fi connection between smart phone and laptop.

User Characteristics:

- The users of this software would be possessors of Android mobile phones with Wi-Fi enabled.
- Desktop users need to have Wi-Fi drivers on their PC.

Product Functions:

- User will enter the IP address to connect the server (which will be running on desktop).
- As soon as the connection is established, it will then provide options for keyboard, mouse or game play.
- As per the option selected by the user, the application will allow to do the intended task.
- It provides with the functionality to type and scroll the cursor on laptop/pc screen through just typing or scribbling on smart phone touch screen.
- User can easily control the cursor or type even from certain distance.
- It will provide an overall new experience to user to play game by connecting laptop to smart phone through Wi-Fi and use smart phone as an input device.



Figure 4: Client (Smart Phone) will enter IP address

Constraints, Assumptions & Dependencies: The SRS document has been developed based on the requirement with the following assumptions:

- User should have a Wi-Fi enabled touch screen Smartphone.
- WAP 1.0 or above (Wireless Access Protocol)
- Network consistency and reliability for sending/receiving the signals from Smartphone to laptop/PC.
- Desktop users should have Wi-Fi drivers installed on their PC.

III. CONCLUSION

We are developing a desktop application which acts as server on PC/laptop and mobile application which acts as client. This allows user to use Smartphone's keypad and mouse pad to operate/control Laptop/PC. Also it will allow user to play games on their PCs through Smartphone using sensor feature as well as directional key games. Thus we are implementing a system that provides ease and convenience. And will also the user to make full utilization of his/her Smartphone.

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