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A PATH FOR HORIZING YOUR INNOVATIVE WORK

CONTROLLING PC THROUGH MOBILE PHONE

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Abstract: As all are familiar with both mobile phones and computer like home PC, laptop etc. and also all are having mobile phone with high and low prices. We know that computer can be controlled by a user by using client server basis. There are various limited options available to the users when they are not connected to the internet to access their workstations. Most of the options available are tedious, expensive and unsecure. Hence there was a need for an easy to use, application that will be able to connect the users while being offline from their cell phones and access their data regardless of their location anywhere in the world. I would like to share a new technology, i.e. controlling computer system by using a mobile phone. I am connecting my mobile phone to laptop and PC's mostly to share information. This paper involves interfacing the computer hardware and software and the mobile phone so that the computer should be switch on and off using mobile phone and also some of the computer task could be performed using the same phone. The proposed system is based primarily on Bluetooth and Java technology and in order to achieve the idea of accessing workstation with personal mobile phone as a remote interface. This study involved design a new application that enables users to connect to their workstations remotely by the use of Bluetooth technology present in cell phones are user friendly. Once this application is installed, computer users are successfully able to connect with their workstations and control it via their Cell phones

Keywords: Mobile Communication, Bluetooth, Remote desktop, Communication protocols, Pocket wizard client and server

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INTRODUCTION

As consumer electronics devices and personal computers have become inevitable part of our life. Similarly, mobile devices and computers like cell phones and Tablets are becoming more and more commonly used in our day to day life. Controlling consumer electronics devices and computers remotely is an important aspect of this technology. Today, we have universal remote control devices to control consumer electronic devices such as TV sets. Similarly, it is desirable to remotely control stationary desktop/laptop PCs and their applications. In this we will have view of a desktop in our mobile and can operate our PC through it. Our application will be primarily based on pocket wizard. The server side of the system runs on top of the Windows operating system and the client side is a cell phone with inbuilt Bluetooth technology. Its architecture is based on client-server paradigm. It consists of two parts: a server part and a client part. The server part runs on a desktop PC or laptop PC to be controlled remotely. The client part runs on a cell phone that can be easily carried by a user and that will act as the remote controller device for desktop PC and its applications. The server side of the system is capable of listening incoming connections, sending and receiving data, processing control, commands taking screenshots, modify applications.

Presently the computer can be operate with the help of another computer remotely but there is an problem with it that both system must have same software inbuilt and we can operate it but cannot access the data. The drawback of the existing system is that it is difficult to control PC with another PC. It is difficult to perform all the operation of another PC with this, only we can share the data but we cannot operate it .The Propose system Will be very easy to install and maintain and you can operate your PC through Mobile phone. The system consist of a PC and a Cell phone. In this the mobile phone will have a view of your desktop and you should have to login with a port no of PC and IP address of your PC. Once the connection is established between the two devices then you can do any operation. Such that you can transfer the file from your mobile to your PC, you can do update into your PC and many related options .The main advantage of this system is that it will save your time and you don't have to keep your PC with you always

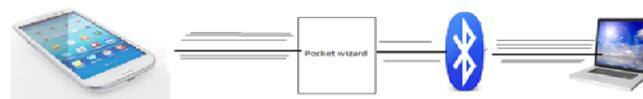


Fig 1.1: Accessing device

Controlling PC applications remotely inside a house, an office, or a conference room. As the remote control device, we consider using a cell phone purpose pocket PC computer with Bluetooth capability.

For this purpose, we have designed and implemented mobile system software, called Pocket Wizard that enables a cell phone to act as a remote controller device for desktop PCs and their applications

Pocket Wizard is a system/tool that allows users to control their desktop computer applications from a cell phone by using its inbuilt Bluetooth technology. The connection between a controlling Cell phone and a desk- top PC can be over a single wireless hop, or over many wired and wireless hops using the Internet infrastructure. In both cases IP (Internet Protocol) is used as the communication glue. The TCP is used as the transport protocol. The wireless link technology can be a wireless LAN technology such as IEEE 802.11 a/b/g or a wireless PAN technology such as Bluetooth. For this both cell phone and desktop PC should be wireless capable

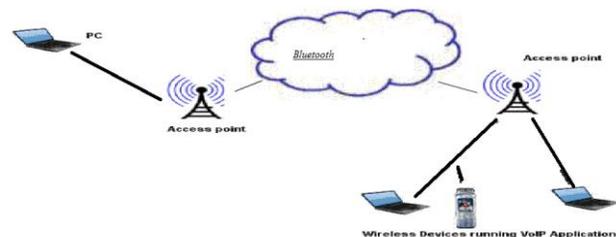


Fig 1.2: Connecting Devices

The PC can have a wireless adaptor to talk to the cellphone or it can first talk to a wireless access point over Ethernet and then the wireless access point can bridge this connection to the cellphone over the wireless link Access point is the point through which the connection can be established between the two or more devices, both the devices has its own access point and through that the communication between the devices takes place.

1. Bluetooth technology

Bluetooth is a wireless communication protocol mainly used for short distance and in devices with low power consumption. Because Bluetooth is capable of communicating in an Omnidirectional manner of up to 30 feet at 1 Mb/s it is far superior to infrared. Bluetooth is a standard used in links of radio of short scope, destined to replace wired connections between electronic devices like cellular telephones, Personal Digital Assistants (PDA), computers, and

many other devices. This technology allows to the users instantaneous connections of voice and information between several devices in real-time.

The PC controlling part of our program can send command to a connected PC to control some basic component of it. The mobile connects with the PC by obtaining the URL String that is needed to connect to the device from the Service Record object that we get from service discovery. Our program generates the connecting string automatically by comparing the UUID of Serial Port profile with the UUID of discovered service record objects in the current inquiry. If there is a match then our program saves the connecting string to connect with the remote device

1.1 Bluetooth protocol stack

Bluetooth is defined as a layer protocol architecture consisting of core protocols, cable replacement protocols, telephony control protocols, and adopted protocols etc.

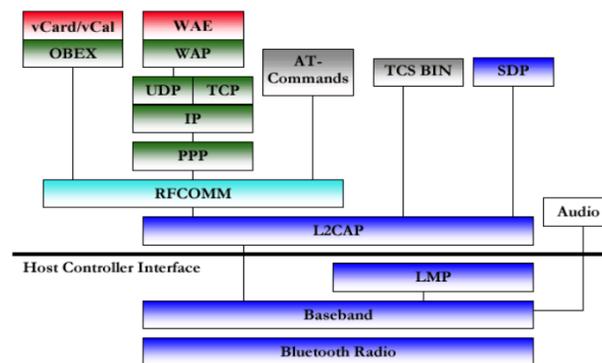


Fig.3.2.1: Bluetooth protocol stack

1. 1.1.1:LMP

The Link Management Protocol (LMP) is used for set-up and control of the radio link between two devices.

1.1.2: AVRCP

Audio/Video Remote Control Profile. AVRCP is designed to provide a standard interface

1.1.3: L2CAP

The Logical Link Control and Adaptation Protocol (L2CAP) Used to multiplex multiple logical connections between two devices using different higher level protocols. Provides segmentation and reassembly of on-air packets L2CAP provides packets with a payload configurable up to 64 kB, with 672 bytes as the default MTU. In Retransmission and Flow Control modes, L2CAP can be configured either for isochronous data or reliable data per channel by performing retransmissions and CRC checks

2. 1.1.4AVCTP

The Audio/Video Control Transport Protocol (AVCTP) is used by the remote control profile to transfer AV/C commands over an L2CAP channel.

1.1.5: TCP

Transmission control Protocol (TCP) is use to transfer a data file TCP is a connection-oriented protocol responsible for ensuring the transfer of a datagram from the source to destination machine (end-to-end communications), TCP must receive communications messages from the destination machine to acknowledge receipt of the datagram. The term virtual circuit is usually used to refer to the handshaking that goes on between the two end machines, most of which are simple acknowledgment messages. TCP is based on a unicast network model, and supports data exchange between precisely two parties. It does not support broadcast or multicast network models.

1.1.5.1 Connection state:

Rather than impose a state within the network to support the connection, TCP uses synchronized state between the two endpoints. This synchronized state is set up as part of an initial connection process, so TCP can be regarded as a connection-oriented protocol. Much of the protocol design is intended to ensure that each local state transition is communicated to, and acknowledged by, the remote party.

1.1.6: UDP

UDP is a connectionless and unreliable transport protocol. The two ports serve to identify the end points within the source and destination machines. User Datagram Protocol is used, in place of TCP, when a reliable delivery is not required. UDP is never used to send important data such as web-pages, database information, etc. Streaming media such as video, audio and others use UDP because it offers speed.

1.1. RFCOMM

Radio Frequency Communications (RFCOMM) is a cable replacement protocol used to generate a virtual serial data stream. It provides for binary data transport and emulates control signals over the Bluetooth baseband layer.

2. Working of device

This system consists of two software programs: one server program running on a desktop PC or laptop PC that is to be controlled remotely; and one client program running on a cell phone to be used as the remote controller. The server process starts listening on a well-known TCP/IP port after being started up on the desktop PC. A cell phone user has to know the IP address of the desktop PC and the well-known port number for being able to connect to the desktop PC from the cell phone.



Fig 2.1: Connection



Fig 2.2 Explore the controls

A username and password is required for the user to login to the system. The server process asks the client process a username and password, and then authenticates the user. In this way, only users with previously created accounts can access the PC for controlling. These parameters (server IP address, port number, username, and password) are maintained at the server side and are configurable via a GUI interface. A Cell phone user that would like establish a connection to the PC for controlling the PC applications enters the required information (IP address, port number, username and password) and a TCP connection is established to the server. Over the TCP connection, besides sending username and password, the client process also sends some parameter values regarding the screen width and height. If the server authenticates the user, it replies back with a login command and OK message. Otherwise if the authentication is not successful, the server replies back with a login command and NO message. The TCP connection is closed in this case. If the client gets logged in to the server successfully, other operations can be executed and controlling of the PC can start for this, the client first requests the current state of the PC screen. It sends a Send New Image command to the server to obtain the view of the desktop PC. Upon receiving such a command from the client, the server captures the image of the screen, resizes it according to the dimensions of the client's screen, Then the server sends Image command to the client including the size of the image in bytes, and the binary data corresponding to the image. When the client gets the Image command, it reads the binary image data and creates an image to be displayed on cell phone's screen. The image corresponding to the screen state of the PC is then displayed on the screen of the cell phone as part of the GUI structure for the Pocket Wizard client. After getting a view from the PC, the cell phone can request more screen shots. For this, it should again send a Send New Image command to the PC. This mechanism, i.e. waiting for an image to be downloaded before sending the next request for another image, is a simple flow control mechanism between the cell phone and PC. Another alternative could be requesting images periodically; but then the period should be adjusted depending on the speed of cell phone and the bandwidth of the wireless link. The mechanism that we use and available bandwidth. After getting the View of the PC, the cell phone user can start doing some control operations. Those include mouse operations and keyboard operations a mouse operation is triggered when the cell phone user touches to the screen of the cell phone that has the PC image. Additionally, the cell phone user has a GUI through which he/she can indicate whether she would like to emulate a left mouse button press event or a right mouse button press event. Then the mouse operation and location is transported to the server which converts the mouse position to a point on the PC screen. Then the server sends a mouse event to the PC operating system and appropriate action is executed on the PC. Similarly, a keyboard operation can be triggered when the user presses on a key on the cell phone keyboard. The appropriate keyboard

command is conveyed to the server which in turn sends keyboard events and character codes to the PC operation system. Besides these, if an error occurs on the server side, an Error command and an appropriate error string is sent to the client side. If the client gets disconnected from the server unexpectedly, the client tries to reconnect to the server if the user has enabled the “try to protect disconnections” option. Otherwise, reconnection is not attempted and the user is informed about the disconnection .is adaptive to the changes in the wireless link properties

The devices must be connected to the same Wireless network. Once the devices are connected, you can open the file browser from your Android phone and start controlling from mobile.



a. Fig 2.3 Control operation



Fig 2.4 Type away

For all the above operation we are using TCP / UDP Protocol. To transfer a data file we are using TCP i.e. transmission control Protocol and to transfer Audio and video file we are using UDP i.e. User datagram Protocol.

3. Control command and Data Flow

A command is sent in a message and represented with a string followed by a new line character. The commands Login, Error, Okay and Not Okay are used at the beginning of client server handshake and authentication. The Error command indicates an error condition and is used in other phases as well. The Left Click, Left Double Click, Right Click, Right Double Click, Mouse Left Down, Mouse Left Up, Mouse Right Down, Mouse Right Up, Mouse Move commands are mouse related commands and are used to control the mouse pointer on the desk- top PC screen.

The relative location of the pointer on the cell phone screen is sent to the server side and the server calculates the actual location on the desktop screen. Key Down and Key Up commands are keyboard related commands and are used when the user would like to provide keyboard input to the PC applications via the cell phone keyboard panel. For that, the character code of the key is sent inside a command to indicate which key is pressed. Since the screen size of a cell phone is much smaller than the screen size of a desk- top PC, the screen view of the PC has to be scaled down, and this may cause a low quality image to be presented on the cell phone screen. Therefore, supporting zooming of the screen image is an important feature to have on the client side.

4. Objective

1. It operates PC from mobile device using Internet with key pad inputs of mobile.
2. It allows a power button, as well as a switch or series of buttons to select which device the remote is controlling at the moment.
3. It allows a numeric keypad for entering channel numbers and some other purposes such as time and date entry.
4. It allow selection of a particular set of codes (usually entered on the keypad) and allows user to cycle through the list of available codes to find one that matches the device to be controlled
5. It allowing the user to program command sequences to be sent with one button press. Programmable soft keys, allowing user-defined functions and macros.
6. It allowing the remote to be programmed to control new devices not already in its code list by IR coding

7. It allow the code lists programmed into the remote to be updated to support new brands or models of devices not currently supported

5. Applications

This system can use as a remote control

Use to transfer the simple data file as well as audio and video file.

View songs and artist information

Use your phone as a wireless or wireless mouse

Control power point presentation by viewing the slide information on your phone.

Play game on your PC by controlling them with your mobile phone Shutdown your PC.

6. Advantages

1. **Ease of use:** The system can be easily launched, configured and used. It is having nice and graphical user interface.
2. **Mobility:** The system support mobility of the user while controlling the desktop computer application. Mobility can be enabled if the remote control device is portable and if its connection to the desktop computer.
3. **Wireless:** The wireless connection can be a short – range local or personal area connection, most of the time. In that case, the roaming range can be up to 100 or 300 meters depending on the wireless technology used and on the propagation environment.
4. **Flexible Control:** A user should be able to control and execute as much functionality as possible. The user can do everything that he/she can do on a desktop computer also in a remote manner. The user is able to give keyboard inputs and mouse inputs to the desktop PC and also can get as much screen information as possible
5. **Power:** The system is power efficient since cell phones are power constrained devices and have limited energy.
6. **Reliability:** The system and connectivity is reliable enough so that a user can control the desktop computer without losing data and/or commands.

7. Future scope

1. Server scanner that scans and shows Pocket Wizard servers on a local area wired or wireless network into which a hand- held device can get connected.
2. New user types can be created with the different security levels such as a guest user who only observers the activities on the server.
3. The size of a screenshot image can be reduced further by an appropriate compression scheme or image format. This will decrease bandwidth usage on the wireless channel. The same approach is applied for mobile phones to use them as remote control device as well.
4. Application can be made to control your PC by Mobile Phone using Wi-Fi technology
5. With this you can share video and songs directly from PC through Mobile

8. CONCLUSION

Smart phone and tablet universal remote software is usually highly customizable. As with traditional universal remotes some are programmed using the handset (phone/tablet) itself and others are programmed using a computer. Remote control features, Controlling of PC with Smartphone from remote place using internet with the help of Client / server mobile technology using 3 – tier concept. Virtual keyboard of mobile can be handled to operate the functions of the PC. Server based concept is utilized to capture the screen on mobile from PC. IP is assigned to PC and can be accessed on mobile browser with the help of wireless router attached with dongle for the internet. The mobile device will work like a remote control for the PC. This introduces our system for local or wide area re- mote controlling of desktop/laptop PC applications using handheld devices like Pocket PCs. The contribution of this paper is providing the architecture and detailed design of a general purpose remote control system for controlling desktop PC applications from handheld devices.

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