

Remote computer access through Android mobiles

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Abstract – In this paper, we will present the process to access the computers with the help of android mobile phones. This process is based on VNC (virtual network computing) technique. So to work on this, we must install VNC server on our computer connected with Wi-Fi network. The user can access & perform operation through the range of Wi-Fi platforms like Linux, Mac, windows etc. The image of the desktop is compressed before it is transmitted to the cellular phone. There are several functions provided so as to ease the viewing on cell-phones. There is shortcut function that can be used to quickly access the frequently used area. Current key assignments can be viewed using guidance function. A user can view two areas simultaneously using a twin view function. The prototype is already implemented using java and tested on a java based cellular phone.

Index terms: DLNA (digital living network alliance), IR (Infra Red), GSM (Global system for mobile communication), GPS (Global positioning system), Android, Java, Wi-Fi, Mobile Terminal.

Introduction

Now a day we can operate television by our mobile not only at home but also from outside. Total control will be there in our hands. Another advantage is TV can be keep away from children (just like child lock system) and also from unwanted persons.

Operating Systems have developed a lot in last 15 years. Starting from black and white phones to recent smart phones or mini computers, mobile OS has come far away.

Especially for smart phones, Mobile OS has greatly evolved from Palm OS in 1996 to Windows pocket PC in 2000 then to Blackberry OS and Android.

World is contracting with the growth of mobile phone technology. As the number of users is increasing day by day, facilities are also increasing. Starting with simple regular handsets which were used just for making phone calls, mobiles have changed our lives and have become part of it. Now they are not used just for making calls but they have innumerable uses and can be used as a Camera , Music player, Tablet, PC, T.V, Web browser etc. And with the new technologies, new software and operating systems are required.

One of the most widely used mobile OS these days is **ANDROID**. **Android**[1] does a software bunch comprise not only operating system but also middleware and key applications. Android Inc was founded in Palo Alto of California, U.S. by Andy Rubin, Rich miner, Nick sears and Chris White in 2003. Later Android Inc. was acquired by Google in 2005. After original release there have been number of updates in the original version of Android are android 1.1, 1.5(Bluetooth), 1.6(google),2.0/1(fileex change upport)(2009), 2.2(wi-fi support),2.3(touch screen)(2010), 3.0(video chat)(2011), 4.0 latest. Android 4.1,Jelly bean the world's most popular platform gets ever better.

Features & Specifications

Android is a powerful Operating System supporting a large number of applications in

Smart Phones. These applications make life more comfortable and advanced for the users. Hardware's that support Android is mainly based on ARM architecture platform. Some of the current features and specifications of android are:

1. Application framework- it enables reuse and replacement of components
2. Dalvik virtual machine- it is optimized for mobile device
3. Integrated browser- it is based on the open source web kit engine
4. Optimized graphics- it is peered by a custom 2D, 3D graphics library.
5. SQLite
6. media support
7. GSM technology
8. Bluetooth, EDGE, 3G, Wi-Fi, camera, GPS, compass etc.

Applications

- Android applications are composed of one or more application components (activities, services, content providers, and broadcast receivers)
- Each component performs a different role in the overall application behavior, and each one can be activated individually (even by other applications)
- The manifest file must declare all components in the application and should also declare all application requirements, such as the minimum version of Android required and any hardware configurations required
- Non-code application resources (images, strings, layout files, etc.) should include alternatives for different device configurations (such as different strings for different languages)

We are working on porting our iphone/itouch/ipad IR remote over to Android. Most of the basics are done and we should be releasing a base version in about a month. Testing on a moto android right now with 2.1 and UI is as crisp as the iphone version. The

graphics are the same so it is just a matter of the screen resolution. It requires a hardware piece which has a full IR dbase containing over 348,000 unique function codes with compatibility for over 230,000 brands and models built in + a built in learner to learn any IR code directly via app. has macro support also along with emitter ports, blaster, relays, rs232, etc.

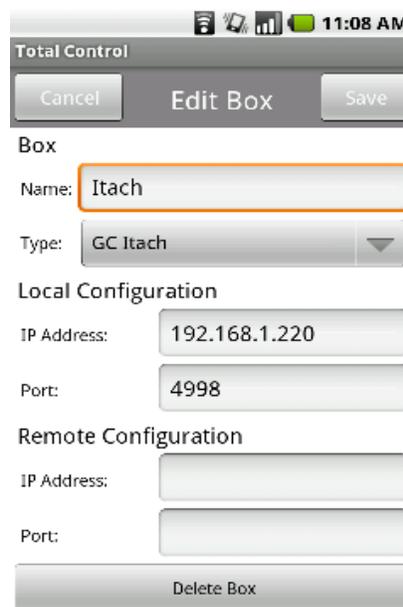
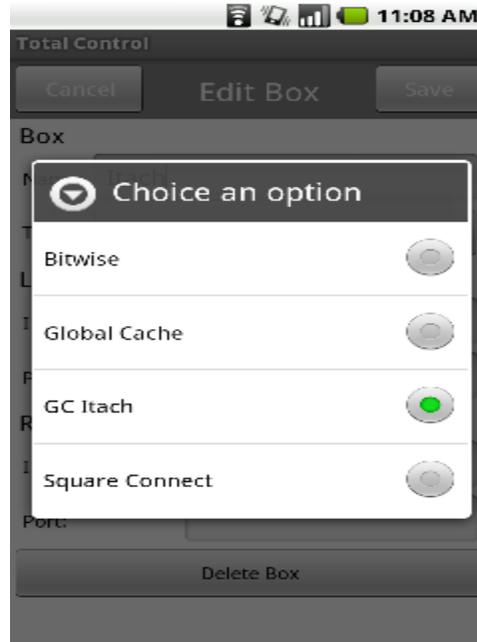


We can get a remote DVR app and a mobile remote control app through the Widgets on your FiOS STB. USB UIRT [2] has a device that connects to the computer and blasts IR out to devices. How it is that no one has made an app to use this? there is one for the iphone, there is even free software event host that can tie it all in. frankly, no disrespect to total control, but I don't know why someone needs a 400 dollar box to accomplish what can be done with a 60 dollar piece connected to a PC that likely will be right next to your electronics anyway. An app called 'Unified Remote Server' that gives a lot of capabilities to control the computer enabled TV but we want to find an easy remote to use on

Microsoft Media Center for the Xbox. There an away to use Unified Remote Server on Xbox is as follows.

Steps to connect android remote to TV

1. For easy setup: add user device that will be select from predefined lists.
 2. utilize built-in IR data base by selecting codes from list
 3. Simple connection type. Just input IP address & port number.
 4. test data base selection from set up with power on/off device button
 5. Pre made GUI. No need for our own Icons or templates. Setup will complete with in minutes
 6. numeric pad for direct number input
 7. easily edit devices after adding them in
 8. Learn keys: learn our own IR (Infra Red) codes if needed. Override buttons or whole custom reports
 9. add multiple devices control all of our devices from one application
 10. Code sets: select from pre defined IR cods groups in Data Base.
 11. Macro support is also provided. So that we can enjoy multi step controls from a single button selection
 12. At end select power on (options like on/off) button for close the connection.
- These steps are shown diagrammatically as





TV can be controlled by different applications like virtual remote control, GoFlex TV remote control, smart TV remote control with the help of DLNA (digital living network alliance), sky remote codes and We-Teli etc.

Samsung released an Android app that connects with their Wi-Fi-enabled TVs (much like their iPhone version), and lets you handle all of your usual remote control needs, like channel changing, volume control (with mute), changing the connection source, and navigating menus from your phone. Probably the most helpful feature is a QWERTY keyboard so you can use your phone to input text as needed, instead of hunting and pecking with the directional pad. Currently-supported sets are any LCD, plasma, or LED TVs in the C6500 series and up.

Samsung is smart to leverage their other home electronics on mobile, but they certainly aren't alone in that strategy. Windows phone plays particularly nice with Xbox and Zune, and Sony Ericsson will be working closely with the PlayStation brand. Samsung's biggest direct competition in this area is LG, but aside from a Bluetooth-enabled TV two years ago, but matches this degree of phone-TV connectivity is greater.

If Samsung really wanted a leg-up, they'd make this remote control app clever enough to tell what you're watching, and let's check in to Get Glue with it. We can find the Samsung TV Remote in the Android Market. There's a Galaxy Tab-optimized version available too.

Hardware List

1. 2 Wheels MiniQ Balancing Robot Chassis or 2 Wheels MiniQ Robot Chassis (comes with castor)
2. Arduino UNO
3. 2A Motor Driver Shield for Arduino
4. Infrared Kit
5. 7.4V 500mAH Lipo Rechargeable Battery
6. PCB Stands, screws, nuts and also some components

Currently these manufacturers support smart phone remote controlling:

- Samsung
- LG
- Sony
- Panasonic
- Philips
- Vizio (coming soon)

Step-by-step setup wizard

Here is a step-by-step guide to get we started:

1. **Home network** First of all we need a wireless home network. If we do not have a wireless router, buy one in our local store. Preferably with the fast “N” wireless standard.
2. **TV on network** Now we need to connect our TV to the home network - either wirelessly or via cable.
 - **Cable**
If we plan to connect TV with cable setup is easy. We just need to plug in the Ethernet cable and we are ready.
 - **Wi-Fi**
Wi-Fi requires us to go through a few setup step. Few TVs come with integrated Wi-Fi so we need a a GUI button that is not currently displayed on the viewer.
 - **USB Wi-Fi dongle** – often from our TV manufacturer. Once we have it, need to go through the network setup menu steps in the TV menu and find our own local wireless network. Enter the password and we should be ready.
3. **Download App** Now we need to download the Remote App for our Apple or Android smart phone. Depending on your TV you need to download a specific App.
4. **Pair TV and phone** Before we can start using your smart phone we need to pair the TV and the phone. Open the

App and follow the instructions on the screen. Sometimes we need to enter the TV menu and find a remote control setup option.

5. **Enjoy** we are now ready to control our TV with IOs or Android devices.

PROPOSED ARCHITECTURE

Cellular phones have shown a dramatic improvement in their functionality to a point where it is now possible to have cellular phones execute Java programs. As a result, cellular users throughout world are now able to read and write e-mail, browse Web pages, and play Java games using their cellular phones. This trend has prompted us to propose the use of a cellular phone as a device for remotely controlling computers. Virtual Network Computing is a graphical desktop sharing system providing remote control via network. It supports a controlling functionality by usage of a graphical screen update from a controlled device and capturing a mouse and/or a keyboard. VNC system is based on RFB (Remote Frame Buffer) protocol [3] to transmit all information between connected devices. Transmission is running on one port from range 5900-5906 using TCP/IP protocol. VNC system required two type of application for a proper work - server application for a machine under control and client - for a supervisor (controlling) device. Client side is called viewer because of its functionality. Controlling machine is responsible for viewing a shared desktop (or screen in general) and capturing and converting all user activity into the RFB protocol [5] messages. On the other side, server must to interpret all events received from client and inject them into self system. Server should also response to graphic screen update request by sending back a desktop view to connected client. The cellular user can see and manipulate the desktop on the cellular phone. The same cellular phone to talk

someone, the user must terminate the network connection.

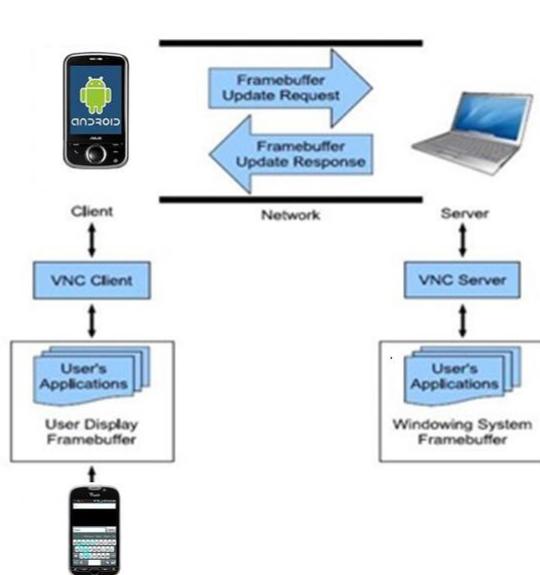


Fig VNC architecture based mobile access computers

DESIGN OF THE PROPOSED SYSTEM

Here we have five main modules. Those modules are listed as below and the functionality and design of each module is described further.

A. Desktop Sharing:

In this module the remote desktop screen will be shared. This can be implemented with the help of the VNC protocol. VNC protocol is based on the concept of a remote frame buffer (RFB). The protocol simply allows a server to update the frame buffer displayed on a viewer. Because it works at the frame buffer level it is potentially applicable to all operating systems, windowing systems and applications. The protocol will operate over any reliable transport such as TCP/IP.

B. Panning and zooming:

The user can move the viewport horizontally and vertically. The viewport can be widened (zoom out) to browse its contents and narrowed (zoom in) to see the display in greater detail.[1]

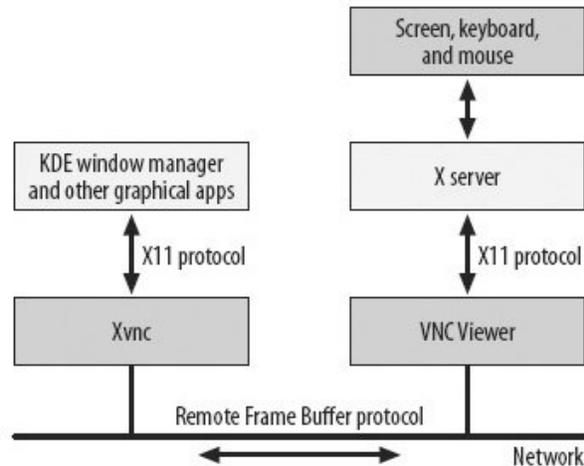


Fig Basic Model of VNC protocol

C. Over viewing and twin view:

In order to browse the entire area of the desktop display and to choose a specific area within it, the over viewing mode is provided. When the user turns this mode on, the aspect ratio is changed so that the whole area is rendered to fit the screen of the cellular phone. This helps the user adjust the viewport to the desired area of the desktop display. [1] Sometimes, it is convenient to display two areas of the desktop simultaneously. We can enter test conditions and observe the results simply by moving our line-of-sight slightly

D. Pointing and clicking:

The user can move the pointer on the remote desktop display vertically and horizontally by pressing keys. Dragging can be executed by pressing a key to specify the start of the dragging operation, then moving the pointer, and finally pressing the same key to indicate the end of the dragging operation.

E. Inputting text:

Text is entered and edited locally on the cellular phone using the built-in text input capability of the cellular phone.

F. Shortcut Assignment:

Common GUI operations, such as pressing GUI buttons and opening pull-down menus become very tiresome when only basic operations are provided.

Eg:

Input	Output
User inputs Username, password, IP address.	User is logged into the system.
User can move the cursor	Accordingly the cursor position changed on the desktop.
User can zoom	Depending on the area of zooming, the enlarged view of a region can be seen.
User can use shortcut assignments	Depending on the input related to a shortcut corresponding output is executed.

system will provide mobility for users for controlling their computer desktops over internet. More facilities and features for accessing applications running on remote desktop from mobile handheld devices will be provided. Thus the extended scope of this system will prove to be helpful in providing mobility and accessing the remote desktop over the internet.

REFERENCES

[1] Android. <http://www.android.com> Retrieved March 1st, 2011.
 [2] Remote Control of Mobile Devices in Android Platform Angel, Gonzalez Villan , Student Member, IEEE and Josep Jorba Esteve, Member, IEEE.
 [3] www.realvnc.com/docs/rfbproto.pdf, reviewed on June 20th, 2011
 [4] Virtual Network Computing, Tristan Richardson, Quentin Stafford- Fraser, Kenneth R. Wood and Andy Hopper, Reprint from IEEE Internet Computing Volume 2, Number 1 January/February 1998.
 [5] Global Telecommunications Conference GLOBECOM 2010), 2010IEEE.

Limitations

There are some limitations, however. The most important one is the lack of wake-on-LAN compatibility in most TVs. Basically this means that we cannot turn on the TV with the smart phone – only navigate and turn the TV off.

Feature scope:

TV can be controlled by mobile. In future TV can be controlled by computer (already started in some areas).

Conclusion:

This application will provide assistance to the system administrator in monitoring the tasks and also provide file transfer. Currently the scope of this system is within Wi-Fi area. Next step will be implementing this system over Internet. The same RFB protocol will be used for the data transfer. The VNC architecture will be used for implementation of the system. Due to wide use of android devices, this system will be developed for tablets and other handheld devices. This

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