Changing life's Perspective: Android

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Abstract : **Android has evolved to be one of the most popular tools for mobile application development. This platform easily provides a range of benefits for mobile application developers. One of which is the easy to handle and easy to implement feature. Thus, the popularity of android devices has gone up significantly. To benefit from this lot of consumers, huge communities of developers write applications including games, social networking, and business modules, for Android smart phones. Due to user-friendly interfaces of Android applications, they are utilized by personals belonging to almost all sectors.**

However, since Android platform is open to modifications; it paves way for inconsistent experience across the diversity of android devices. This indeed makes applications to be incompatible with some android devices. Thus, the developers are propelled to find alternative ways of programming that could work on any versions of android efficiently. Furthermore, the lapses in security features of certain Android devices create an opportunity for malicious applications to get hold of some crucial system resources.

The future of Android applications seems promising as invention of new devices would provide a platform for new applications to venture.

Keywords: Open Source, Operating System, Smart Phone, GPU, ARM, versions.

I. INTRODUCTION

Android is an open source operating system which is used by smart phones, tablets, computers etc. It is based on Linux kernel and developed by Google.

Also, android is a stack of software for mobile devices which has operating system, middleware and some key applications. The application executes within its own process and its own instance of Dalvik Virtual Machine. Many virtual machines run efficiently by a DVM device.DVM executes Java language byte code which later transforms into application code (.dex) format files.

With a user interface based on direct manipulation, Android is designed primarily for touch screen mobile devices such as smart phones and tablet computers, with specialized user interfaces for televisions (Android TV), cars (Android Auto), and wrist watches (Android Wear). The OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard. Despite being primarily designed for touch screen input, it also has been used in game consoles, digital cameras, and other electronics.

Android is popular with technology companies which require a ready-made, low-cost and customizable operating system for high-tech devices. Android's open nature has encouraged a large community of developers and enthusiasts to use the open-source code as a foundation for community-driven projects, which add new features for advanced users or bring Android to devices which were officially released running other operating systems. The operating system's success has made it a target for patent litigation as part of the so-called "smart phone wars" between technology companies.

II. WHAT IS OPEN SOURCE OS?

Open Source Operating System is an operating system with its source code made available with a license in which the copyright holders provides the right to study, modify and distribute to anyone and for any purpose.

In production and development, open source as a development model promotes a universal access via a free license to a product's design or blueprint, and universal redistribution of that design or blueprint, including subsequent improvements to it by anyone. Open-source code is typically a collaborative effort where programmers improve upon the source code and share the changes within the community so that other members can help improve it further. The main open source HTTP server is Apache HTTP.

Open Source is a certification standard issued by the Open Source Initiative (OSI) that indicates that the source code of a computer program is made available free of charge to the general public. OSI dictates that in order to be considered "OSI Certified" a product must meet the following criteria:

- The author or holder of the license of the source code cannot collect royalties on the distribution of the program.

- The distributed program must make the source code accessible to the user.

- The author must allow modifications and derivations of the work under the program's original name.

- No person, group or field of endeavor can be denied access to the program.

- The rights attached to the program must not depend on the program's being part of a particular software distribution.
- The licensed software cannot place restrictions on other software that is distributed with it.

III. FOUNDATION OF ANDROID

Android was founded in Palo Alto, California in October 2003 by Andy Rubin (co-founder of Danger), Rich Miner(co-founder of Wildfire Communications), Nick Sears (Vice President at T-Mobile) and Chris White(headed design and interface development at Web TV) .Google acquired these people in his company with their development i.e. Android OS. The main focus of Google was to enter the mobile phone market. After this, the team led by Rubin developed the mobile device platform powered by Linux Kernel.

Finally, in 2007 Google launched its first series of smart phones, tablets and named it NEXUS series.HTC collaborated with Google and launched first NEXUS series smart phone NEXUS ONE. Till then, Google updated his NEXUS series with NEXUS 5 made by LG.

Since 2008, android has seen numerous updates which have incrementally improved the operating system, adding new features and fixing bugs in previous releases. Each major release is named in alphabetical order after a dessert or sugary treat.

IV. VERSIONS OF ANDROID

Since April 2009, Android versions have been developed under a confectionery-themed code name and released in alphabetical order :

- Apple pie (1.0)
- Banana Bread (1.1)
- Cupcake (1.5)
- Donut (1.6)
- Eclair (2.0–2.1)
- Frozen yogurt (2.2–2.2.3)
- Gingerbread (2.3–2.3.7)
- Honeycomb (3.0–3.2.6)
- Ice Cream Sandwich (4.0–4.0.4)
- Jelly Bean (4.1–4.3.1)
- KitKat (4.4–4.4.4)
- "L" release (developer preview)

Apple Pie(1.0) : It was the first commercial version of the software, was released on 23 September 2008.The first Android device, the HTC Dream (G1), incorporated the following Android 1.0 features: Android Market application download and updates through the Market app, Web browser to show, zoom and pan full HTML and XHTML web pages – multiple pages show as windows ("cards") , Camera support – however this version lacked the option to change the camera's resolution, white balance, quality, etc.

Banana Bread (1.1) : The 1.1 update was only available on the HTC Dream, otherwise known as the T-Mobile G1. Released in February 2009, version 1.1 resolved a number of issues encountered in the 1.0 build as well as implementing some API changes. The Maps app was improved to enable the display of details and reviews for venues and locations. Added functionality allowed users to click on businesses to view detailed information.

Cupcake(1.5): Android 1.5 is a major platform release deployable to Android-powered handsets starting in May 2009. The release includes new features for users and developers, as well as changes in the Android framework API.

For developers, the Android 1.5 platform is available as a downloadable component for the Android SDK. The downloadable platform includes a fully compliant Android library and system image, as well as a set of emulator skins, sample applications, and more. The downloadable platform is fully compliant and includes no external libraries.

Donut(1.6): Android 1.6 is a minor platform release deployable to Android-powered handsets since October 2009. The platform includes new features for users and developers, as well as changes in the Android framework API.

For developers, a new release of the Android 1.6 platform is available as a downloadable component for the Android SDK. The platform — Android 1.6 r2 — includes a fully compliant Android library and system image, as well as a set of emulator skins, sample applications, and minor development updates.

Éclair(2.0-2.1): On December 3, 2009 re-launched Android phone with version 2.0/2.1 (Eclair),changes were made to the hardware optimization,improved Google Maps 3.1.2, change the UI with a new browser and support for HTML5, the new list of contacts, support flash for thecamera 3 , 2 MP, digital zoom, and Bluetooth 2.1.

Frozen Yogurt(2.2-2.2.3): On May 20, 2010, the Android version 2.2 (Froyo) was launched. The changes are generally against the previous versions include support for Adobe Flash 10.1, speed and performance of applications 2 to 5 times faster, integration V8 JavaScript engine used by Google Chrome that speeds rendering capability in the browser, the installation of applications in the SD Card, WiFi capabilities portable hotspot, and the ability to auto update in the Android Market application.

Gingerbread(2.3-2.3.7): Gingerbread is the dessert-themed Android codename for the version 2.3 update of the open source Android mobile operating system. Gingerbread made its debut in December 2010 for a variety of smart phones, introducing Google Voice over Wi-Fi, enhanced gaming functionality and improved Google Apps.

Honeycomb(3.0-3.2.6):Android 3.0 Honeycomb is the current version is specifically optimized for gadget with a screen width, in particular, and the tablets. In this

version introduced a new UI design, virtual and holographic but also elegant with the interaction model focuses oncontent.
In this versionof Google makes multitasking, notifications, Home screen customization,widgets, and others have also become more interactive, vibrant, and provide a 3D experience but still familiar and also better than ever

Ice Cream Sandwich(4.0-4.0.4): ICE CREAM SANDWICH is designed to either phones or tablets. It offers a much improved from what already exists in Gingerbread and Honeycomb with at the same time providing new innovations. Some of the upgrades include the ability of a better copy and paste, data logging and warnings, and the ability to screenshot by pressing the power and volume simultaneously.

Jellybean(4.1.-4.3.1): Android 4.1 "Jelly Bean" was first unveiled at the Google I/O developer conference on June 27, 2012, with a focus on "delightful" improvements to the platform's user interface, along with improvements to Google's search experience on the platform (such as Knowledge Graph integration, and the new digital assistant Google Now), the unveiling of the Asus-produced Nexus 7 tablet, and the unveiling of the Nexus Q media player.

Kitkat(4.4-4.4.4) : Android 4.4 KitKat is a version of Google's operating system (OS) for smart phones and tablets. This version was released on 31st October. The Android 4.4 KitKat operating system uses advanced memory optimization technologies. As a result, it is available on Android devices with as little as 512 MB of RAM. This is important because previous versions of the operating system required more internal memory which made them incompatible with many older device models.

V. DEVICES

Many types of Android devices have been introduced ever since Google acquired Android Inc. Though Android is designed mainly for smart phones and tablets, the open and customizable nature of the operating system allows it to be used on other electronic devices such as laptops, net books, smart books, e book readers and smart TVs (like Google TV) as well. Furthermore, the OS has seen niche applications on smart watches, headphones, automobile CD and DVD players, smart glasses (like Project Glass), refrigerators, home automation systems, games consoles, mirrors, cameras, portable media players, landlines, treadmills etc. In these Android devices, android applications are executed. Android has appeared on a number of third party devices ported by the members of that device's community rather than being an "official" OS delivered by the manufacturer of the device. The best example is Bluestacks app player on Windows PC, Windows tablets. This app player allows the users to run android applications on their respective computers and tablets without the full featured android experience.

VI. ANDROID OSP (OPEN SOURCE PROJECT)

Android platform is open for modification. This has given vendors the opportunity to change and enhance their products based on their own preferences. This led to creation of a large variety of phones that vary from vendor to vendor. The AOSP is overseen by the Open Handset Alliance (OHA), a Google-led coalition of over 30 wireless carriers, semiconductor companies, handset manufacturers and software companies. The purpose of the OHA is to further the development of open source standards for mobile devices.

The OHA member list includes Qualcomm, Broadcom, HTC, Intel, Samsung, Motorola, Sprint, Texas Instruments and Japanese wireless carriers KDDI and NTT DoCoMo. Companies that are conspicuously absent from the OHA member list include Nokia, Symbian, Apple, RIM, Microsoft, Verizon and Cingular.

VII. ANDROID APPLICATION DEVELOPMENT

Android technology is based primarily on Java software applications. This technology requires the use of software development kit (SDK) to create applications for an Android device. Java classes are compiled into Dalvik executables and run on Dalvik, a specialized virtual machine designed specifically for Android and optimized for battery-powered mobile devices with limited memory and CPU. Other development tools are also available, like Native Development Kit for applications or extensions in C or C++, Google App Inventor, a visual environment for tyro programmers and various cross platform mobile web applications frameworks.

Android applications are executed in a sandbox, which is an isolated area of the operating system that has no access to the rest of the system's resources, unless permissions to access those files are granted by the user at the time of initialization.

VIII. WHY ANDROID APPS ARE POPULAR

Android became the world's leading smart phone platform at the end of 2010, powering more than hundreds of millions of mobile devices in more than 190 countries. For the first quarter of 2012, Android had a 59% smart phone market share worldwide. Then at the half of 2012, there were 400 million devices activated and 1 million activations per day.

Along with android devices, android applications too started to grow, in June 2012, there were more than 600,000 apps available for Android, and the estimated number of applications downloaded from Google Play was 20 billion.

Some reasons of the popularity of android apps are:

- Open-Source Platform: As android is an open source platform, the developers can able to get more chances of developing new and inventive android applications. Also, the platform is more affordable for the developers who build the applications and for the customers who use the applications.

- Developer-friendly: Android provides a Software development kit (SDK), which consists of uncomplicated tools for developers to develop their projects easily. The SDK offers an ease of developing Android applications and hence helps developers to transform their ideas into android applications. Thus, it provides a great experience for developers when they develop android applications.

- Various security options: The major reason for the popularity of android is that the security options obtainable by android applications for Smart phones. The "Orbot" application on android allows users to perform instant messaging, access internet and access emails without being scrutinized and blocked by the provider of mobile internet services.

- Saves Money: As android is an open source platform, it allows developers to develop applications at very low-cost. Also, the time that is taken during the development process is considerably reduced in android. Therefore, Android helps developers to save both time and money.

- Application Store: The android application store facilitates users to analysis, exploit and download a large variety of android applications. Almost all applications are freely available for users whereas some carries price tags. According to the survey, around 7 lakhs applications are at present available in the Android application store and estimated over 25 billion applications have been downloaded.

IX. BENEFITS AND ADVANTAGES OF SOME ANDROID APPLICATIONS

WIDE CHOICE OF APPLICATIONS : Android offers a wide range of applications to choose from as Android is an easy platform to work on for developers- even for hobbyist developers.

REMOTE CONTROLLING: Anroid applications like Remote Droid, Boxee Remote, Tivo Remote, Squeeze Control and Gmote can turn an Android phone into an universal remote control that controls a home theater PC, Tivo, Squeeze box and other devices via the Android phone. To some this has indeed helped to save a few for the users as it eliminates the need to buy media centre accessories. In addition, Android also provides quite a few apps that let the users to control their Android phone from their PC.

APPLICATION THAT FINDS PHONE:: "Find My Phone", is useful type of security application that is available for Android devices. Through this application, a registered user can find the approximate location of the phone, if switched on, over the Internet. This helps to locate lost or stolen phones. The best part of this application is that, it can be installed on a phone even after it has gone missing.

WALK WITH ME APP:: StreetSafe is an android application that has innovative features that handles saftety of a person while being left alone in a street with potential danger. With the help of StreetSafe's "Walk with Me" feature, the app connects to one of StreetSafe company's safety advisers, who tracks the user's whereabouts via GPS and offers safety tips. If the situation becomes dangerous, the adviser calls 911(US police number) and relays the user's location. If a user encounters a dangerous situation more suddenly, StreetSafe's "silent alarm" feature allows him or her to call the police with a swipe of the finger. The app transmits the user's location to emergency personnel. Like any other GPS-reliant app, StreetSafe will drain a battery more quickly than other apps. Unfortunately, this application is yet to come in many countries. Currently, it is used primarily in USA.

X. LIMITATIONS AND DRAWBACKS

Defect-free software does not exist. Android applications are definitely a boon to mobile technology but there also lie some setbacks in it.

SECURITY HAZARD: Android malware problems continue to grow as more and more applications are fed with malicious viruses and Trojans. If the security threats are not curtailed, users may slowly shift to more secure platforms.

INCOMPATIBILILITY:: As mentioned earlier, android platforms are open to modifications; this has created a large spectrum of device. Not all devices are compatible with the other. Thus different versions of the same application have to be created to suit the system features of various Android devices.Application developers could write programs that are compatible with the versions that has high usage share.

SANDBOX LIMITATIONS: Though the sandboxing and permissions system weaken the impact of vulnerabilities and bugs in downloaded applications, developer confusion and limited documentation has resulted in applications routinely requesting unnecessary permissions, reducing its effectiveness and thus proving the limitations of such system of protections. Many security firms have released antivirus applications for Android devices, such as Lookout Mobile Security, AVG Technologies, Avast!, F-Secure, Kaspersky, McAfee and Symantec. However, these softwares are ineffective as sandboxing also applies to such applications, limiting their ability to scan the deeper system for threats.

AASandbox might be used to improve the efficiency of classical anti-virus applications available for the Android operating system.

XI. COMPLEXITY OF SOME APPS:

The complexity of inter-application communication provides opportunities to run unauthorized codes. Thus, interconnected applications can be downloaded as a package, if not, while adding applications that supports or interacts with other installed application, parity codes can be used.

XII. IMPACT OF ANDROID ON WORLD

In today's lifestyle, technology has become an important of our lives. Even from a child to an elder person, it has

galloped a breath-taking pace in past few years. The best addicted example of the technology is the mobile phones. Initially, mobiles phones were used only just for making and receiving calls. But today, it is used for every purpose like from personal to business purposes. We can now access internet, play games and access office documents.

After the development of android, our lives have changed drastically. Android based mobile phones are in great demand in market. Android applications are providing various servicers to the users according to their needs like :

- User can do mobile banking in few seconds. He can get account statements,payment transactions etc. In short, he can get day to day transaction updates through android applications.

- User can entertain himself by playing games. By just one click, he can get the best game on his phone from android market.

- User can also get frequent updates about their favourite teams in sports, matches and even tournaments.

- For business purposes, user can access office documents,send e-mails, share files in few seconds which saves ample of time.

- Through android apps, user can get weather updates of the city, state as well as country and can also get healthy tips and stay healthier.

Similarly, there are much more applications in android market which are free as well that changes our lives completely. Today, almost 70% people are dependent on android applications. So, android solutions have proved to be boon for all purposes.

XIII. THE FUTURE

The future of android seems very promising. Last year, Google's entry into the home automation market was Android @Home. Since, Google, is in the process of creating a service that would turn one's entire home into a network of Android accessories, with Android as the operating system for an home, we can expect new avenues to employ android applications.

Likewise this concept can be applied to a classroom environment where students get to learn and experiment using android devices. Also, if one is absent from class, he could still view the happenings in the class on an Android virtual medium from anywhere. With the help of android devices, parents could keep track if their children are in their education institutions or not. Along with these innovations, we should come up with devices that have high battery backup power so as to ease mobility.

Furthermore, the impending application of android devices in space exploration seems to turn out well. Strand-1 – a satellite team with a group of volunteers is hoping to fly the first Smartphone satellite in orbit. After several months of development, the group is close to launching the device later this year.

XIV. CONCLUSION

Probably, the next generation of android applications that we would be expecting is applications that would enable us to control all our electrical & electronic devices and even automobiles via our Android devices. Before we are able to expertly make use of those applications, we need to clear the ambiguities in the present platform and applications, only then we could achieve an enriching experience of using those applications.

REFERENCES

[1] "Android Code Analysis". Retrieved June 6, 2012.
[2] "Lenovo N308 Desktop specs". *PCWorld*. Retrieved November 1, 2014.
[3] Charles Arthur (March 13, 2013). "Andy Rubin moved from Android to take on 'moonshots' at Google | Technology | guardian.co.uk". London: Guardian. Retrieved March 14, 2013.
[4] Chris Welch (April 16, 2013). "Before it took over smartphones, Android was originally destined for cameras". The Verge. Retrieved May 1, 2013.
[5] Vance, Ashlee (July 27, 2011). "Steve Perlman's Wireless Fix". *Bloomberg Businessweek*. Bloomberg. Retrieved November 3, 2012.
[6] Mark Wilson (September 23, 2008). "T-Mobile G1: Full Details of the HTC Dream Android Phone". gizmodo.com. Retrieved December 27, 2013.
[7] Richard Wray (March 14, 2010). "Google forced to delay British launch of Nexus phone". London: guardian.co.uk. Retrieved February 17, 2012.
[8] Kennedy, Pagan (October 11, 2013). "Who Made That Android Logo?". The New York Times, October 11, 2013.
[9] Isacc, Mike (October 21, 2011). "A deep-dive tour of Ice Cream Sandwich with Android's chief engineer". Ars Technica. Retrieved September 15, 2012.
[10] Cunningham, Andrew (June 27, 2012). "What happened to the Android Update Alliance?". Ars Technica. Retrieved September 15, 2012.
[11] Delap, Scott (November 12, 2007). "Google's Android SDK Bypasses Java ME in Favor of Java Lite and Apache Harmony". *InfoQ*. Retrieved April 27, 2014.
[12] Arthur, Charles (December 20, 2013). "Android's permissions gap: why has it fallen so far behind Apple's iOS?". *The Guardian*. Retrieved February 19, 2014.
[13] Brian Klug (November 14, 2013). "Android 4.4 Factory Images Now Available for Nexus 4, 7 (2012 and 2013), and 10". AnandTech. Retrieved November 19, 2013.
[14] Reardon, Marguerite (February 11, 2008). "Google Android prototypes debut at MWC | Crave – CNET". News.cnet.com. Retrieved November 9, 2012.
[15] Fingas, Jon (September 4, 2012). "ComScore: Android tops 52 percent of US smartphone share, iPhone cracks the 33 percent mark". Engadget.com. Retrieved November 24, 2012.
[16] Wired UK (May 3, 2012). "Op-Ed: Android Piracy Is Huge Problem for Game Devs | Game|Life". Wired.com. Retrieved September 15, 2012.
[17] Yin, Wesley (April 24, 2012). "Football Manager dev hopes to stick with Android despite 9:1 piracy rate". Eurogamer.net. Retrieved September 15, 2012.
[18] Singel, Ryan (October 5, 2010). "Calling Oracle Hypocritical, Google Denies Patent Infringement". *Wired*. Retrieved February 16, 2012.
[19] Josh Lowensohn (May 23, 2012). "Jury clears Google of infringing on Oracle's patents". *ZDNet*. Retrieved May 25, 2012.
[20] Jacqui Cheng (August 3, 2011). "Google publicly accuses Apple, Microsoft, Oracle of patent bullying". Retrieved February 16, 2012.
[21] Samsung (August 29, 2012). "Samsung Galaxy Camera". *Samsung.com*. Retrieved August 30, 2012.
[22] Hollister, Sean (January 10, 2012). "Sony Smart Watch (aka Sony Ericsson LiveView 2) hands-on". The Verge. Retrieved February 16, 2012.

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[23] Rik Myslewski (January 12, 2011). "Android-powered touchscreen Wi-Fi headphones". theregister.co.uk. Retrieved January 16, 2012.

[24] "Car Player Android-Car Player Android Manufacturers, Suppliers and Exporters on". Alibaba.com. Retrieved February 20, 2012.

[25] "Android Everywhere: 10 Types of Devices That Android Is Making Better". Androidauthority.com. February 26, 2012. Retrieved September 15, 2012.

[26] Will G. (December 1, 2011). "Top Android MP3 Players for 2011". Androidauthority.com. Retrieved February 16, 2012.

[27] Erik Kain (April 18, 2012). "An Interview With 'Ouya' Founder Julie Uhrman On A New Breed Of Video Game Console". Forbes. Retrieved November 2, 2012.

[28] Nilay Patel (February 27, 2012). "Home in the clouds: Google's home automation platform to have major services integration". The Verge. Retrieved November 2, 2012.

[29] Palladino, Valentina (September 30, 2013). "Google reveals Android Wear, an operating system for smartwatches". The Verge. Retrieved March 20, 2014.