ENERGY CONSUMPTION IN WIRELESS ROVING APPLICATION

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Abstract

Recent days, Energy consumption is becoming an issue in android devices. Android is an open code which is easily understandable and handle by the users to get and use new kind of properties and applications on their handsets. Many studies focused on energy lifetime prediction, but the models are not capable of light weight devices.

This paper was designed to improve the quality of user experience (QoE) and energy efficiency of wireless broadcast receivers. The energy is saved in the user terminals using Time Slicing approach. Time Slicing allows discontinuous reception at the User Equipment's (UEs), thereby facilitating the UE to turn-off the radio when not receiving data bursts and hence saving energy. Time slicing reduces the energy consumption and increase Quality of Experience (QoE).

Joint optimization is achieved by grouping the users based on their device capabilities and estimated channel conditions experienced by them and adaptive content to these groups. This optimization is a game theoretic approach which performs energy saving versus reception quality trade-off, and obtains optimum video encoding rates of the different users. This consumption is a function of the proportion of users in a cell with different capabilities, which in turn determines the time slicing proportions for different video content layers for maximized energy saving of low-end users, while maximizing the quality of reception of the high-end users.

The optimized layered coding rate is coupled with the receiver groups SNRs, an adaptation of the MCS for transmission of different layers; ensure higher numbers of users are served while also improving user's average reception quality. Thorough testing has shown how the proposed consumption solution supports better performance for multimedia broadcast over wireless in comparison with the existing techniques.

The peak energy drainer of mobile and tablet devices are the transmitter like Bluetooth or GPS and Wi-Fi radios. The service of android device includes display brightness, streaming video, signal weakness, playing games, background data, GPS & location services. The proposed system implements the service of streaming video, in which video coder and time slicing approaches are used for reducing the life of energy. The proposed has higher efficiency in improving the life of energy than the existing technique.

Keywords - Mobile computing, energy consumption, TSA, SVC, android.

1. INTRODUCTION

Mobile computing is one of the upcoming technologies with different models and methods. Mobile computing uses a wireless network infrastructure to provide wherever, anytime communications and access to information. Mobile communications are involved with mobile Ad-Hoc network to improve the networking communication.
Android is a mobile operating system based on the Linux kernel and developed by Google. Thousands of devices uses the android technology becomes defy. Android is a determination, built platform for mobile devices. These devices meant that they will be limited in terms of memory and speed. The proposed works of designing android mobile devices are energy motorized. Android designed primarily for touch screen input, it also has been used in digital cameras, other electronic devices and game consoles. The application using android runs efficiently,

competently and rapidly. The operating system's success has made it a target for patent litigation as part of the so-called "smart phone" between technology companies.

The energy consumption is occurring because of the screen, brightness, multitasking and transmitter. Optimizing energy existence seeks to limit its impact on the energy life of its host device. The energy life is extensive in the user terminal using Time Slicing approach which helps to save energy. Even more energy is required when you are playing games or streaming a video.

Streaming video is usually a high power usage event that can drain the energy in 4 or 5 hours. Among streaming video, YouTube depleted energy life best, as users skip from one video to the next, watching multiple videos in sequence. The storage space on a mobile device is limited by the size and power supplies. Since disks consume more energy than RAM chips they are less popular and tend to be a liability and thus lengthen the life of a charge.

The proposed work implements the service of streaming video. The Time Slicing approach is used in video streaming function. This technique improves the quality of user or experience (QoE) and energy efficiency of wireless transmit receivers. Using the time slicing and scalable video coding algorithm the background running application memory will be empty, the energy life will be optimized. The time slicing and scalable video coding algorithm is implemented to deliver the quality of video at the time of broadcast. The scope of this work will be looking at performance energy life, efficiency and speed [9].
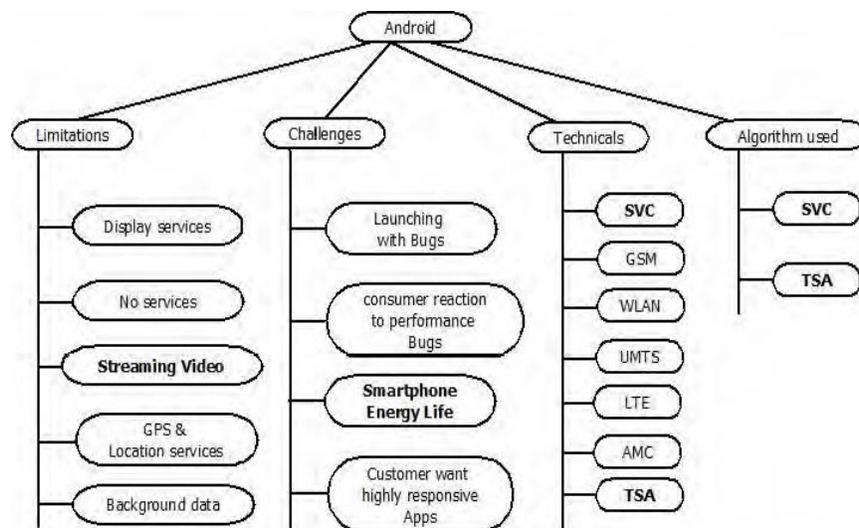
Figure1: Android Limitations, Challenges and Technical.

1.1 Works of Mobile Computing

The discipline of mobile computing has its origin in Personal Communications Services (PCS). PCS refers to a wide variety of wireless access and personal mobility services provided through a small terminal (e.g., cell phone), with the goal of enabling communications at any time, at any place, and in any form. These PCS are connected to the Public Switched Telephone Network (PSTN) to provide access to wired telephones. PCS include high-tier digital cellular systems for widespread vehicular and pedestrian services and low-tier telecommunication system standards for residential, business, and public cordless access applications.

1.2 High-tier digital cellular systems include

1. Global System for Mobile Communications (GSM)
2. IS-136 TDMA based Digital Advanced Mobile Phone Services (DAMPS)
3. Personal Digital Cellular (PDC)
4. IS-95 CDMA-based CDMA One System

1.3 Low-tier telecommunication systems include

1. Cordless Telephone 2 (CT2)
2. Digital Enhanced Cordless Telephone (DECT)
3. Personal Access Communication Systems (PACS)
4. Personal Handy Phone Systems (PHS)

1.4 Mobile Computing Components

1. Handheld, mobile computing device.
2. Connecting technology that allows information to pass back and forth between the sites's centralized information system and the handheld device and back.
3. Centralized information system.

2. WORKING

 The user enters or access data using the application on handheld computing device. Using one of the several connecting technologies, the new data are transmitted from the handheld devices to the information systems where the files are updated and the new data are accessible to other system user. Now both systems (handheld and computer system) have the same information and are in sync. The process works in the same way starting from the other direction.
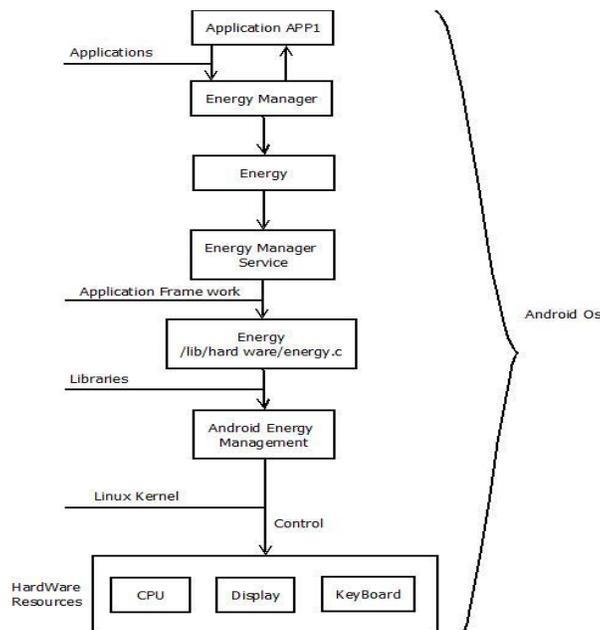
Fig: Work flow Energy Consumption

3. ADVANTAGE OF MOBILE COMPUTING

Mobile computing reducing transaction costs from one a/c to another. It is a Streamline business processes. Everything can be done through the mobile internet. It shows Competitive pricing. Mobile computing is reduce time to order for any products. It is User friendly, low transmission power and Robustness.

3.1 Task Use in Domain

Android Application consists of a set of loosely connected or tightly connected processes that work together so that in many respects they can be viewed as a single system. The components of a cluster are usually connected to each other through fast local area networks ("LAN"), with each node (computer used as a server) running its own instance of an operating system. Computer clusters emerged as a result of convergence of a number of computing trends, including the availability of low cost microprocessors, high speed networks, and software for high performance distributed computing.

Clusters are usually deployed to improve performance and availability over that of a single computer, while typically being much more cost-effective than single computers of comparable speed or availability. Computer clusters have a wide range of applicability and deployment, ranging from small business clusters with a handful of nodes to some of the fastest supercomputers in the world. The computer clustering approach usually (but not always) connects a number of readily available computing nodes (e.g. Personal computers used as servers) via a fast local area network. The activities of the computing nodes are orchestrated by "clustering middleware", a software layer that sits at the top of the nodes and allows the users to treat the cluster as by and large one cohesive computing unit, e.g. via a single system image concept.

4. EXISTING SYSTEM

Existing techniques cannot be used effectively in a wireless broadcast environment, where only sequential data access is supported. It may not scale to a very large extent of users. In an existing system to communicate with the server, mostly a client uses a fee-based network to achieve a reasonable operating range.

Users must reveal their current location and send it to the server, which may be undesirable for privacy reasons. It cannot send large amount of data because the communication latency decrease. It cannot satisfy the demands as per the statistics needed. The main idea is to increase mobility energy usage when accessing query. The speed of accessing the query can be moderate. The difficult problems in existing systems are following:

- Only sequential data access is supported.
- It may not scale to very large users populations while increasing the Smartphone users.
- In an existing system to communicate with the server, a client must most likely use a fee-based network to achieve a reasonable operating range.

5. PROPOSED SYSTEM

The motivation of Optimization is to improve the quality of service to clients and make memory intensive. The demand as well as the sophistication and required computation power, for these types of application increase, energy and communication bandwidth limitations may prevent the use of many of these applications.

This System can reduce traffic between the mobile device and WiMAX helpers with Time Slicing. The method exhibits great scalability, higher in network density and then more queries answered by peers. This System is an approach to reducing the spatial query access latency by leveraging results from nearby peers in wireless broadcast environments.

In the video application the user can make an upload to server with good quality of the video to the other person. This system can improve the response time and increase the energy usage of the System. Less computation power need only limited energy resources. The steps in the proposed systems follow by:

- Reducing the spatial query access latency by leveraging results from nearby peers.
- To improve the mobile network density.
- The query access latency can be decreased with the increase in clients.
- Additionally, the large communication delays may be reduced as processing can reduce the message size.

6. TECHNICAL GLOSSARY

6.1 TIME SLICING APPROACH

A short interval of time allotted to each user or program in a multitasking or timesharing system. Time slices are typically in milliseconds. This process is used to calculate the battery efficiency with accurate value. Time slicing reduces the energy consumption and increase Quality of Experience (QoE).

- Time slicing is a procedure to execute multitasking in operating system.
- Time slicing (digital broadcasting), the visible real-time performance of two or more data streams in digital video broadcasting.

Time slicing supports a quasi-optimum seamless handover by accomplishing the altering of the response from the one transport stream to another during the off time between two bursts. The percentage of power consumption from time slicing is expressed as:

$$Ps = \frac{t^{off}}{t^{on} \pm t^{off}} \text{X } 100 \text{ [7]}$$

6.2 SCALABLE VIDEO CODING

Scalable video coding (SVC) is an extension of the H.264 (MPEG-4 AVC) video compression standard for video encoding. The video codec allows video transmission to scale so that content is delivered without degradation between various endpoints -- for example, between a laptop and a mobile device. The SVC codec translates bits from a network data stream into a picture and conversely translates camera video into a bit stream. It breaks up video bit streams into bit stream subsets that add layers of quality and resolution of video signals.

Scalable video coding (SVC) is one solution to the problem posed by the characteristics of modern video transmission systems. The applications are benefits for SVC is:

- Streaming
- Conferencing
- Broadcast
- Surveillance
- Storage

In this paper, SVC streaming problem is taken to solve with TSA. The basic proposal of video streaming is to divide the video into parts, broadcast these parts in sequence, and allow the receiver to decode and playback the video as these parts are external, without having to kill time for the entire video to be delivered.

- Frame N must be delivered and decoded by time TN
- Frame N+1 must be delivered and decoded by time $TN + \triangle$
- Frame N+2 must be delivered and decoded by time $TN + 2\triangle$
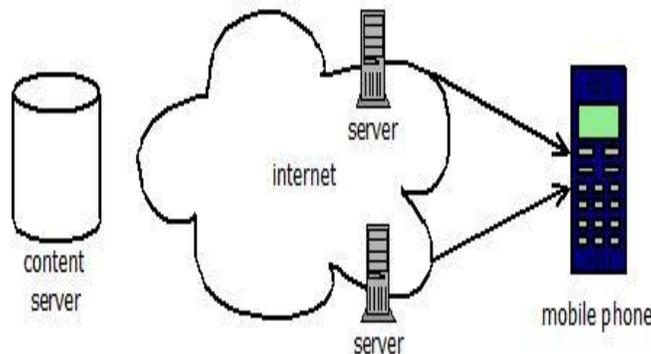
Fig: multi description streaming video

7. LITERATURE SURVEY

Year	Title & Author	Content	Limitations
2010	MEASURING MOBILE PHONE ENERGY CONSUMPTION FOR 802.11 WIRELESS NETWORKING Andrew Rice & Simon Hay	1) The measurement framework produces fine grained, annotated traces of a phone's power consumption which we are using to develop an understanding of how particular aspects of an application drive energy use. 2) The power consumption of Android based handsets and show that changes to the DHCP process have reduced the energy consumed when connecting to a wireless network.	1) The system is the ability to annotate the power measurements with phone and network activity. 2) Minimizing power consumption change between devices, operating systems and operating scenarios.
2011	PERSONALIZED BATTERY LIFETIME PREDICTION FOR MOBILE DEVICES BASED ON USAGE PATTERNS Joon-Myung Kang & Sin-seok Seo & James Won-Ki Hong	1) The average battery consumption of each of these activities and the length of time a user spends on each one determines the battery lifetime of a mobile device. 2) This paper proposes an approach to predict a mobile device's available battery lifetime based on usage patterns. 3) Time-series log data related to battery consumption and the use time of each state.	1) Predicting the battery lifetime of mobile devices is important to minimize battery consumption at the application level. 2) In this paper, we have proposed a prediction model based on usage patterns, such as the battery consumption rate when making voice calls, using data communication, or waiting for calls.
2012	ANALYSING POWER CONSUMPTION OF DIFFERENT BROWSERS & IDENTITY MANAGEMENT SYSTEMS IN MOBILE PHONES Md. Sadek Ferdous & Ron Poet	1) One of the major concerns for the user of mobile phones is the battery life which is limited and tends to run out quickly. 2) This paper, we analyze the efficiency, in terms of power consumption, of different browsers in mobile phones and different Identity Management Systems when the mobile phones are used to access online services protected by those Identity Management.	1) A bit difficult to collect data due to the volatility of readings in the PowerTutor app. 2) The app itself consumed a huge amount of power which was necessary to estimate the power consumption by all consecutively running applications.

2013	AN ANALYSIS OF POWER CONSUMPTION IN A SMARTPHONE Aaron Carroll & Gernot Heiser	1) Mobile consumer electronics devices, especially phones, are powered from batteries which are limited in size and therefore capacity. 2) In mobile phones, battery capacity is severely restricted due to constraints on size and weight of the device. 3) Our approach is to measure the power consumption of a modern mobile device.	1) The main feature it is lacking is a 3G cellular interface, which supports much higher data rates than the 2.5G GPRS interface. 2) The difference in power consumption compared with more modern processors can traced largely to idle power; in other respects, the age of the CPU is not a substantial limitation.
2013	A PROFICIENT SCHEME FOR BACKUP AND RESTORE DATA IN ANDROID FOR MOBILE DEVICES M S. Shriwas	1) A need of an efficient backup and restore technique to protect valuable data from loss, failure and theft. 2) In this work an efficient and secure technique of backup and restores data in Android Smartphone is presented which employs the use of efficient RLE compression technique. 3) The compression of data helps to save time, space to store and further improves performance of the device by conserving the battery.	1) The use of smart phones are increased as it having PC-like functionality, memory and batteries are still limited. 2) Compression of data helps to save time, space to store and further improves performance of the device by conserving the battery.

8. CONCLUSION

This paper has introduced a novel cross-layer optimization solution to improve both the quality of user experience of wireless multimedia broadcast receivers with varying display and energy constraints. This joint optimization is achieved by grouping the users based on their device capabilities and estimated channel conditions experienced by them and broadcasting adaptive content to these groups. The optimization is a game theoretic approach which performs energy saving versus reception quality trade-off, and obtains optimum video encoding rates of the different users.

9. FUTURE ENHANCEMENT

The future enhancement can be done in order to maintain the efficiency of the battery life and also to improve the speed of the application using various streaming applications. Depending upon the usage of the particular application the life of the battery is maintained. To improve this features with multiple persons. Because, in this paper it can send the files by the connected persons only and will improve this to upload and download the video files from the server in easy manner with multiple options and with the resolution levels.

REFERENCES

[1] Mehdi Rezaei "Advances On Video Coding Algorithms For Streaming Applications" in the Tampere 2008.
[2]Andrew Rice and Simon Hay, "Measuring Mobile Phone Energy Consumption for 802.11Wireless Networking," in the
    Article in Press Pervasive and Mobile computing http://www.elsevier.com/locate/pmc,2010.
[3]Joon-Myung Kang , Sin-seok Seo and James Won-Ki Hong, "Personalized Battery Lifetime Prediction For Mobile Devices
    Based On Usage Patterns," in the *Journal of Computing Science and Engineering*, Vol. 5, No. 4, December 2011, pp 338-345.

[4]Md. Sadek Ferdous and Ron Poet, "Analyzing Power Consumption of Different Browsers & Identity Management Systems In Mobile Phones," in *the International Journal of Distributed and Parallel Systems (IJDPS)*, Vol.3, No.2, March 2012.

[5]Ms.Shriwas "A Proficient scheme for Backup and Restore Data in Android for Mobile Devices," in the *International Journal of Innovative Research in Engineering & Multidisciplinary Physical Sciences (IJIRMPS),* Volume 1, Issue 1, October 2013.

[6]Jaspreet Kaur Aulakh, Sugandha Sharma and Mayank Arora "Securing the Android Phones Using the Power of Cloud," in the *International Journal of Advanced Research in Computer Science and Software Engineering,* Volume 4, Issue 6, June 2014.

[7]Sheenam,Sugandha Sharma and Mayank Arora "Research Paper on Self Learning Offloading Scheme for Android Phones," in the*International Journal of Advanced Research inComputer Science & Technology IJARCST,* Vol. 2, Issue 3,Sep 2014.

[8]Renuka M. Dhanwate and Vaishali B. Bhagat "A Literature Review on improving energy efficiency on Android using Cloud based services," in *the International Journal of Advance Research in Computer Science and Management Studies,* Volume 2, Issue 12,December 2014.

[9]Mahalakshmi m, "A Survey On Energy Consumption In Wireless Roving Application" *in the International Journal of Computer Science & Engineering Technology (IJCSET),* Vol. 6 No. 03 Mar 2015.

A Brief Author Biography

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