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A Priority Based Technique to improve energy efficiency for multiple applications in Mobile computers

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Abstract:- Energy efficiency has become one of the most burning issue in today's mobile computing .In today's era mobile phones has become one of the most important part in one's life. When we are talking about mobile computing, we are not stick to one application. But we are using multiple applications at a time and at the same time we have to maintain the energy efficiency of the mobile computers to provide better performance. So in this paper I have tried to use a technique to improve energy efficiency for multiple applications for mobile computers by giving a priority based technique to each of the application which we are running and less consumption of battery for those applications.

Keywords: Energy efficiency, Mobile computing, battery yield, Performance, priority task.

I. INTRODUCTION

Mobile computing systems are constrained by scarce resources, such as small memory, slow CPU, etc. They are specially constrained by limited battery capacity owing to the weight/size limits for the battery. On the other hand, as we enter the era of pervasive computing, users are expecting more flexible and ubiquitous services and higher productivity from mobile computing systems. In view of the slow battery capacity growth, it is increasingly important to develop techniques to achieve high energy efficiency for such systems. Energy efficiency refers to the amount of work that the system can accomplish given a battery capacity constraint. Mobile computing systems provide services to their users through software programs, which demand different hardware resources. Therefore, software and hardware form a pair of consumer and supplier of resources. Today's smart phones need to be charged far more frequently than older cell phones. But if it weren't for rapid improvements in energy efficiency, smart phones, laptops, and other mobile gadgets might still be on the drawing boards. This development (of laptops replacing desktop computers) would not have been possible without long-term improvements in computational efficiency because battery technologies have not improved in the past nearly as rapidly as semiconductor technologies, In our analysis we have discussed about different applications that we are using in mobile computers and their related efficiencies.

In the next section we have discussed about the battery consumption related to the applications that we run on the mobile computers The rest of the paper is organized as providing overview of the mobile computing, priority based technique for multiple applications, their positive results advantages and disadvantages. The paper ends with conclusions and references.

1.1 Different applications in Mobile Computing:-

Energy efficiency is a fundamental consideration for mobile devices. Cloud computing has the potential to save mobile client energy but the savings from offloading the computation need to exceed the energy cost of the additional communication. Mobile computing involves mobile communication, mobile hardware, and mobile software. Communication issues include ad hoc and infrastructure networks as well as communication properties, protocols, data formats and concrete technologies. Hardware includes mobile devices or device components. Mobile deals with the characteristics and requirements of mobile applications. There are at least three different classes of mobile computing items: portable computers, compacted lightweight units including a full character set keyboard and primarily intended as hosts for software that may be parameterized, as laptops,

notebooks, notepads, etc.

mobile phones including a restricted key set primarily intended but not restricted to for vocal communications, as cell phones, smart phones, phone pads, etc. wearable computers, mostly limited to functional keys and primarily intended as incorporation of software agents, as watches, wristbands, necklaces, keyless implants, etc. In many fields of work, the ability to keep on the move is vital in order to utilize time efficiently. Efficient utilization of resources can mean substantial savings in transportation costs and other non quantifiable costs such as increased customer attention, impact of onsite maintenance and improved intercommunication within the business. Many multimedia application such has music, videos , photos requires more energy and battery consumption. Online applications such as browsing, updating and downloads requires also better efficiency and battery related issues.

1.2 Battery Consumption related to applications:-

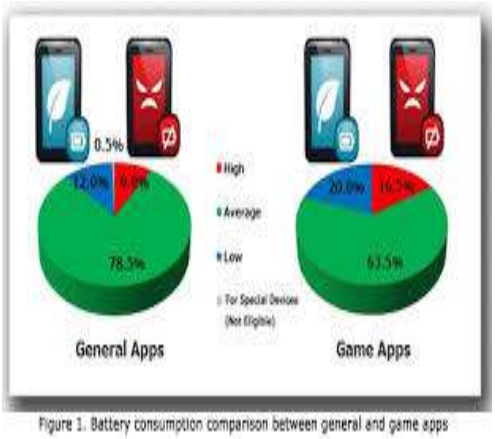

Figure 1. Battery consumption comparison between general and game apps

We are using many applications in a mobile phone at a time. Listening to music, watching video, browsing internet operating GPS devices and talking. But before you start using that functionality, it's important to understand what's causing all that battery drain in the first place. Want to know what's sucking the power from your phone? You might be surprised. Some things, like leaving GPS on all the time or streaming endless YouTube videos, are notorious battery hogs. Others, however, are not so obvious. For some of the important applications energy efficiency is decreased because some unwanted applications consume and waste more energy in true sense consuming more battery rather than those applications which are important in true sense are ignored. Which result in drainage in battery and the phone is discharged soon without completing the important applications. Smart phone users can now manage their energy through a proliferation of apps that do everything from help us find energy rebates to reveal the workings of multi-state electricity grids. Many apps spring from the understanding that we are visual creatures: If we see our energy consumption rise and fall on a screen, as it happens, then we're more apt to shut off the lights when we leave a room.

II. Efficiency related issues

Mobile phones are becoming the next computing platform that is already dominating as our main source for communication and basic computing needs. In addition, the mobile phones are becoming more and more popular for healthcare monitoring. Subsequently, we expect better functionality, performance as well as a longer battery life from our mobile and hand-held devices. Better functionality and performance usually come at the expense of battery life. The battery life is critical to providing all of the functionality the user is expecting.

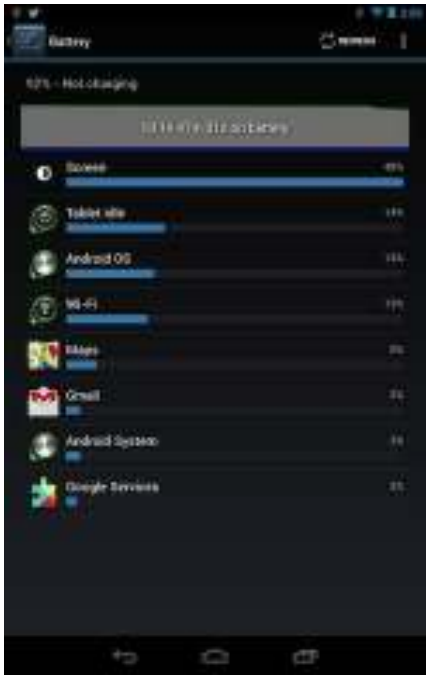

Fig 2. Consumption of battery for different applications

The battery life on modern portable gadgets is much lower than ten or twenty years ago, mainly because electronics technology is developing much more quickly than battery technology. Batteries are struggling to keep up with all the amazing new things that portable gadgets are capable of. With this in mind, it's important to use a portable device's battery as efficiently as possible.

III . RELATED WORK

In this paper I have proposed a priority based technique to improve the energy efficiency for multiple applications in mobile computers. In today smart phones multiple applications are running at a time. For a user to identify which application is important is a very difficult task. We may be accessing music, videos, downloading, chatting and updating information's. Most energy is wasted when we are using high display screen feature and other battery consumption application. In order to avoid this we would be providing a priority level to each of the applications which important in our respect. By doing such we not only increase the energy efficiency but we also save battery life for more hours. According to priority level assigned the amount of battery required is used.

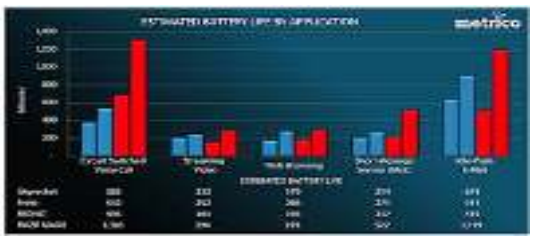

Fig.3: Estimated Battery life by application

Coordination among multiple applications:-

Applications are classified into two categories according to their user-specified priority. When a service with a high priority is called, we check the service list that contains the concurrently-running applications. The applications with a low priority yield the resources to the new service, and other high-priority applications keep running and competing for the battery with the new one. When the new service has a low priority, we still check the service list. If there are high-priority applications running, we reserve battery energy for them and the remaining energy is assigned to the new ser-vice for appropriate adaptation. Otherwise, each low priority application views itself as the only one using the battery, and all of them compete for the battery energy on a fair basis.

TABLE 1: different aspect of application with priority and battery consumption

Application	Priority	Battery Consumption
Display	low	less
Music/videos	low	less
Downloads	high	high

IV. CONCLUSION

We have proposed a priority based technique to improve energy efficiency for multiple applications in mobile computers devices, which not only meets user-specified goals under battery energy constraints, but also abides by the user's intention through use of a user-specified priority. It is implemented in the user space, with no changes needed in the underlying OS Our framework does have some limitations. It relies greatly on the application being adaptable. In practice, however, we found many mobile applications have adapt-able features. In the future, adaptability could be built into the application to further exploit our framework.
In future we can further expand this technique to face challenges regarding the different network related application issues.

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