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Energy Economization using Multimedia Cloud Computing

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Abstract - With the wide range of development of smart-phones there is increasing demand in the consumption of the smart-phones. Due the advanced features, that the smart-phone possesses the consumption of battery increases. This paper focuses on the existing development and research in the field of saving the energy of smart-phones.

Keywords **- Smartphone, offload, cloud, energy.**

1. Introduction

Smart-phones are becoming more & more popular because of their unique design, lightweight & compact size. Their various features such as many useful applications like multimedia applications, games etc .and ease to carry from one place to another have added to their popularity. But these new features have created a new set of problems like limited battery capacity, processing capacity and memory capacity. Even after a lot of research & development done in recent times limited battery size is one of the major problems that has not been solved satisfactorily. In complete contrast development in other smart-phone applications like multimedia, games, GPS, etc .have occurred in leaps & bounds. For example, classic games like Tetris, requires less memory storage & processing capacity to operate. Due to this battery usage was less. In complete contrast recent games are very much resource intensive in terms of processing and data transfer rates, this causes a huge drain on batteries of smart-phones.

Let us consider a scenario where a customer purchases a smart-phone which runs an application consuming more processing power such as an addicting game & starts playing that game on his smart-phone. After a few minutes when the events in this game have taken an interesting turn and his Smartphone stops running the game because of low battery. This scenario is very frustrating for the customer.

But you would say that this example is only of games. Not everyone uses their mobile for playing games. So let's consider another scenario which would relate to the gravity of the situation. Consider an engineer working on a site and he is using smart-phone to make a video call to his boss. They are discussing about the implementation of a certain task in his project undertaking. Now suddenly he finds that his smart-phone is out of battery power. This situation is not only frustrating but could also cause loss and damage to the customer.

1.1 Solutions

1. Increase battery capacity – With the development of smart-phones, the problem the users face is the limited battery capacity. Research is going on to increase the battery capacity of smart-phone. But results are not very fruitful. Hence we cannot rely on increasing battery capacity for our power problem.

2. Increase the number of batteries. –Smart-phones are light weight and attractive but to increase the battery capacity we can increase the number of batteries attached in the smart-phones which will make the phone bulky in the mere future. Hence, no one would buy it. So this solution is also not a viable solution.

3. Not running apps which use more power – Using a smart-phone means utilizing the facilities available therein, which in turn consumes more battery. The solution to this problem is to running only those apps which will consume less power but it kills the purpose of the using the smart phone.

4. Offload it to a cloud – The best solution is to offload heavy tasks on the cloud. Offloading large computation to the cloud may save the battery usage. The solution to this problem is increasing the battery capacity. But as stated earlier battery capacity can only be improved to a certain extent. Here Cloud computing can come in handy. Cloud Computing can be used in multimedia operations to save energy.

2. Literature survey

During the literature survey, it was found that cloud computing plays an important role in reducing battery consumption of smart-phones and to backup user's data.

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Many people have focused to build frameworks to offload large computation on the cloud. Mobile computation offloading involves communication in between the real mobile device and the cloud. For mobile computation offloading to work we have to run same application on smart-phone as well as on the cloud. But the application is not present on the cloud, so we have to offload or copy the application on the cloud. This copy or "Clone" of the application that is used for offloading is referred as "off-clone "

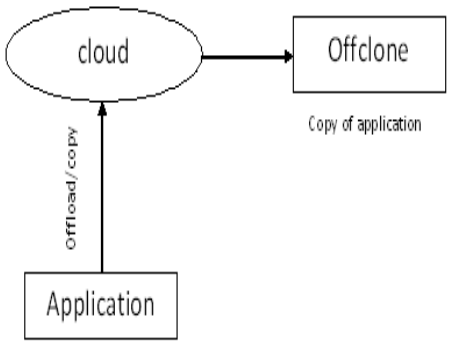

Figure 1 Offclone

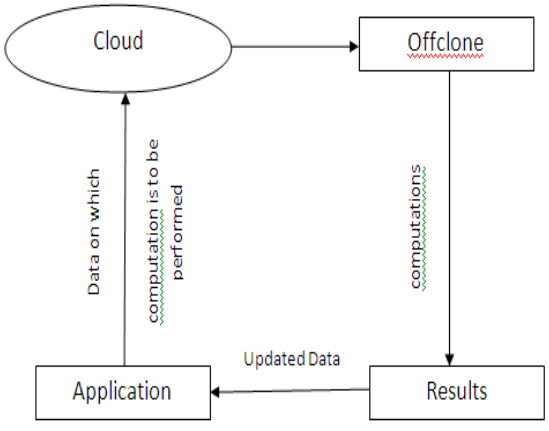

Figure 1 Flow Chart for working of Offclone

The clone used to backup user's data is referred as back-clone.

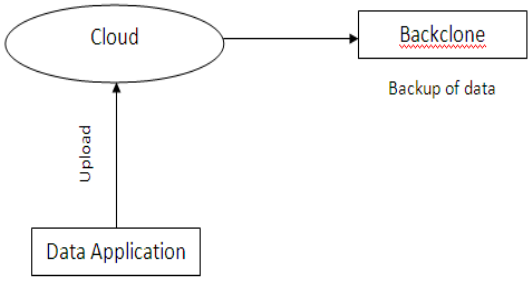

Figure 2 Backclone

3. Proposed Approach

If we take a look around we see that there are many types of smart-phone users. Basically we are classifying the users on the basis of the types of software which they mostly use.

i) Video users
ii) Game users
iii) Audio Users
iv) Internet users
v) Regular users. (SMS audio call)

Most of the literature papers deals with a user which is all of the above i.e. it is assumed that the user uses all the applications (such as listening to music, surfing net, chatting, watching videos, etc) regularly and in equal proportions. But usually that is not the case. A person can listen to music for 1 hour and send SMS in 5 minutes only. What we are trying to do is to focus on a particular type of user and see whether performing computation on the cloud saves smart-phone energy for that particular user.

In our approach, we would be performing heavy cloud operations on the device and also on the cloud, then comparing the power efficiency of the outputs on the device and that on the clouds. For that it is divided into following four modules.

1. Development of Local and Cloud database
2. Access of cloud database rigorously and checking the energy consumption
3. Access of local database rigorously and checking the energy consumption
4. Comparing the energy consumed by cloud and that by our local devices

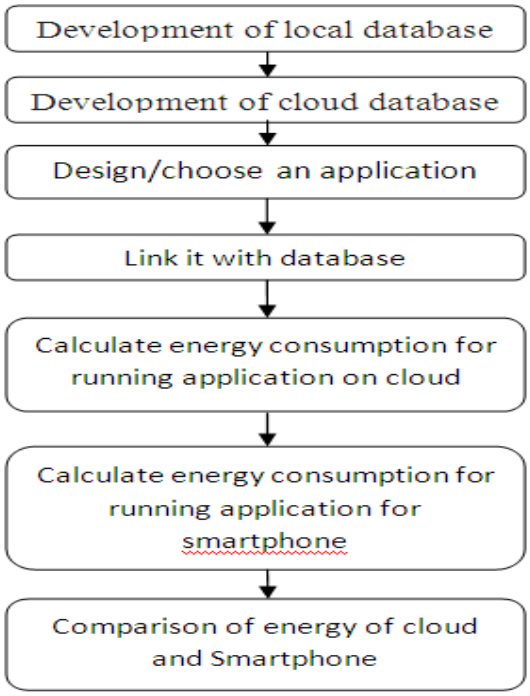

Figure 3 Flowchart for methodology

4. Conclusion

This paper reviews the existing development and research in the field of saving the energy of smart-phones. Offloading heavy tasks on the cloud may save the energy of smart-phone. Offloading heavy tasks on the cloud, allows large computation to be performed on the cloud, saving smart-phone energy as the computations are not performed on the real device. This paper further proposes the line of action which could lead to the solution of the problem of heavy battery consumption by the smart-phones.

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