ISSN : 2348 - 9065 (Online)
ISSN : 2349 - 3143 (Print)
Vol. 2, Issue 2 April - June 2015
International Journal of Research in Electronics and Communication Technology (IJRECT 2015)

Improve The Performance of Smartphone Application Traffic Using 4G/LTE Technology

[I]Sneha Parab, [II]M.B. Limkar, [III]Sonali Jadhav
[I]PG Student, Alamuri Ratnamala Instituite of Engineering & Technology, Asangaon, India.
[II]Dept. of Electronics, Terna college of Engineering, Nerul, India.
[III]Dept. of Electronics & Telecommunication, PVP College of Engineering, India.

Abstract
Smartphone today has become an integral part of our day-today life, but there is an inefficient use of wireless resources due to the fact that there is less internetworking between network and mobile devices as well as the apps. In this paper we propose to improve the performance of Smartphone Application traffic for the context and policy based interface and traffic management (CPITM), by using chaotic interleaving technique and lowering the BER by using 4G/LTE technology. The proposed system combines the advantages of block interleaving and 4G technology thereby increasing the delivery rate. The BER performance with and without 4G technology will be further evaluated and results will be compare. By Simulation results, we will show that CPITM approach with our proposed 4G/LTE technology can improve the delivery rate significantly compared to that without our scheme.

Keywords
Bit Error Rate, Long Term Evolution, Delivery Rate, Smartphone Application Traffic

I. Introduction

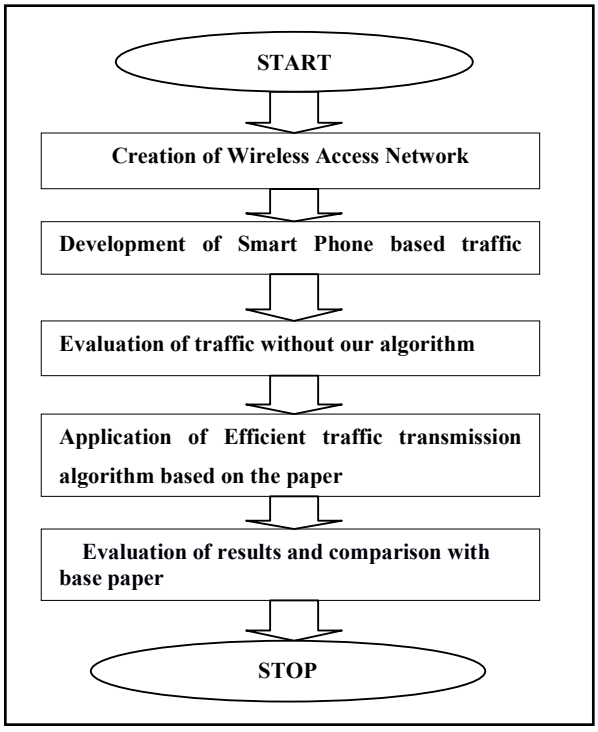
Some of the most popular Smartphones Applications are also some of the greatest generators of the signal traffic. Social networking applications in which friends stay connected with each other for extended periods of time ,involve frequent back and forth messages or status updates. When end users started complaining about poor battery life in early Smartphones, handsets manufacturers responded to their need introducing proprietary features to prolong their battery life, but the same power saving features ended up being a significant root cause of increased signaling load. Signaling traffic consists of small background messages exchanged between the handset and the network set up.

The application services are not interface or network capability agnostic. That leads to the fact that the wireless interfaces in mobile devices are not used in the most effective way meaning that especially the wireless resource but also the energy resource usage on the mobile device is not optimal. So a context- and policy based interface and traffic management (CPITM) approach which significantly improves network efficiency and battery runtime was proposed. In this the traffic and interface management approach is handled by the network operator and is taking into account context information coming from the device (e.g. apps, sensors, etc.) and the network. The only drawback of this approach was the active data transmission mode, wireless access network which is used in this approach. We therefore proposed to improve the CPITM approach by using chaotic interleaving schemes and lowering the BER by using the 4G/LTE technology

II. Methodology

In the proposed system consists of the following stages

a. Creation of mobile environment.
b. Evaluation of traffic without 4G/LTE
c. Evaluation of traffic with 4G/LTE.



II. Design Considerations

A. Interface Management

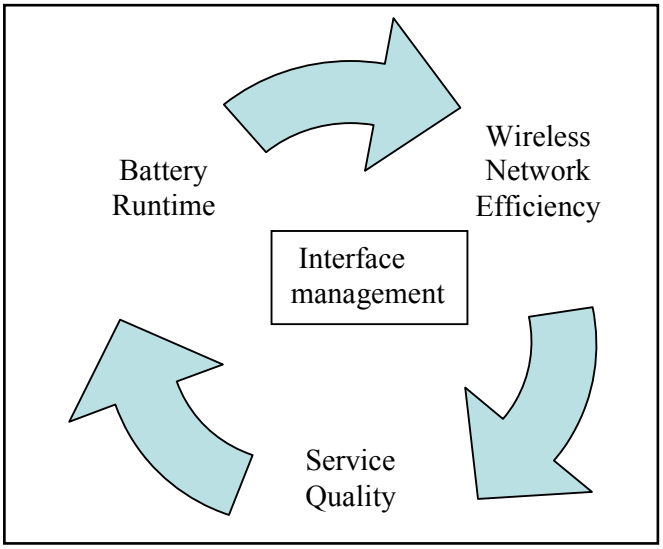
There are usually two wireless connections in Smartphones, firstly the 3rd generation partnership project (3GPP) and secondly the IEEE wireless interfaces. The 3GPPP contains the 2G (GPRS), 3G (UMTS), 4G (LTE) but only one of the interface can be up and running at the same time for sending and receiving messages. Selection of the interface to be used for the data communication depends upon the following:

I. Different technologies have different power consumption
II. Network signaling load is different for various technologies
III. Bandwidth and Quality of Service provided varies from technology to technology.

© All Rights Reserved, IJRECT 2014

ISSN : 2348 - 9065 (Online)
ISSN : 2349 - 3143 (Print)

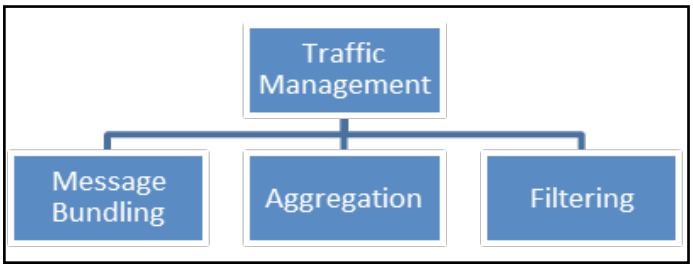
Present way of interface selection depends upon the hierarch9ical policy, which selects an interface based on the priority list. Normally the order is a) WI-FI b) LTE c) UMTS d) GPRS. The main drawback of this interface selection is that it does not consider the current traffic demand and usage scenario; also it allows only one data network access at same time.
Interface Selection influences the following:



In this approach intelligent interface selection has been proposed including the following characteristics:

i. Network based interface selection will be done using the policies pushed by the network.
ii. Parallel usage of different interfaces to perform the load balancing.
iii. Consider the current usage scenario, traffic demand, device status and network availability.

B. Traffic Management



Data Packets are queued for configurable amount of time. Resources on the wireless link have to be reserved only once for the number of app signaling packets and not for each packet separately. Due to this the packets are send out in bursts which results in improving the efficiency.

C. Interleaving Techniques

There are some channel errors caused by the mobile wireless channels which are bursty in nature, so to avoid this interleaving is a must in mobile communication system.
There are two types of interleaving techniques. The simplest form of interleaving techniques is the block interleave technique, Chaotic interleaving technique is another technique which has been used to improve the performance of the OFDM system. Chaotic interleaving scheme is based on the 2d chaotic map. Its general idea is to generate permuted sequences with low correlation between their samples from the sample sequences before the data is transmitted over the channel .As a result, a better BER performance can be achieved It also increases the security of the communication system.

IV. Implementation

The implementation does not yet consider all the elements. In the current part of the work there is a creation of mobile environment. Currently the Smartphone Application traffic has been deployed in it.

A. Creation of Mobile Environment:

Firstly, to create the mobile environment we have created wireless access network and then we have done the development of Smartphone application traffic in it, So that the data can be send from source to the receiver through OFDM, so that we can firstly do the evaluation of traffic without our algorithm and then do the evaluation of traffic with our algorithm and then after comparing we can get the results.

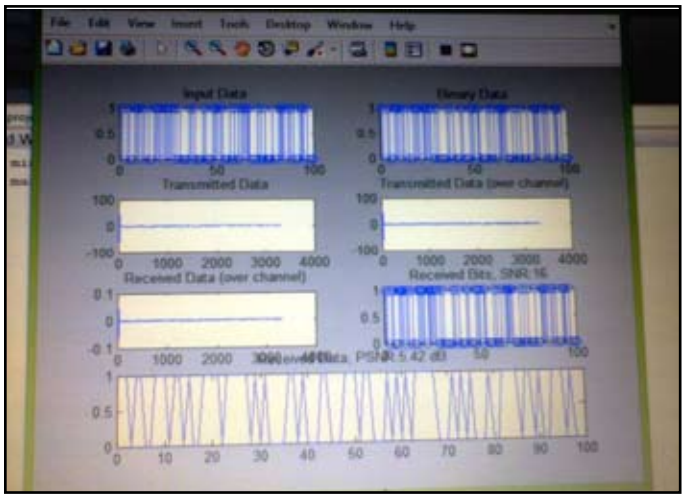


Fig.1: Transmission of data using OFDM

B. Why OFDM in Broadcast?

1. Enables Single Frequency Network (SFN)
2. Multiple transmit antennas geographically separated
3. Enables same radio/TV channel frequency throughout a country.

C. Why OFDM for High- -Speed Internet Access?

1. Large bandwidths -> high rate,
2. Many computations –Small sampling periods -> delay spread becomes a serious impairment
3. Requires much lower BER than voice systems
4. OFDM pros –Takes advantage of multipath through simple equalization
5. OFDM cons –Synchronization requirements are much more strict
6. Requires more complex algorithms for time / frequency synch
7. Peak-to-average ratio •Approximately 10 log N(in dB)
8. Large signal peaks require higher power amplifiers
9. Amplifier cost grows nonlinearly with required power.

Orthogonal frequency-division multiplexing (OFDM) effectively mitigates intersymbol interference (ISI) caused by the delay spread of wireless channels. Therefore, it has been used in many wireless systems and adopted by various standards.. We address basic

© 2014, IJRECT All Rights Reserved

OFDM and related modulations, as well as techniques to improve the performance of OFDM for wireless communications, including channel estimation and signal detection, time- and frequency-offset estimation and correction, peak-to-average power ratio reduction, and multiple-input–multiple-output (MIMO) techniques.

The following figure shows the normal BER vs SNR graph when the Smartphone Application traffic is created, in the further implementation by simulation Experiments we will show that CPITM approach with our proposed method can improve the delivery rate significantly compared to that without our proposed method.

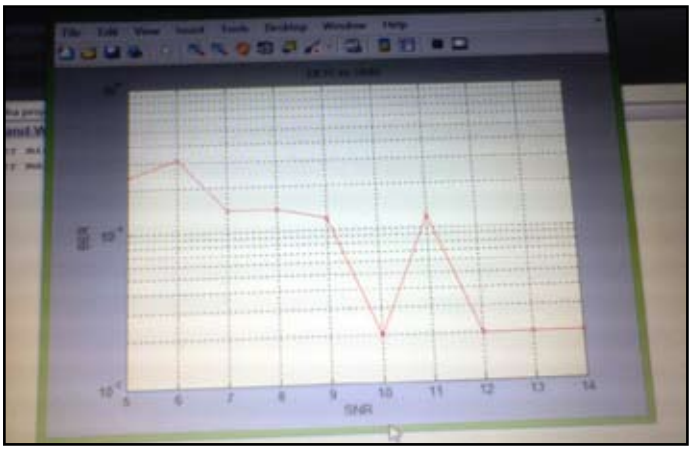


Fig. 2: BER vs. SNR graph

V. Conclusion

This paper simulates a discussion on the inefficient resource usage. In this paper we present the concept of improving the performance of Smartphone application traffic using 4G/ LTE technology for the CPITM approach. This approach will increase the delivery rate and also lower the BER. Initial results are promising and are the motivation for the logical next steps: continuation of the implementation and more intensive performance measurements.

References

[1]. *Efficient transmission of Smart phone application traffic using WAN by Hans j. Einsiedler, Thorsten rettig,*telecom Innovation laboratories, Germany.*

[2]. *A new structure of chaotic secure communication in wireless AWGN channel*

[3]. *Hang-Hong Kuo, Jui-Sheng Lin, Teh-Lu Liao Department of Engineering Science National Cheng Kung University Tainan 701, Taiwan, R.O.C. tlliao@mail.ncku.edu.tw.*

[4]. *Nokia Siemens Network smart labs "Understanding Smartphone behaviour in the network", in white paper, 2011.*

[5]. *Efficient channel coding and interleaving schemes for mobile radio communications, L.Hanzo, K.H.H. Wong and R.Steele.*

[6]. *A close examination of performance and power Characteristics of 4G LTE networks, Junxian Huang, Feng Qian, University of Michigan.*

[7]. *OFDM and Its Wireless Applications: A Survey Taewon Hwang, Chenyang Yang, Senior Member, IEEE, Gang Wu,Member, IEEE, Shaoqian Li, and Geoffrey Ye Li, Fellow, IEEE*

[8]. *Wireless Systems Innovations Laboratory Wireless Networking and Communications Group Department of Electrical and Computer Engineering The University of Texas at Austin rheath@ece.utexas.edu.*

[9]. *Y. Choi; Cha-hyun Yoon; Young-sik Kim; S.W. Heo et al., "The impact of application signalling traffic on public land mobile networks," in Communications Magazine, IEEE(Volume:52 , Issue: 1, 2014.*

[10]. *"Access Network Discovery and Selection Function (ANDSF) Management Object (MO)," 3GPP TS 24.312."Android market app," Internet site, last access January,2014.*

Author's Profile and Image

My name is Sneha parab. I have completed BE from Mumbai University in May 2013 with first class and presently pursuing my ME from Mumbai university. Presently I am doing research work in Wireless communication.

© All Rights Reserved, IJRECT 2014