INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881
VOLUME 1, ISSUE 2, JUNE 2012

# AN EFFICIENT ALGORITHM FOR OPTIMIZATION PARAMETERS OF QOS IN MULTIMEDIA APPLICATIONS OVER AN AD-HOC NETWORK

**Preety Poswal**
Department of Computer Science and Engineering
School of Engineering & Technology,
Sharda University
Greater Noida,GautamBuddha Nagar, India

**A.K.Sahoo**
Department of Computer Science and Engineering
School of Engineering & Technology,Sharda University
Greater Noida,GautamBuddha Nagar, India

**K.Gunjan**
Department of Computer Science and Engineering
School of Engineering & Technology,Sharda University
Greater Noida,GautamBuddha Nagar, India

## 1.Introduction

Today the mobile ad hoc network has more importance in the growth of wireless technology. In wireless multimedia delivery, a wide variety of services are provided by wireless communication system that gives the high quality of data transmission. Multimedia application is bandwidth hungry and required high data rates.QoS is an open issue in wireless communication. "The notion of QoS, as mentioned before, is a guarantee by the network to satisfy a set of predetermined service performance constraints for the user in terms of the end-to-end delay statistics, available bandwidth, probability of packet loss, and so on". For multimedia services, the Orthogonal frequency division multiple access (OFDMA) is a better transmission approach [1] .There are many local area wireless network used OFDMA for achieving speed and high data bit –rates in multimedia.

A lot of studies have done in this area. [2] proposed a opportunistic scheduling algorithm for OFDMA system in wireless channel but it acts only on QoS requirements for best effort services not for other type of traffic.

For real time and non real time traffic, In [3] proposed a packet scheduling and resource allocation algorithm. In this paper we discuss an approach OFDMA (Orthogonal Frequency Division Multiple Access). This approach will act for real-time (RT) and best-effort (BE) services over a wireless channel. The purpose of this approach is to achieve maximum system throughput and minimum transmission delay as better quality of service (QoS) requirements.

## 2.Description

2.1 OFDMA(Orthogonal Frequency Division Multiple Access)

Wireless system has dynamic nature so by using resource allocation algorithm can achieve system performance. In OFDMA, resource allocation algorithm is based on dual optimization technique which will effectively enhance system throughput. In[4]also used dual optimization technique but in this it works only on non real time

traffic. In wireless broadband system ,the OFDM transmission is a widely used. By using various combination of different type multiple access schemes the OFDM have used in fixed and mobile environment that is orthogonal frequency division multiplexing-time division multiple access(OFDM-TDMA),OFDMA and multicarrier code division multiple access(MC-CDMA). In OFDM-TDMA technique ,the user acquire the channel for some time period.In OFDMA the multiple user signal are separated on the base of time and frequency.

In this paper we discuss a resource allocation algorithm that is based on dual optimization technique. For traffic management, resource allocation algorithm is important and it will improve system throughput. This approach is for both RT and BE services.

## 3.Methodology

This approach is widely used for 3G mobile communication.This algorithm overcome the excessive delay in real time services that is video streaming services. For this two type of QoS requirement is consider ,first is "required average transmission rate" and other is "variation in transmission rate".By time and frequency serving resource allocation the variation in transmission rate can be control and it can cause the less packet delay.This is a multiple access technique of future and current wireless multimedia communication. The representation of radio resources is in time and frequency both. This resource allocation algorithm is based on dual optimization technique.

### 3.1 Real Time

In real time the video streaming service is considered because it generates larger traffic than other multimedia service.

### 3.2 Best effort

In BE the QoS requirement is required transmission rate ,it will overcome the starvation and packet delay. This apporoach is essentially useful for internet services that uses TCP protocol services because the slow start of congention control can cause the degradation in system performance.

### 3.3 Steps

3.3.1. The OFDM system providing a sub-carrier group to a large number of users in a user sequence for data transmission, where's the users are arranged according to their data transmission rates in a descending order, the fair sub-carrier allocation method comprising the following steps:

A. In consecutive manner select an allocated user from the user sequence, wherein the user after the last user in the user sequence is the first user in the user sequence;

B. allocating a sub-carrier with the largest response in the sub-carrier group to the

allocated user;

C. removing the sub-carrier with the largest response from the sub-carrier group;

D. removing the allocated user from the user sequence when the sum of the data transmission rates of all the sub-carriers allocated to the allocated user is larger than that requested by the allocated user; and

E. returning to step A when the user sequence includes at least one user.

3.3.2. Wherein, for the assigned user, based on the proportion of the response of the first assigned sub-carrier to that of the second assigned sub-carrier, the portion of the data carried by the first assigned sub-carrier is assigned to the second assigned sub-carrier.

**4.Simulation results**

It is shown by the simulation that this apporoach meets well its design goal and outperforms in term of packet drop rate for the real time users.

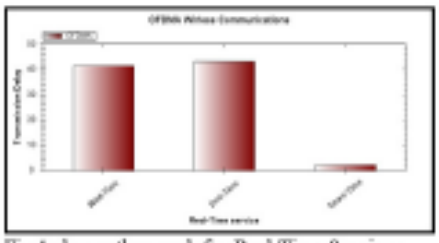

Fig.1 shown the graph for Real Time Services

In Fig.2,It shows the good throughput for best effort (BE) users.

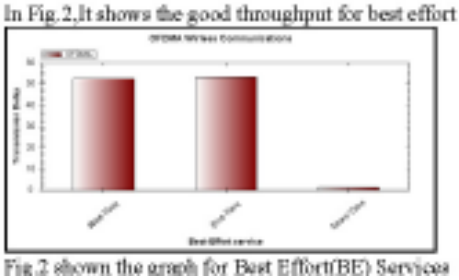

Fig.2 shown the graph for Best Effort(BE) Services

By this algorithm the optimization problem have formulated and solve it by dual optimization techniques.

**5. Future Scope**

Todays mobile networks are attempting to 3G service to the mobile users but in other countries they are arriving for the 4G. OFDMA technique is the base of the 4G. In future definitely OFDMA will occupy major portion of the 4Gtechnology

## 6. Conclusions

OFDMA technologies are currently attracting intensive attention in wireless communications to meet the ever-increasing demands arising from the explosive growth of Internet, multimedia, and broadband services. OFDMA-based systems are able to deliver high data rate, operate in the hostile Multipath radio environment, and allow efficient sharing of limited resources such as spectrum and transmit power between multiple users. Clearly recent advances in wireless communication technology have led to significant innovations that enable OFDMA-based wireless access networks to provide better Quality-of-Service (QoS) than ever with convenient and inexpensive deployment and mobility.

## References

1. K.B.Letaief, "Dynamic Multiuser Resource Allocation and Adaptation for Wireless system,"*IEEE Trans.Wireless Communication*, vol.13,pp.38-47,Aug.2006.
2. Z.Zhang,Y.He,and E.K.P.Chong, "Opportunistic downlink scheduling for multiuser OFDM systems, "in *Proc.IEEE Wireless Communication and Networking Conf.*,vol.2,pp.1206-1212,May 2006.
3. **S.S.Jeong,D.G.Jeong,and W.S.Jeon, "Cross-layer design of packet scheduling and resource allocation in OFDMAwireless multimedia**
4. networks," in *Proc.IEEE VTC 2006-Spring*,Australia,vol.1,pp.309-313,May 2006.
5. K.W.Choi,W.S.Jeon,and D.G.Jeon, "Resource allocation in OFDMA wireless communication systems supporting multimedia services,"*IEEE Transactions on Networking*,vol.17,pp.926-935,2009.
6. Helmut Blcskei, David Gesbert, and Arogyaswami,J.Paulraj. "On the Capacity of OFDM-Based Spatial Multiplexing Systems,"*IEEE Transactions On Communications,*vol. 5.,pp.225-234,Feb 2002.
7. S. Borst and P. Whiting, "Dynamic channel-sensitive scheduling algorithms for wireless data throughput optimization*," IEEE Trans. Veh.Technol.*, vol. 53, no. 3, pp. 569–586, May 2003.
8. P.Frossard,C.W.Chen, "Guest Editorial Cross –layer Optimized Wireless Multimedia Communication," *IEEE journal on Selected Areas in Communication*,vol.25,pp.641-643,May 2007.
9. D. Kivanc, G. Li, and H. Lui, "Computationally efficient bandwidth allocation and power control for OFDMA," *IEEE Trans. Wireless Commun.*, vol. 2, no. 6, pp. 1150–1158, Nov. 2003.
10. Z. Zhang, Y. He, and E. K. P. Chong, "Opportunistic downlink scheduling for multiuser OFDM systems," in *Proc. IEEE Wireless Communications and Networking Conf.* , New Orleans, vol. 2, pp. 1206–1212,Mar.2005.
11. K. W. Choi, D. G. Jeong, and W. S. Jeon, "Packet scheduler for mobile communications systems with time-varying capacity region," *IEEE Trans. Wireless Commun.*, vol. 6, no. 3, pp. 1034–1045, Mar. 2007.

12. Robert Bestak Pavel Mach, "Analysis and Performance Evaluation of IEEE 802.16 Enhanced with Decentrally Controlled Relays".in *proc. IWSSIP*,pp.1-6 ,June 2009.

13. H.Shruti.Deshmukh and K.Hardia.Sarman, "Performance Evaluation of Resource Allocation Technique for OFDMA WiMAX System ," *International Journal of Recent Technology and Engineering (IJRTE)*,vol.1,pp.48-53, April 2012.