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An Enhanced Scheme of Video Transmission Using Priority Based Fuzzy Scheduling in Wimax

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Abstract: **WIMAX (IEEE802.16) is an alternative solution to traditional wired broadband techniques due to its cost efficiency. Being an emerging technology, WiMAX supports multimedia applications such as voice over IP (VoIP) and video conference. It is necessary to provide Quality of Service (QoS) guaranteed with different characteristics for Broadband Wireless Access (BWA) networks. Therefore, an effective scheduling is critical for the WiMAX system. Many traffic scheduling algorithms are available for wireless networks, e.g. strict priority, Weighted Round Robin and Round Robin scheme. This paper uses an effective video transmission using H.264video codec over Wimax networks using fuzzy based scheduling algorithm. To support various services by considering the QoS constraint with respect to BER, PSNR, Throughput, delay of rtps class. H.264 video compression and decompression is used to provide high quality video at low bit rate without increasing the complexity of the design The proposed scheme provides better QoS support for each class efficiently for WiMAX using MATLAB simulation.**

Keywords: **QOS; BER; PSNR; JITTER.**

I. INTRODUCTION

There are much advancement in wireless communication, in the last few decades have changed the daily lives of people to communicate with each other. The present day computers play a vital role in daily activities with the help of internet application, people can able to browse the information and communicate with other people and even play. Wimax(worldwide interoperability for microwave access) is the most emerging technology for broadband wireless access providing the user to access to internet, sent text message, video conferencing in metropolitan areas for the last mile, this technology has become an alternative for the cable modem and digital subscriber line(DSL) because of its high resource utilization, easy implementation, low constant also provides high data applications with a variety of Quality of Service(Qos) requirements.

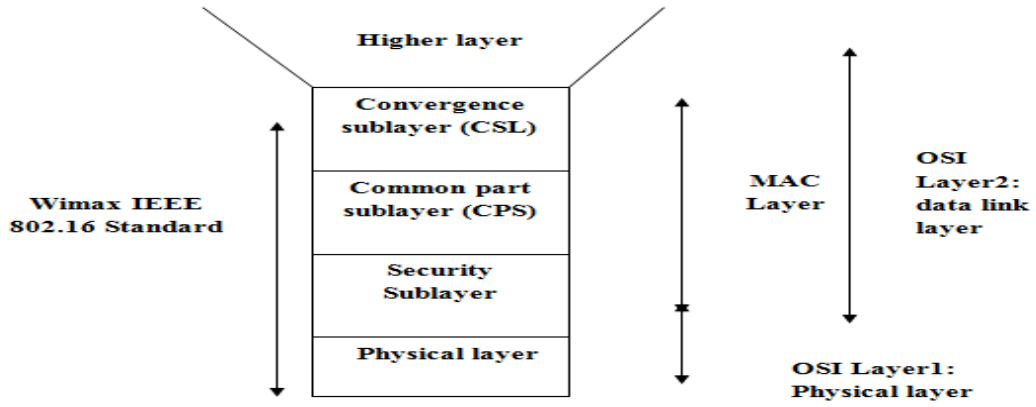

Fig. 1: Architecture of Wimax

One of the issues for streaming real-time video over wireless networks is sustaining the satisfactory video quality even when congestion happens or the wireless channels become less reliable. In order to achieve acceptable video quality different scheduling techniques are used with respect to the limited network resources; and, in some cases, it is unavoidable to prevent the video packets from being lost due to transmission errors over wireless channels or dropped due to overflow of the queues at the Base Station (BS).Due to burst errors which occur frequently in wireless networks due to noises there is a packet loss on the video quality. There are many error moderating schemes are used to reduce the loss effect in video quality which include, rate adaptive coding, forward error correction schemes, and scalable video coding are introduced in order to reduce the packet loss.

In order to reduce the noise effect and loss of video packets at receiving end an priority based fuzzy scheduling technique is used .According Shannon channel limit if the packets occupy the full bandwidth there is less effect on noise to the data which is transmitted .In our project the use of fuzzy scheduling is used to schedule the data packets to the data depending on waiting time, queue length ,expiry time packet size and so that it occupies the channel bandwidth completely and the video frames are transmitted so that it has less loss compared to other techniques used.

II. PROPOSED SCHEDULING ALGORITHM

The main objective of this paper is to provide an implementation of the IEEE 802.16(e) standard using dynamic fuzzy based priority scheduler. This proposed scheduler is named as Priority based fuzzy Scheduler (FPS). In the proposed Primary Scheduler there are four inputs namely Expiry time (Ext), Waiting time (Wtt), Queue length (Que), and Packet size (Pkz).According to dynamic priority based rule if packet size is low and queue length is low, then priority index is low, Similarly if packet size is high and queue length is high, then priority index is high. The priority index, if high, indicates that the packets are associated with the highest priority and will be scheduled immediately. If the index is low, then packets are with the lowest priority and will be scheduled only after high priority packets are scheduled.

Algorithm: Setting up the priority Input: Expiry Time (Ext), Waiting Time (Wtt), Packet Size (Pkz) and Queue Length (Que) .These first four inputs are in 4scales (VH, H, M, and L).

Output: Highest Priority Request

For i=1 to n do

- Compare Expiry Time and Waiting Time which arrives at Priority index ‘m’.
- Compare Packet Size and Queue Length which arrives at priority index ‘n’
- Compare ‘m’ and ‘n’ which arrives at Intermediate Priority’1’.

III. PROPOSED BLOCK DIAGRAM

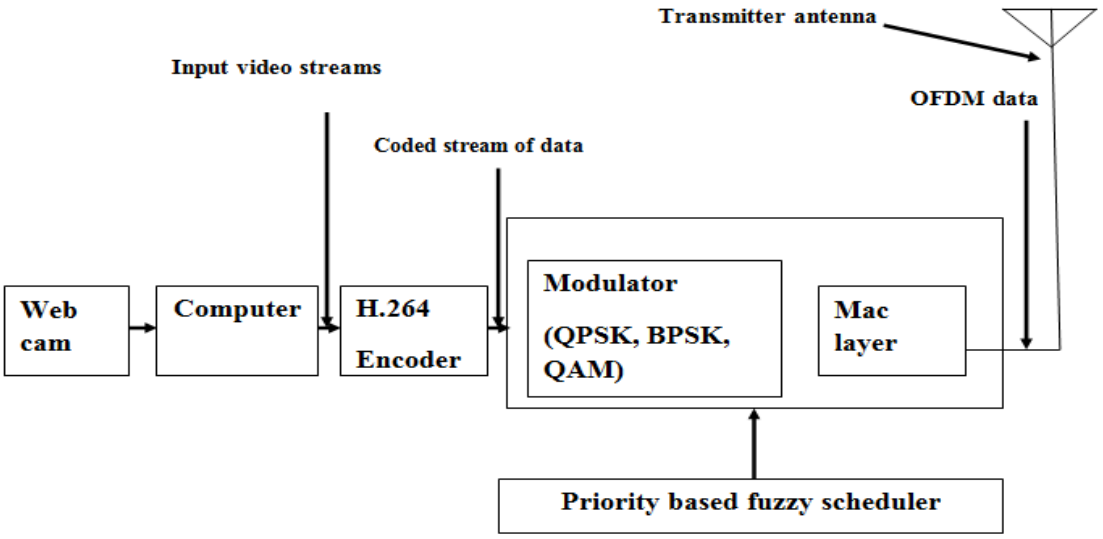

Fig 3.1: Block Diagram of Transmitter section

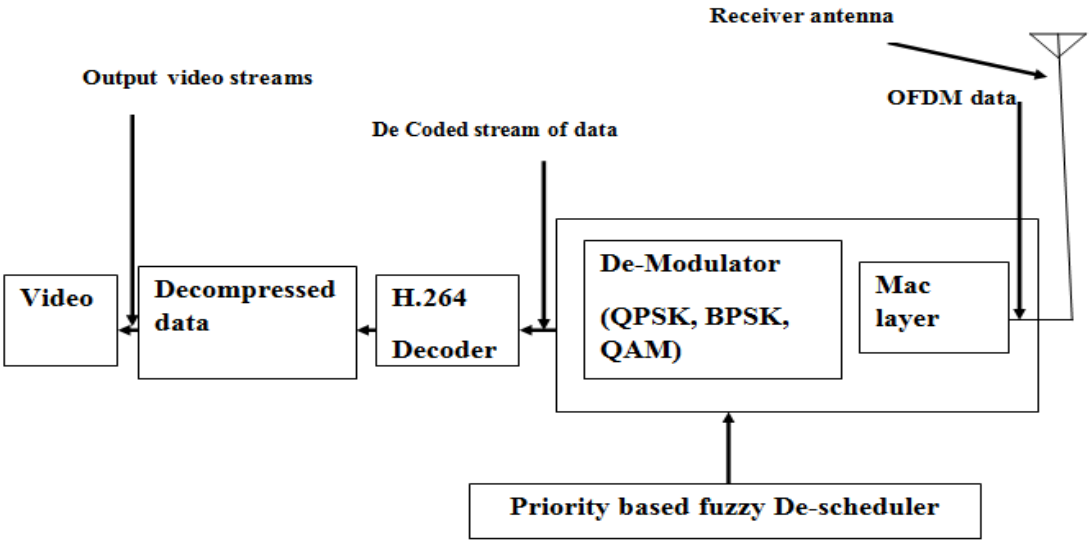

Fig 3.2: Block Diagram of Receiver section

IV. METHODOLOGY

The video stream is received and converted into avi format using MATLAB and stores into buffer, this formatted video is given to H.264 lossy compression which compress the video into 4:2:2 frame format .This compressed video is modulated using different modulation schemes like QPSK,BPSK,QAM techniques which acts like carrier signals to the compressed frame and by using fuzzy based scheduling algorithm the packets are scheduled depending upon their size, priority and then it is transmitted over noisy channel. These transmitted signals are DE-scheduled and the carrier signals are removed by demodulator. These demodulated signals are then given to H.264 decoder which converts 4:2:2 video frame format signals into avi and the video is played back with minimum loss compared to other techniques.

V. SIMULATION RESULT

The priority based fuzzy scheduling algorithm for video transmission in wimax are tested with results of video Quality, Throughput, jitter, PSNR ,and Quality of service (Qos)classes (ugs,rtps,be,nrtps).

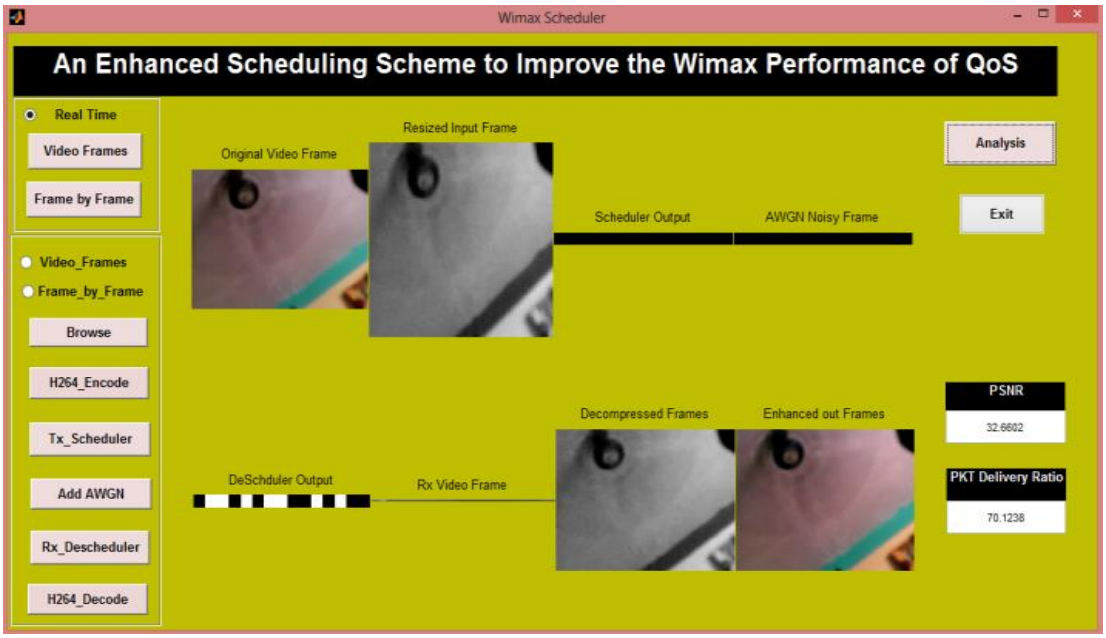

Fig 5.1: Output of Video Frames In Graphical User Interface

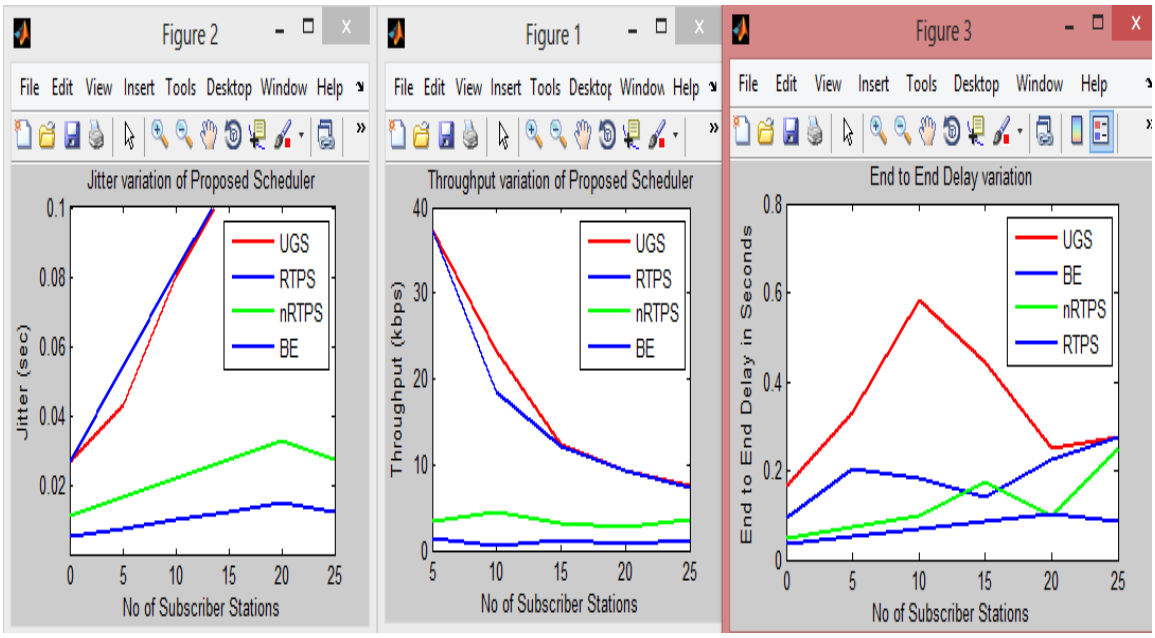

Fig 5.2: Output Variation of Throughput, Jitter and End To End Delay

From the result we can see throughput is high if the number of subscriber stations is less and decreases gradually as the number of subscriber stations increases, delay and jitter is less compared to other scheduling algorithms the throughput is high compared to other scheduling algorithms.

By using this type of algorithm the packet delivery ratio and PSNR is high so that the performance of the Wimax layer increases with efficient utilization of bandwidth.

VI. CONCLUSION

In this paper an enhanced priority based fuzzy scheduling algorithm for video transmission in real time and non-real time over WiMAX network is implemented using MATLAB. and by comparing results such as video quality, throughput, jitter ,delay and PSNR (Quality of service) QoS classes with other techniques we can conclude the results obtained is efficient than other techniques like modified weighted Round robin algorithm, weighted fairy queuing algorithm.

VII. FUTURE ENHANCEMENT

The work presented in this project can be expanded in many directions. Some of the directions are:

- Employing different performance criteria for comparison such as the make span. The make spans defined as maximum time needed to complete the execution of all the tasks arriving to the system.
- Applying scheduling technique on tasks that have dependencies among each other.
- Studying performance in real time applications where tasks have priorities and deadline constraints.

REFERENCES

[1] Vijayalakshmi,M ,SwaroopR.Puranik, LinganagoudaKulkarni,"A Cross Layer Scheduling Algorithm in IEEE 802.16e WiMAX standard to supportrtPS traffic class" 2014 IEEE

[2] Mario Poggioni, Member, IEEE, Luca Rugini, Member, IEEE, and Paolo Banelli, Member, IEEE"QoS Analysis of a Scheduling Policy forHeterogeneous Users Employing AMC Jointly with ARQ CONCLUSION" IEEE Transactions On Communications, VOL. 58, NO. 9, September 2010

[3] Leonardo Badia, Imt Lucca Institute For Advanced Studies Andrea Baiocchi And Alfredo Todini, University Of Rome "La Sapienza" Simone Merlin, SilvanoPupolin, Andrea Zanella, And Michele Zorzi, University Of Padova

On" The Impact Of Physical Layer AwarenessOn Scheduling And Resource Allocation InBroadband Multicellular "IEEE 802.16 Systems.

[4] Ranjan Parekh. "Principles of Multimedia". Tata-McGraw Hill publishing company limited, 2006.

[5] Rakesh Rajbansh, AnupamaVeeragandham. "OFDM System Design" December 9, 2004].

[6] K. Wongthavarawat and A. Ganz, "Scheduling for QoS Support in IEEE 802.16 Broadband Wireless Access Systems," Int'l. J. Commun. Sys., vol. 16, 2003, pp. 81–96.] .

[7] AbhishekMaheshwari, "Implementation and Evaluation of a MAC Scheduling Architecture for IEEE 802.16 Wireless MANs" A thesis presented to the Indian Institute of Technology Kanpur in fulfillment of the thesis requirement for the degrees of Bachelor of Technology and Master of Technology in Department of Computer Science and Engineering IIT Kanpur, India, May 2006.

[8] J. She et al., "A Cross-Layer Design Framework for Robust IPTV Services over IEEE 802.16 Networks," IEEE JSAC, vol. 27, no. 2, 2009, pp. 235–45

[9] Sridhar M, Varghese G. Efficient fair queueing using Deficit Round-Robin. IEEE/ACM Trans Netw Jun. 1996; 4:375–85.

[10] D. Eager, M. Vernon, and J. Zahorjan, "Minimizing bandwidth requirements for on-demand data delivery," IEEE Trans. Knowl. Data Eng., vol. 13, no. 5, pp. 742–757, Sep. 2001.