UNLEASHING THE POWER OF AI

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FOREWORD

The PGdepartmentof commerceof KorambayilAhamedHajiMemorial UnityWomen'sCollege, Manjeri takes much privilege in bringing out a Journal for the reference of academiccommunity and also aiming at many other stakeholders such as students, Research Scholars,Industrial community etc. The publication covers almost all significant areas of technology suchas networking, IoT, etc. I am very much sure that this effort will bean investing asset for the accomplishment of higher education dreams. Wishing all the successtothis smallendeavour.

Mr. Rahib B

Head & Assistant Professor

PGDepartment ofComputer Science

PREFACE

Welcome to the world of software projects and technologies. The book serves as a comprehensive Guide that explores the dynamic and ever – evolving landscape of software development, providing valuable insights and practical knowledge to both seasoned professionals and enthusiasts.

The field of software project and technologies has an integral part of our lives, transforming industries,Revolutionizing communication, and driving innovation across the globe.The structure of this book is organized in a logical and progressive manner. Each chapter focuses on a Specific aspect of software project and technologies, building upon the foundation established in thePreceding chapters.Whether you are a seasoned professional seeking to expand your knowledgeOr a student starting your journey in the world of software projects and technologies, thisBook caters your needs.

I would like to express sincere gratitude to the mentors, colleagues, and reviewers who have

Contributed their expertise and insights to the development of this book. Their invaluable input And support have played a pivotal role in its creation.

Iwouldliketo putonrecordadebtofdeepsenseofgratitudetoDr.MuhammedBasheerUmmathur,ourbelovedPrincipal,for his valuable guidance. I express my sincere thanks to Mr. Rahib B, Head andAssistant Professor, PG Department of Computer science, for his wholehearted encouragement incompleting the publishing work. Besides, I would like to shower my sincere gratitude to allfacultymembersofPGDepartmentofComputer sciencefortheirinspiration,guidanceandsuggestions.IwouldbefailinginobligationsifIdonotmentionmygratitudetoeveryonewho hascontributedtheirarticles tothisbook.

-The Editor

SEMINAR ARTICLES

Paper 1 : CONTROLLING MOUSE CURSOR USING EYE MOEMENT BY COMPUTER VISION TECHNOLOGY……

Paper 2 : IOT BASED ON RNA[RECURSIVE INTERNETWORK ARCHITECTURE]……

Paper 3 : SWEAT POWERED WEARABLES……

Paper 4 : TRAFIC SHAPING……

ABSTRACT

This paper focused on the analysis of the development of hands-free interface between human and computer. The computer vision technology is intended to replace the conventional computer screen pointing devices for the use of disabled or a new way to interact with mouse using their face and eye movement. Some people who do not have hands cannot use computer, due to their inability to control mouse and keyword operations. By introducing them to technology and make them computer compatible will create them to learn and do some work. Several efforts are made by professionals to assist the disabled in providing them a tool to interact with the computers using signals such as electroencephalography(EEG) from the brain, facial muscle signals(EMG), which require the use of attachments and electrodes that makes them impractical. The method described in this paper does not use any of this expensive equipment. It just needs a computer with a webcam making it easy and uncomplicated method. By taking real-time images of the user, the program is designed to evaluate these images using a face detection algorithm. By using different expressions of a face using computer vision and matching it with already stored expression and execute actions as per the move. After detecting the face, the position of eyes and mouth is captured for controlling the mouse functions such as o left-click, right-click, scroll up and down, move the cursor up, down, left, right. This method doesn't require any special hardware and sensors.

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Chapter 4

TRAFFIC SHAPING CONCEPT RELATED TO NETWORKING

4.1 TRAFFIC SHAPING

Traffic shaping and traffic scheduling in time sensitive networking aims to achieve low bounded latency and zero congestion loss. Traffic shaping is an important technique to ensure high quality of services and also it is an important requirement for network firewall.

Traffic shaping is also referred to as packet shaping, generally it is a bandwidth management technique that delays certain type of packets in order to ensure network performance and to provide high quality services. Most common type of traffic shaping is the application based traffic shaping. If applying traffic shaping to the higher layers of the protocol stack(data link layer and physical layer) what will happen? what are the interpretations may occur when applying traffic shaping in these layers or how the interpretations influence the traffic shaping are going to be discussed. The two important traffic shaping are Audio Video Bridging and Cedit Based Shaping.

One of the disadvantage of traffic shaping is that the throughput of network traffic is fixed it wont make use of additional bandwidth if it is available. Applying traffic shaping to improve network performance can be a cheaper solution than upgrading a network's hardware.

4.2 AUDIO VIDEO BRIDGING

Audio Video Bridging is a common name for the technical standards that are developed by AVB task group of the IEEE 802.1 standard committee. AVB standards provide reliability and low latency for Ethernet networks. The transmission of frames in Ethernet AVB is scheduled in a high prioritized manner. Frames from different sources are distributed over FIFO out put queues depending on the corresponding priority classes. In Ethernet AVB different priority classes are possible, but consider high,medium,low and best effort(BE) priority classes.

AVB is a growing up technology in several automation domain. AVB offers several benefits such as open specification and real time support and offers advantages in frame of high bandwidth.

The standard IEEE 802.1BA represents the audio video system.

MINIMUM LATENCY: 0.25ms.

MAXIMUM SAMPLING RATE: 192KHZ.

MAXIMUM BIT DEPTH: 32 bit floating point.

DEVELOPMENT DATE: September 2011

MANUFACTURER: IEEE Avnu.

4.3 CREDIT BASED SHAPING

Credit based shaping is one of the traffic shaping mechanism. It is a queuing discipline is intended to be used by time sensitive networking. Credit based shaping is completely based on a term is called "credits".Credits are accumulated to the data queue as they wait for transmission. Only the data queue with positive credits are eligible to service and the credits are spent by the data queue while they are in transmitting. If frames are waiting for service the credits are accumulated or raised. If all the transmission from that queue is finished the credits is reset to zero. The rate

at which the credits are increased and decreased are expressed in terms known as "idleslope" and "sendslope".

already discuss that in time sensitive networking many priority classes are possible like AVB A , AVB B and BE. BE is the best effort traffic. In best effort traffic there are no guarantee regarding the delivery of packets or frames. Best effort is a network service to deliver messages or data packets to the desired destination but a disadvantage is that it does not provide any special features like retransmitting corrupted packet or lost packet.

The class AVB A has higher priority and is used for audio traffic and the class AVB B has a medium priority and is used for video traffic and finally best effort traffic obtain the remaining bandwidth. It indicates that best effort traffic has low priority. These classes are originates from Ethernet AVB standards. TSN provides a time aware shaper that act as a traffic gate and it allows higher priority queues to transmit and can undergo credit based shaping.

Now let us discuss what happened when credit based shaping is applied in the physical layer and data link layer of the protocol stack and what are the interpretations occurs.

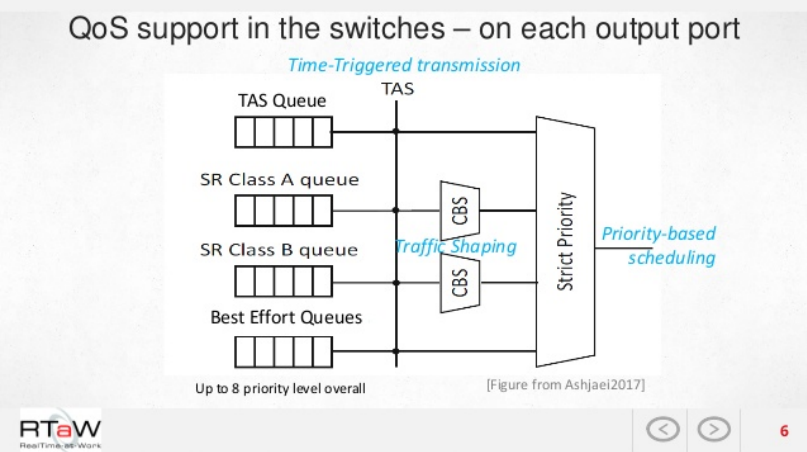

Figure 4.1: output port of a Ethernet switch

4.4 IEEE 802.1Qav CREDIT BASED SHAPER

- IEEE 802.Qav: Forwarding and queuing enhancement for time sensitive streams.
- IEEE 802.1Qbv: Enhancement for scheduled traffic. IEEE 802.1Qbu IEEE 802.3br: Frame preemption.
- IEEE 802.1Qca: Path control and reservation.
- IEEE 802.1Qcc: Stream reservation protocol(SRP) enhancement and performance improvement.
- IEEE 802.1CB: Frame replication.

4.5 IEEE 802.1Qav - TIME AWARE SCHEDULER

The basic function of the time aware scheduler is to create equal cycles(time periods).These time slots then assigned to the traffic classes. Time aware scheduler provide a fixed time table for the different traffic classes. This scheduler requires synchronization.

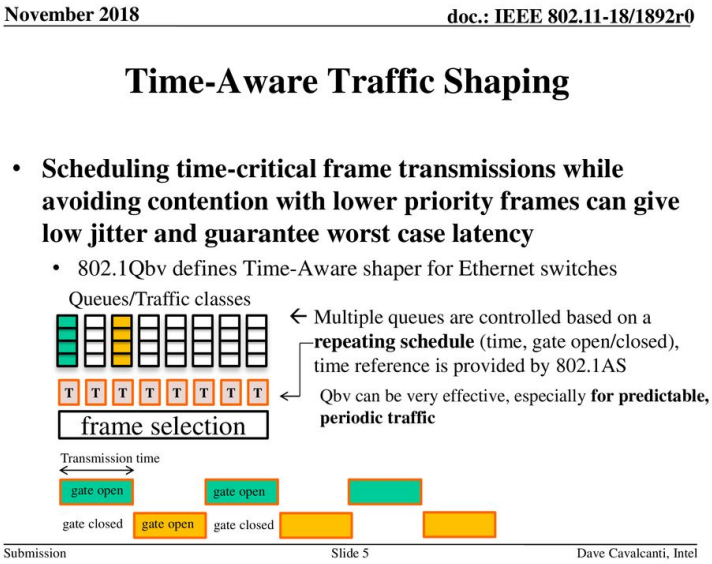

Figure 4.2: time aware traffic shaping

Chapter 5

DATA INTERPRETATIONS

Data interpretation and data analysis are fast becoming important with the increasing of digital communication. Huge amount of data get accumulated day by day. For managing huge amount of data more efficiently and effectively data interpretation and data analysis are important and also to ensure the security of data.

Data analysis is the first step towards data interpretations. Data interpretation is the process of reviewing the data through some processes to assign some meaning to the data that are analysed and by studying the result they can arrive at a definite conclusion.

When applying credit based shaping in layers it may cause some kind of interpretations. In general, say that physical layer interpretations and data link layer interpretations. The interpretations may occur due to some criteria called "start of frame transmission" and "end of a frame transmission". Mainly these interpretations are based on the inter packet gap(IPG) between the Ethernet messages.

5.1 INTER PACKET GAP(IPG)

"Start of a frame transmission" is defined as the starting of a frame and "end of a frame transmission" is defined as the end of a transmission of packet or the end of a inter packet gap.

inter packet gap is the minimum pause between the network packets or network frames generally 9.6 microsecond inter frame gap. The purpose of inter packet gap is to allow enough time for the Ethernet devices to recover. If the inter packet gap between the data packets are too small proper clean up wont be performed. According to IEEE 802.3 standards a data link layer must allow a minimum amount of time to sent another packet for transmission.

The main purpose of inter packet gap is to clean up and reallocate the resources used by previous transmission. If the inter frame gap is too small it will lead to the incoming new packets to utilize the resources allocated for the previous packet transmission. So any new connection get refused. The main reason for the 9.6 microsecond inter frame gap is to allow the station to back to the receive mode from the transmitting mode. With out inter frame gap there is possibility for losing frames or packets. This may arise interpretations.

Chapter 6

ANALYSIS TECHNIQUES

6.1 WORST CASE RESPONSE TIME ANALYSIS

Worst case response time of a message is defined as the longest time to receive a message that was initialized by a sender. A message is said to be schedulable if and only if it's worst case response time is less than or equal to the deadline. Worst case response time (WCRT) is must for controller area network(CAN) messages. Controller area networks is currently the most widely used technology in the field of autompbiles.

6.2 SCHEDULABILITY ANALYSIS OF ETHERNET AUDIO BRIDGING NETWORK WITH SCHEDULED TRAFFIC SHAPING

In the schedulability analysis an improvement to the AVB protocol called AVB ST(scheduled traffic) is proposed. AVB ST meant for supporting scheduled traffic. Schedulability analysis is mainly presented for the real time traffic that crossing through AVB ST networks. Here defines two stream reservation classes , SR class A and SR class B and a credit based shaper is added. The class with higher bpriority can undergo credit based shaping . Time aware shaper allow transmission according to the schedule. When an scheduled traffic message pass through the network some elements influence the delay of messages. This analysis do not lead to a schedulable result in most of the cases.

Here the element or the factor that cause delay in message is the "bandwidth".Bandwidth is the major factor that effects the efficiency of packet transmission through network channel. Bandwidth is the maximum amount of data transmitted over the internet in a given amount of time. Bandwidth reservation guarantees high quality of services for different types media like audio, video. A solution to increase the bandwidth of the traffic classes is known as "bandwidth over-reservation". This is a solution for obtaining minimized bandwidth over reservation. Bandwidth reservation is beneficial only when the number of users asking for guaranteed bandwidth is relatively smaller than other users . So the solution can be used for both AVB and AVB ST networks.

6.3 INDEPENDENT WCRT ANALYSIS FOR INDIVIDUAL PRIORITY CLASSES IN ETHERNET AVB

6.3.1 BUSY PERIOD ANALYSIS

In the automotive industry bandwidth consideration and standardization are two important factors for considering Ethernet is an alternative solution for the real time communication . Initial method to guarantee latency for Ethernet AVB depended on traditional busy period analysis. The worst case response time of a frame transmission can be bound using traditional busy period analysis. This analysis is performed to estimate the maximum amount of influences from which a transmission may suffer. By performing traditional busy period analysis a desired independence not achieved. As a solution for the interferences occured eligible interval analysis is performed.

6.4 ELIGIBLE INTERVAL ANALYSIS

Eligible interval analysis is an independent real time analysis . By introducing the eligible interval analysis instead of busy period analysis that can manage the analysis quite simply. The new analysis that is eligible interval analysis is independent of interpriority interferences other than the assumptions enforced by the Ethernet AVB standards. In eligible interval analysis only one low priority frame can interfere during an eligible interval. The main challenge of eligible interval analysis is rely in the influence of multiple high priority classes. Because the eligible interval analysis is tight in the case of a single high priority stream.

In cases of multiple higher priority classes provides strict conditions. As a solution to the influence of multiple higher priority classes and multiple low priority classes extend the worst case response time of a medium priority class. So this division prevents the starvation of low priority classes so can guarantee the latency of a priority class effectively.

Chapter 7

CONCLUSION

In this paper discuss about the layering concerns for the analysis of credit based shaping in IEEE 802.1 time sensitive networking. Already discuss that time sensitive networking is a growing technology. Here point out the various interpretations may occur when credit based shaping is applied to the data link layer rather than the physical layer of the protocol stack. Each of these interpretations has it's own advantages and disadvantages. Here a question is arised that whether the existing analysis are still valid to solve these kind of interpretations. So mainly adapt the independent WCRT eligible interval analysis for future studies.

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