

BONAFIDE CERTIFICATE

Certified that this project report entitled “*PERFORMANCE ANALYSIS OF IMAGE QUALITY OF MPEG VIDEO WITH NEURO-FUZZY METHOD OVER BLUETOOTH*” is the bonafide work done by **Mr. SANKHA RAY**, **Reg.No:15506024** in partial fulfillment of the requirements for the award of the degree of

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ABSTRACT

In a Bluetooth network, transmission rate can not be determined due to interferences by other wireless devices or general Bluetooth channel noises. MPEG Variable Bit Rate (VBR) video transmission is also not reliable and presents long delay and excessive data loss, due to variations in bit rate. It is therefore almost impossible to transmit MPEG VBR video over a Bluetooth channel, without data loss, excessive time delay or image quality degradation.

Firstly, this project presents a Traffic Shaping tool used to manage network traffic by shaping the traffic to a specified rate. Traffic shaping enables to control access to available bandwidth, to ensure that traffic conforms to the policies established for it, and to regulate the flow of traffic to avoid congestion that can occur when the transmitted traffic exceeds the access speed of its remote target interface. Traffic shaping uses a traffic descriptor for a packet—indicated by the classification of the packet—to ensure that a packet, or data source, adheres to the policies contracted for it and to determine the QoS to apply to the packet. Again it enables to control the traffic leaving an interface, matching its packet flow to the speed of a particular remote interface. By shaping a class of traffic to conform to downstream requirements, it is possible eliminate bottlenecks in topologies with data-rate mismatches.

Secondly, this project presents an integrated Rule-Based-Fuzzy (RBF) approach and Neuro-Fuzzy (NF) scheme to Moving Picture Expert Group (MPEG) video transmission in Bluetooth. In this work, a traffic-shaping buffer is introduced before the Host Controller Interface (HCI) of the Bluetooth protocol stack. This reduces the congestion of the traffic-shaper output rate to enable the MPEG VBR video to comply with the generic cell rate algorithm contract before entering the Bluetooth channel.

In general, a fuzzy scheme is more easily tuned by adjustment of the membership functions. By introducing two control inputs, a fuzzy scheme can trim its response. The two inputs in our scheme were buffer fullness and the deadline margin of the packet at the head of the Bluetooth send queue. A fuzzy scheme is well-suited to implementation on a mobile device, because not only are the decision calculations inherently simple but also by forming a Lookup-Table (LUT) from the fuzzy control surface, its operation can be reduced to simple LUT access. Because of Bluetooth's resemblance to Asynchronous Transfer Mode admission control, fuzzy logic bit rate control has been applied to Bluetooth wireless links. However, this application of fuzzy control was for a quite different purpose, flow control, to the work herein.

Finally, a packet-based algorithm functions like the early discard, and accept a newly arriving packet if the probability that all the cells of the packet are accepted is high. Some performance characteristics are derived of the cell and packet arrival process that are accepted by the leaky-bucket algorithm. From these analyses, a method to determine the values of the parameters of the leaky-bucket algorithm and certain relations between this leaky-bucket algorithm and the generic cell rate algorithm (GCRA) are obtained. The algorithm is represented as the queuing model with the cell and token buffers, where token are generated according to a given process and a cell that can get a token departs from the cell buffer. It is assumed that if a token is generated at the same time as the arrival of a cell then the departure of the cell that gets the token occurs before the arrival.

With the help of computer simulation the results is shown of the proposed scheme that reduces excessive time delay and data loss at the HCI, as compared with a conventional video transmission in Bluetooth.

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LIST OF ABBREVIATIONS

ABBREVIATION		EXPANSION
MPEG	-	Motion Pictures Experts Group
VBR	-	Variable Bit Rate
QP	-	Quantization Parameter
CBR	-	Constant Bit Rate
RF	-	Radio Frequency
HCI	-	Host Controller Interface
GCRA	-	Generic Cell Rate Algorithm
GOP	-	Group of Pictures
NF	-	Neuro-Fuzzy
SCO	-	Synchronous Connection Oriented
ACL	-	Asynchronous Connection-Less
VoIP	-	Voice/Video over IP
BNEP	-	Bluetooth Network Encapsulation
L2CAP	-	Logical Link Control and Adaptation Protocol
QoS	-	Quality of Service
RBF	-	Rule Based Fuzzy