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presents  
a thesis defense for  
Master of Science  
degree in  
Computer Science

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GMCS 405

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Adaptive Low Bit Rate Video Streaming Over Wireless Networks

## Abstract

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The recent trend in multimedia computing applications requires increasing bandwidth and computing power. As an integral part of multimedia computing, the efficiency of digital video processing is a very compelling issue.

This research focuses on an efficient way to wirelessly stream video from any Standard video4linux compatible USB Web Camera which can be scaled to high-end surveillance cameras as well to a mobile user. All communication between the mobile user and the web camera will be performed using a web browser. A real-time video stream will be efficiently encoded and transmitted from the web camera over an 802.11 WLAN and displayed in a mobile user's browser. The end users will be able to remotely view the live video stream using any standard web browser running on any device with a wired or wireless interface. We have proposed a novel video encoding scheme to efficiently transmit video frames to a remote browser. Based on link quality and signal strength, the web camera will adaptively modify the number of frames transmitted per second and the quality of a transmitted frame to reduce packet loss and efficiently saving bandwidth and present the end user with a glitch free video. Based on the available bit rate information and the pre-determined data model the rate-adaptation module uses 'Newton Raphson' method to determine the encoding parameters.

The research also includes understanding of various video compression techniques and Real time video streaming methods. Understanding of some open source libraries such as FFmpeg, MPEG4IP and Live555 are also a part of the research.

## Thesis Committee

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Carl Eckberg, Thesis Chair, Department of Computer Science  
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Carmelo Interlando, Department of Mathematics & Statistics