ABSTRACT

On-Demand Content Based Indexing System

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For students to effectively use educational videos, they must be able to quickly access key points of interest. The process of inserting content-based key points is known as signalling. Finding such key points typically involves a reviewer watching the video, identifying a specific event, then manually recording the type of event and the time it occurred.

This project explores factors which impact the effectiveness of signalling in educational video. The first aspect explored is the use of methods to automatically identify key points of interest for a reviewer's approval. The second aspect explored is the quality of experience (QoE) for users watching video that has been subject to signalling, when delivered under different network conditions.

The events considered in this study, suitable for key points of interest in streaming educational video, are pointing, entry and exit, and silence. To determine the effectiveness of signalling, detected events were compared to a list of manually extracted events. The NS3 simulator was used to subject streaming educational video to different network conditions. Responses from students were captured using a questionnaire designed to determine QoE.

The results of the questionnaire show that once the video quality is acceptable, the use of signalling within video is preferred by viewers. Using the CodeBook method for visual motion detection and the adapted silence detection method, the specified events were detected with a recall rate of 77.435% and a precision rate of 62.199%; rates appropriate for reducing the manual effort required to create effective educational video.

This thesis therefore contributes towards research to determine effective strategies for the on-demand creation and use of signalling within educational video.

Keywords: Aniel Darshan Maharajh; Video Indexing; Content Based; CodeBook; Silence Detection; Network Simulation; Quality of Experience; Questionnaire; NS3; QoE.