

Honours Project Proposal

Student: Jaime Herzog, 101009321

Supervising Professor: Prosenjit Bose

Full time video game live streamers on twitch.tv stream to thousands of viewers for 8+ hours a day, 5 days a week. Viewers that catch these streams live can consume this content as intended, but for many viewers, a streamers schedule can be incompatible with theirs, and generally viewers look to youtube content for stream “highlights” which condense these long form streams into shorter, easier to watch content. Many streamers hire editors to do this work, but it is slow, repetitive work, and costly; for many small time streamers, hiring an editor isn’t a viable option due to the prohibitive cost. As such, there is a need for this work to be automated. To do this, I will do a survey of the existing literature on scene detection in video. I will then use this knowledge combined with my own ideas to implement a scene detection algorithm for video game live streams, to measure these strategies’ effectiveness. To do this, I will leverage various edge detection algorithms such as Canny Edge detection, as well as the colour histogram functionality in opencv to create a metric by which we can compare change from frame to frame in a video, and to compare this change in order to create coherent scenes.

Part of my investigation into my own application will be to do a comparative analysis of two different approaches to change in video, between using edge detection and colour histograms. To do this, I will create a demo which shows visually the change from frame to frame in edge location in one window, and colour percentage in the other, and from this I will create a hypothesis about the appropriate threshold of change from frame to frame in each technique, which will determine whether the scene has “cut” or changed. I will then implement

this threshold and various others, and run experiments to test my hypothesis against other candidate thresholds and their effectiveness.

Something I may do is on top of the visually-oriented scene detection, investigate audio to find consistent low points, creating “active sentences” and “silent downtime” in the audio, to enhance our idea of a consistent scene.

Bi-Weekly Schedule

By **January 19th**: conduct preliminary research on opencv and it’s functionality with respect to edge detection and colour histograms, as well as research into pre-existing published work on this topic.

By **February 2nd**: Finish this research, and begin work on a demo which visually shows a side by side comparison of each frame of a video converted to it’s edges on one side, and to colour histograms on the other.

By **February 16th**: Finish the demo, and use it to visually determine an appropriate threshold for “difference”, either in edge movement or colour change, between one frame and the next.

By **March 1st**: Run various experiments on multiple thresholds to see what the ideal is. Collect data on colour histogram change thresholds and edge detection change thresholds, and how many cuts occur with each threshold/ their relative correctness.

By **March 15th**: Continue research from previous two weeks. Do “nice to haves” with additional time i.e. audio analysis.

By **March 29th**: be close to completing or done the project report.

By **April 12th**: submit project report.