Milestone 1 Submission 1 by Group 1

Proposed Level of Achievement: Gemini

# Panopto Plus

A Chrome extension to improve the user experience of webcasting

**Motivation**

Webcasts, or web lectures, are recordings of lectures held by professors. These webcasts allow students to review and revise lectures and are helpful to students as webcasts can be viewed at any time, any location and even at a faster playback speed to facilitate learning.

For webcasts by NUS, these webcasts are hosted on a website named Panopto. Although the website and webcasts are sufficient for learning, improvements can be made to enhance the user experience of users.

Firstly, the user interface of the Panopto website can be improved. In its current state, the playback of webcasts can only be increased up to two times the speed. The user interface is also filled by unnecessary web elements such as the over-sized carousel/slider for webcast timestamps, when the focus should be on the webcast itself. These can be modified to allow users to increase the playback speed beyond the current x2 speed and remove unnecessary clutter and improve the user experience.

Secondly, machine transcribed subtitles and transcripts can be introduced. With their introduction, even if they may not be entirely accurate, students will be able to use them to skim through certain sections of the webcasts.

Finally, there are sections in the webcast where the professor is writing, thinking or waiting. Since the professor isn’t teaching during these moments of silence, they can be removed without hindering the students’ learning. Depending on the lecture, the removal of these silences can reduce the duration of a web lecture by half, or even down to a quarter of its original duration.

This is not an urgent problem to be solved, but with the development of this project, users will be able to both hear and read what the professor is saying, and enjoy shorter webcasts without compromising their learning.

**Aim**

We hope to improve the user experience of webcasting on the browser Google Chrome through a Chrome extension.

**User Stories**

1. As a student, I want to reduce the time I spend on webcasts while maintaining the same level of comprehension and learning.
2. As a student, I want to have the option of fast-forwarding my lectures at a playback speed higher than two times the original speed.
3. As a student, I want to be able to skim through what the professor is saying during the webcast. A transcript of what the professor is saying would be helpful.
4. As a student, I find that some professors spend a lot of time pausing to write or to think during their lectures. Although this is understandable, I would prefer if these moments of silence were removed from my webcasts.

**Scope of Project**

The Chrome Extension will serve 3 main purposes:

* The Chrome extension will inject HTML, CSS and JS into the page to improve user-friendliness. There will be a side-bar for users to configure the extension settings.
  + Wider range of video playback speeds, restructuring of page to allow for more space for the video webcast
  + Persistent settings across webcasts e.g. always play all webcasts at 2.0x speed.
* Machine Text Transcription (Machine-generated subtitles for webcasts) will by generated by Panopto. This Chrome extension will leverage on that and process the transcript into subtitles and a user interactable transcript.
  + Users can click sections of the transcript to seek to that video timeframe
* The Chrome extension will also process files of the webcast for voice detection. Sections in the webcast where there is no speech will be automatically skipped.

These features are toggleable (except user-interface modifications to the Panopto webpage).

**Features to be completed by mid of June:**

1. Improvements to user interface
   1. Side-bar with tabs
   2. Smaller carousel (timeline of video)
   3. Removal of Panopto header if loaded on LumiNUS
   4. Playback speed slider
2. Subtitles
   1. Retrieval of transcript from Panopto REST API
   2. Conversion of transcript to subtitle
   3. Display of subtitles into video(s)
3. Silence Removal
   1. Basic implementation

**Features to be completed by mid of July:**

1. Improvement to user interface
   1. Support for both single video and double video webcasts
      1. Some webcasts only have one video stream, while some have two. Panopto’s user interface varies in slight but noticeable ways depending on the number of videos. One of the Chrome Extension is to make the experience consistent regardless of number of videos.
   2. Persistent settings across webcasts under the same module
   3. Other generic UI improvements
   4. Keep In View feature: Transcript sidebar in full-screen mode
   5. Keep In View feature: Responsive layout (mobile view)
2. Transcripts
   1. Caching of transcripts
   2. Transcript will be displayed on sidebar
   3. Line in transcript will highlighted when it is in play
   4. User will be able to click line and seek to part in video
3. Silence Removal
   1. Caching of silent sections
   2. Optimizations

**How are we different from similar platforms?**

There are no existing solutions to this problem, but there is another group (Team Huat Ah) in Orbital 2019 doing a very similar project. Unfortunately, they have declined to work together to produce a combined product. Hence, to set this project apart from theirs, a few justifications on our project scope decisions must be explained:

Team Huat Ah’s app will have the following features:

* 1. Adjust play speed
  2. Subtitles
  3. Saving of webcasts
  4. Adding webcasts to playlists
  5. Bookmarks list / un-finished list

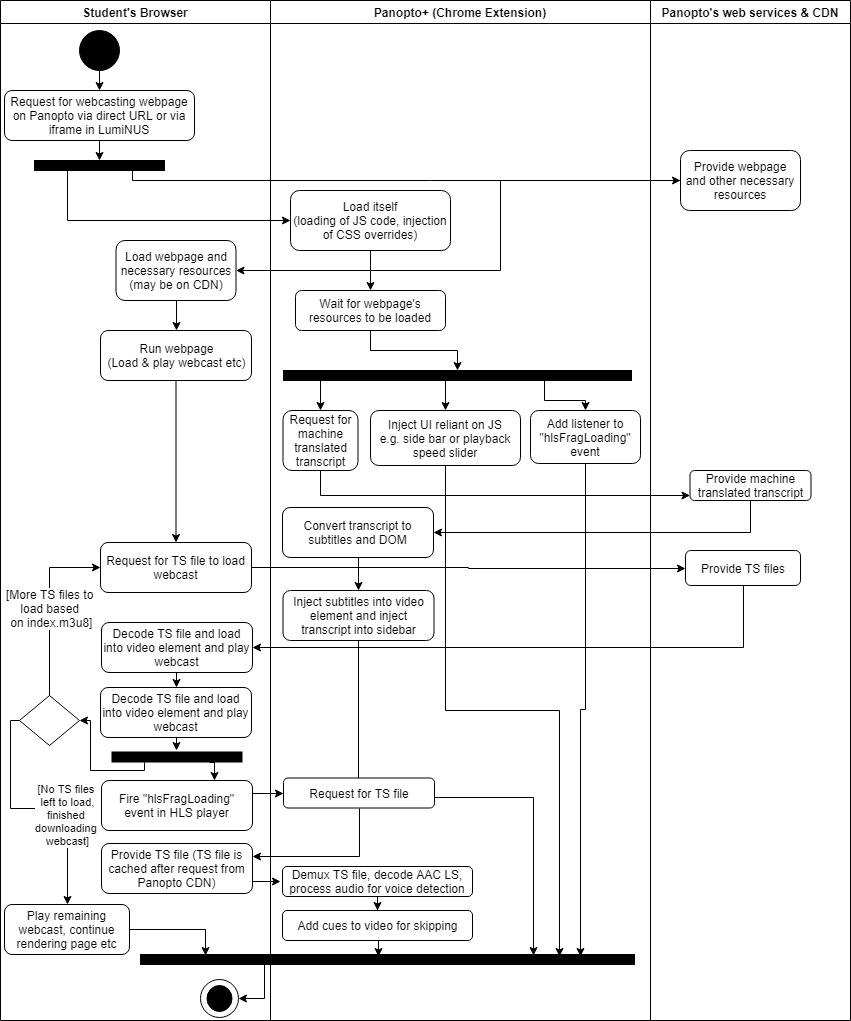
In comparison, our project scope currently does not include features c, d and e and only has silence trimming as an additional feature over features a and b. At first glance, it appears as if their project is everything that this project is but with more features. However, this is by design.

We believe that feature c is worth pursuing only as an extension of the project (i.e. Milestone 3) as there are various complexities in implementing this feature. Saving the webcast itself is doable (considering that Panopto already has a download button for webcasts that only have one video stream), but the complexity comes in embedding the subtitles and trimming the silences from the webcast. As such, we would rather focus on the core features and treat it as an extension of the project once the core features are finished.

We feel that for our project, feature d is unnecessary as LumiNUS already groups all webcasts under a module in a single page.

We also believe that feature e is unnecessary for our project because Panopto already has a bookmark feature.

**Program Flow**



The Program Flow for our project is very simple from the perspective of the user. The user will only need to install the Chrome extension and all upgrades will be made automatically applied. He may toggle Machine Text Transcription and Auto skipping of silent sections under settings.

**Technologies Involved**

The Chrome Extension will be developed using web technologies i.e. HTML5/CSS & JS, but most of the code will be in JS. Git will be used for version control.