

InnerTube

YOUTUBE CAPTION SEARCH

CS 410

Text Information Systems

University of Illinois Urbana-
Champaign

The Team

- Arushi Garg
- Kyle Demeule
- Suraj Nayak

Problem

Searching Video is difficult

- Length of videos can be long.
- No simple way to visualize the content of a video.

Traditional approaches to searching:

- Guess based on title
- Manually scan video
- Read video comments (if available)

Solution

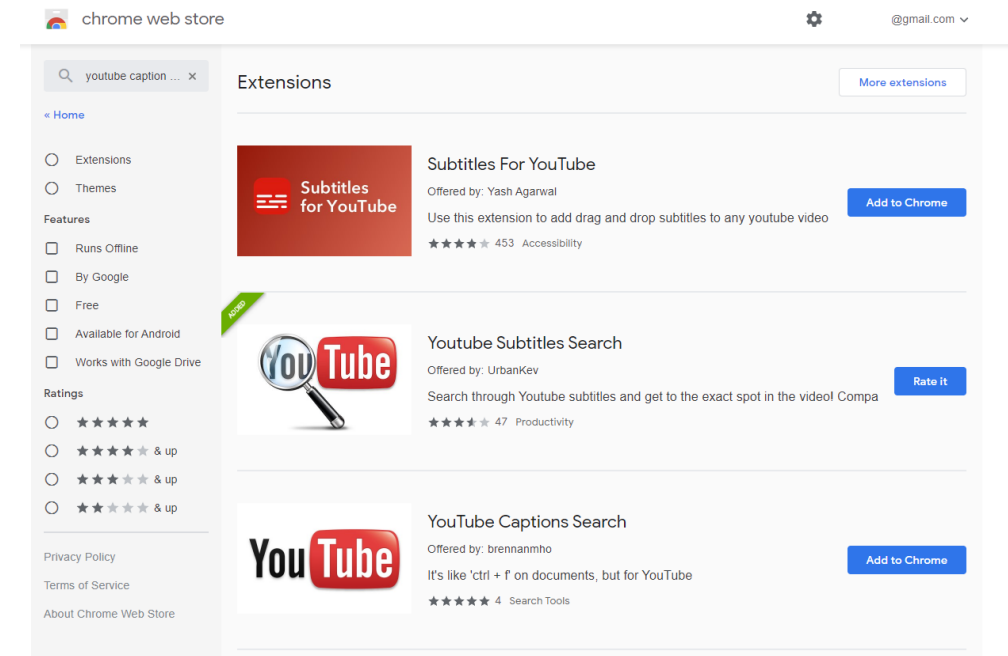
Utilize captions generated by YouTube to create video search engine

Implement as Chrome Extension to work seamlessly with YouTube

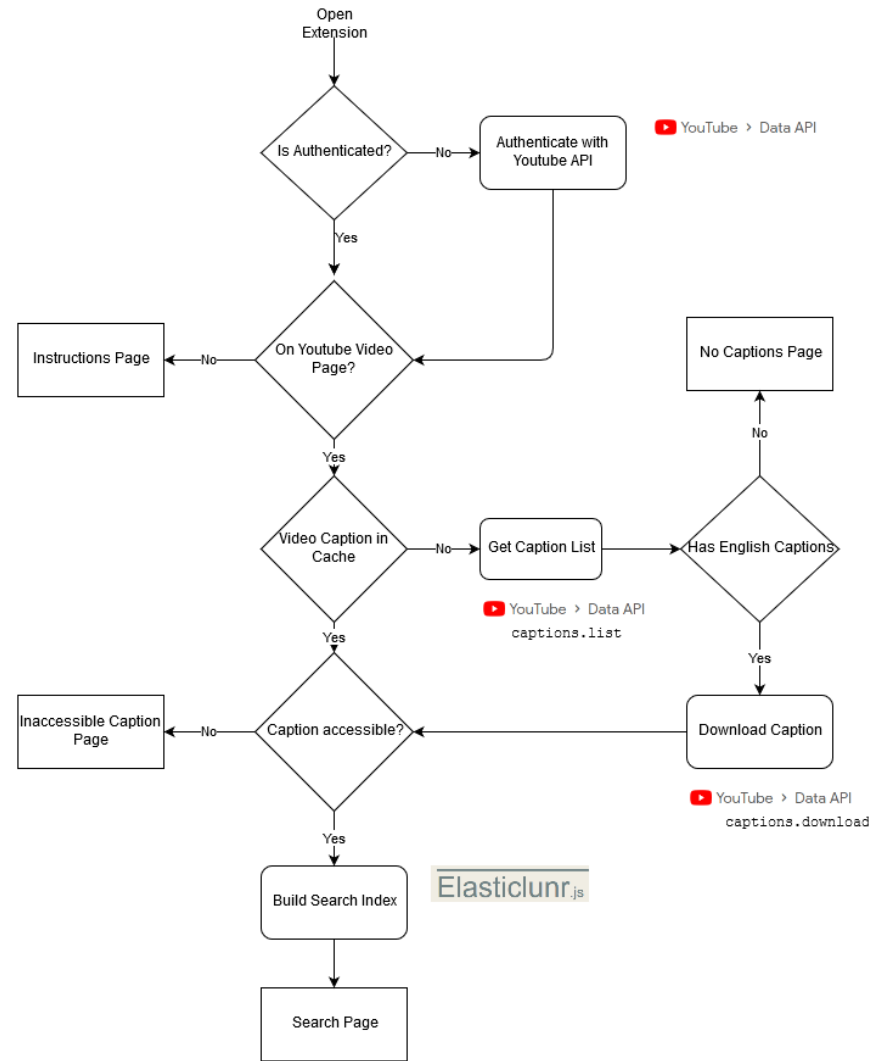
Existing Solutions

Several Plug-ins like this already existed

- However all of them are currently non-functioning.
 - Likely due to parsing YouTube DOM (which can change) or using non-official APIs.
- All are closed source.



Demo



Implementation

Flow on Open

Implementation

Flow on Search

- Get search term
- Search index for search term
- Order results based on search score

Flow on Search Result Select

- Get selected search result
- Convert search result to seconds in video of result
- Inject code to use Youtube iFrame API to seek player to that time

Implementation: Technology Used

[Chrome Extension](#)

- Application Development

[Youtube Data API](#)

- Accessing captions

[Youtube iFrame Player API](#)

- Seeking to video section on search click

[Elasticlunr.js](#)

- Building search index

[jQuery](#)

- DOM manipulation, AJAX

[Google API Client Library for JavaScript](#)

- Authentication

Features

Speed (no need for an HTTP request for each search)

Dynamic (build index on the fly)

Stop words, stemming, token expansion.

Cache downloaded captions

Limitations

This Extension uses the YouTube V3 API to access captions for videos.

Pros:

- Most inline approach with Youtube's TOS.
- Will likely have the most longevity.

Cons:

- YouTube requires oauth and heightened user permissions to access the `captions.download` endpoint.
- YouTube restricts third-party access to video captions, majority of videos on YouTube currently don't allow third party access.

Running Locally

Runs entirely in the chrome extension; no extra servers required.

Steps:

- Download code ([github repository](#)).
- Load Extension locally ([instruction source](#)):
 - Navigate to `chrome://extensions`
 - Expand the Developer dropdown menu and click “Load Unpacked Extension”
 - Navigate to the local folder containing the extension’s code and click Ok
 - Assuming there are no errors, the extension should load into your browser
- Click plugin, follow authentication flow.
- Navigate to Youtube video ([example](#)).
- Click extension, enter search term.

Appendix

Not all videos allow caption downloads by third parties. Some samples that do:

Videos

- [How Turbochargers Work](#)
- [Camera Review](#)
- [Differential Equations](#)

Channels

- [3Blue1Brown](#)
- [Artificial Intelligence](#)
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