In-Video Search & Summarization

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In-Video Search: ***Existing Services***

Quantum Computing 101

Company Published 6/10/2017 by Marc Mroz

When computer science and quantum physics collide that's when you get quantum computing.

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@00:10 "computers attorneys and quantum physics climate for way static second."
@00:18 "lines the quantum physics local on the computer science express coming"
@01:31 "of making it impossible to separate that in a quantum state particles can even achieve "
@02:23 "what things believed that interesting and by quantum computing could come in"
@02:27 "handy quantum computers but nine-point-two bits"

- Microsoft:

  Using Deep Learning Microsoft provides the ability to search their content in Microsoft Stream. When searching for videos, Stream finds videos based on what is said in it.

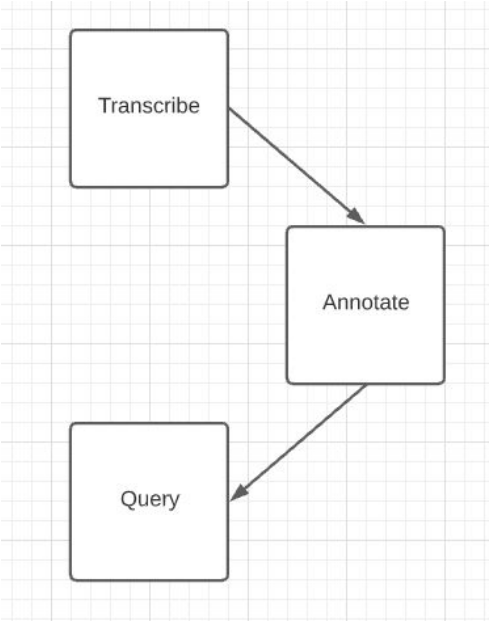
- Kaltura:

  They provide an enterprise video management system which performs a variety of microservices, one of which being in video searching.

- Searchie:

  An online platform for optimizing media content distribution. One of the many things it helps with is video searching, both using classical tag systems as well as machine learning based in video searching.

In-Video Search



General Approach:

1. Transcribe audio of video into text.

2. Timestamp text with where it occurs in video.

3. Search the transcribed text and then jump into the video using the corresponding timestamp.

In-Video Search: Optical Character Recognition

What is video OCR?

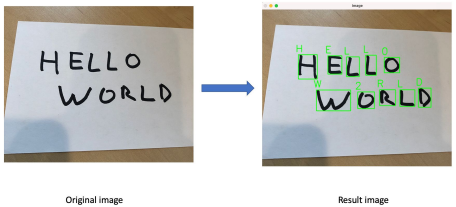
- A method of extracting text from video images/frames.

What types of video OCR are there that might apply to our project?

- **Intelligent Word Recognition (IWR) & Intelligent Character Recognition (ICR):** Cursive or handwritten texts. (suitable for handwritten notes)
- **Optical Word Recognition (OWR) & Optical Character Recognition (OCR):** Typewritten text recognition. (more suitable for documents)

How does OCR work?

1. **Pre-processing**
2. **Character Recognition:**
   a. **Matrix Matching:** Compares stored glyphs with character images
   b. **Feature Extraction:** Recognizes text features such as loops, lines etc.
3. **Post Processing:** Running output through lexicons, NLP and Database lookups



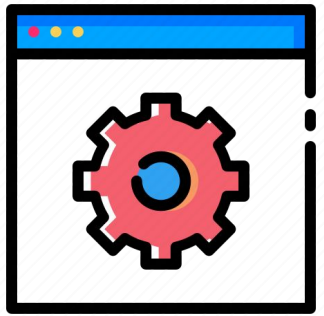
Original image Result image

In-Video Search: Automatic Speech Recognition

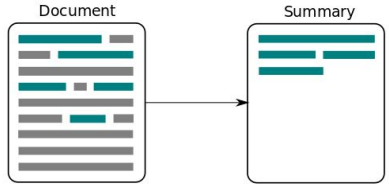
- Transcribes the words that are spoken in a video to make them searchable.
- An independent, machine-based process of decoding and transcribing oral speech.
- Analyses sound using a pattern, model, algorithm -> produces output in text.

In Video Search: Improvements & Optimizations

- Multi-language support - allow user to use ASR to any particular language.
- Combining slide/video OCR with speech recognition transcription.
- Removing stop words from the transcribed text.
- Using stemming to increase the number of hits per query.



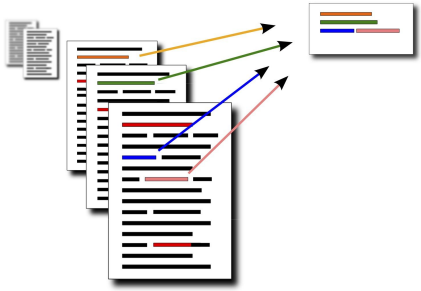
Video Summarisation: Query Based Summarization



Why?

- Reflects user's interests.
- Separates the text to a set of sentences.
- Extracts main sentences from the text based on the query.
- Checks redundancy - groups similar sentences and pick the best sentences from that group in order to generate a more summarised form of text.

Video Summarisation: Query Based Summarization



How?

- Evolutionary algorithm:
  - Score and group sentences by similarity
  - Compute scores based on sentence, word weight and location and group
  - Generate summary from best scoring groups
  - Repeat using summary as query
- Scoring fitness function

Questions?