**Introduction:**

We are increasingly shifting to video based learning. Due to the sheer volume of the videos that are publicly available online it is possible to find a video in regards to any query. There are more platforms such as Udemy or Coursara that are showing up where one can learn almost anything for free from the people who are at the forefront of their field. We can even feel this change in our university with the recent motion of all lectures being recorded.

However with this increasing surge of video data there has not yet been an effective way to navigate them for information that is specific to a particular query within a given context. This project tries to target the issue searching inside videos and producing videos for relevant content.

This has traditionally been a hard problem in computer science, mostly because of the ambiguity around the idea of a relevant topic. The second reason is that there is no well-defined database that’s available with videos that are correctly tagged at various points and two videos that talk about the same content might be completely different.

This project targets the problem of topic segmentation and the creation of the database of tagged videos, which is called a Pygmalion. It targets the former with the introduction of an idea called a Snippet. The latter is resolved by it synthesizing videos of its own through a process called sniffing in regards to a query and then comparing its performance with a ground truth dataset to be able to perform unsupervised classification.

For this project I have implemented a very basic version of the whole system which serves to act as a scaffold for further improvements as well as a proof of concept. Further research can augment the structure by expanding on the relevant ideas mentioned in the report.

**Implementation:**

For this implementation we consider a paragraph to be a snippet. We first break down the videos in out ground truth dataset into smaller sections that correspond to each paragraph. Each paragraph is then converted into a stem cloud.

As we get a query we convert that into a stem cloud as well and using the similarity in stems and lemmatization we try to find the closest paragraphs to the query and then rank them. We then decide on a threshold and cut off the paragraphs at that point. Then the corresponding videos are converted into a montage.

Now we take a new video and find its relevant transcription using Watson. Then that transcription is segmented into paragraphs using the text tiling algorithm. The same process is then repeated to create a montage.

The montages are then compared to one another using their stem clouds for similarity giving us a percentage accuracy.

We now try and move a level of abstraction higher in which we implement the Bayesian topic segmentation for both the transcripts and use that stem clouds to compare similarity.

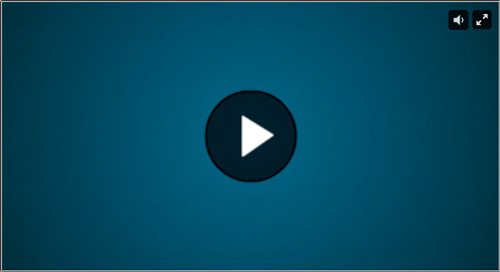
Another layer of abstraction higher uses object recognition using Velora within the video and uses these labels in addition to the stem cloud to compare similarity.

Since our corpus consists of TED talks for the third stage of our implementation we use object tracking in addition to our system to find a correlation between shifts in body language, camera angle and the break between paragraphs. A neural network is then trained on all these information so that the montages for machines are as similar to the montages for humans.

The unsupervised method would then come across a new lecture and preprocess snippets for it. Upon a query it will create a montage to answer it.

In the real implementation of it humans will have the option to select subsections from lecture content and put it in their pool of videos for a given topic. As people create their personal montages the system learns further by creating an equivalent one therefore improving its performance.

With further use the system can become an artificial intelligence personal tutor that is catered around each student, because each student have their own personalized video notes.





**Regularization**

The user can just highlight a timeline and right click to save it under a particular note. The can do the same with subtitles or any slides that have been featured in the video, in either case the neural net at the back will be creating a montage.

Outside the preview of academia we can imagine that as robots begin to identify objects they can pool into a series of stories to also get a semantic context for it. The AI behind our system would have been trained to do this more pragmatically and can do so with documentaries or youtube videos for the real world.

Once can then imagine a link between natural language and video processing. This could then allow robots to tap into the snippet space for a given location and respond to verbal commands seamlessly, as a result of which it resolves another hard problem in robotics.

The applications of a snippet space stretch further. Recently scientistX created a program that can create 3d models from 2d images based on google search. One then then imagine summoning 3d virtual worlds based on language comprehension and then refining them to make it seamless to base reality.

As the teaching AI improves and these systems are also integrated with robotics, you can imagine that we position ourselves at the heart of the job paradigm. The same way they learn they will be able to create. Describing an idea and then refining it to a few stages would be all it takes to then dropship it to completely automated systems and then release the hardware to crowdfunded platform which would then show it to the targeted audience.

Having established this on a planetary level with earth credits we can create a global economy where everyone’s voice can be heard and people have a chance to grow themselves to their fullest potential and create things of value.

The idea of the snippet space can then be improved with my theory of qualia spaces and axiomatic software, which would them mechanize the whole system on learning and creation under an axiomatic framework.

Once this is done we can then merge with this collective mind and transcend the human experience into becoming a new species and joining our friends among the stars.