**Name**: Larissa Basso

**Class**: Senior Design Project

**Professors** : Pablo , Simha

**Date**: October 1st 2019

**Title : QA classifier Proposal (writing 1 Revised)**

Multimedia usage has increased significantly in the past decades due to the fast-technological development and the popularity and intense usage of the internet worldwide. Thousands of videos are uploaded and viewed on a daily basis. For instance, on YouTube, a video-sharing website, “the number of online video platform viewers will amount to 1.86 billion in 2021, up from 1.47 billion in 2017.”(Clement j., 2018). Despite the intense use of multimedia, the number of software or systems that provide multimedia classification and analysis in certain well- needed areas are little to non-existent. For instance, the educational system still heavily relies on its traditional teaching techniques which do not provide the best learning tools to students. Few school systems provide video lectures for courses. Great concepts or techniques are often discussed in office hours, but such knowledge is not available to students that could not physically attend those sessions. Additionally, “96 percent of U.S. internet users aged 18 to 24 years accessed YouTube”.(statistical, 2019).In other words, adult-aged students are the main YouTube streamers. Although, the internet is filled with an excess of information, students often waste time to find videos with contents similar to those covered in classes. The solution to these problems is the implementation of the QA classifier.

The QA classifier is a system which allows video and media input and classifies those videos or media based on their contents. The QA classifier enables the user to easily search information based on keywords or uploaded images. The system also provides web links relevant to the data searched. This system will facilitate learning by significantly reducing the amount of time students spend searching for media relevant to their coursework. Researchers have found that “people retain only 20% of what they hear, 40% of what they see and hear, and 75% of what they see, hear and do (Reisman, 1994)”. The QA classifier will enable students to review course materials and efficiently prepare for exams. Students could also access media shared by professors from other classes or schools. This is a great tool for distance-learning students because it enables them to share the same experience as those students on campus. The QA system applies to areas other than academia. For instance prisons record all telephone conversations and store those records in a database. Unfortunately, those records are not reviewed or interpreted in a daily basis. Major prison incidents such as prison scams often leads authorities to analyze stored records to either determine patterns or newly codes created by inmates. The record review process is time consuming and requires an intensive use of employees.Therefore,, with the QA classifier, the contents from those phone records will be classified under different categories and authorities can search for conceptual videos. The QA system is applicable to a wide range of fields which need, utilize, or store multimedia from the police to companies monitoring their employees’ telephonic interactions with the company’s customers. However, the complete implementation of the QA classifier will only be possible with financial support from investors.

The QA classifier is a great program that will help increase efficiency and productivity. Nonetheless, besides the financial support needed for its implementation there are a few technical aspects that might slow down the implementation of the QA classifier. Some difficulties foreseen with this project are providing an accurate audio to text translation, media classification, and image processing. The difficulty in the audio to text translation section is the accuracy of the translator to provide an accurate translation of audio spoken with people with strong accents or those with vocal cord problems. Media classification can be difficult especially with mispronounced names or incorrectly enunciated words. Classification is another foreseen difficulty as the system needs to be trained to automatically categorize videos specifically to a field. Image processing might become problematic in the processing of graphs or images of illegible handwritten texts. Those problems are solvable. Finally, the QA classifier, is a great system which needs to be funded because it will not only revolutionize teaching and learning in both an academic and professional setting, it will also be a great tool usable by a wide range of fields to improve work efficiency and reduce the manpower needed to accomplish tasks.

Citation:

Clement J. 2018,<https://www.statista.com/statistics/805656/number-youtube-viewers-worldwide/>

Statista, 2019, <https://www.statista.com/statistics/296227/us-youtube-reach-age-gender/>

Rachell Kim (Team 11)

10/02/19

Writing 1

QA Classifier

One of the most concerning issues within the teaching community is the difficulty of communicating complex concepts to general student bodies. From homemade lecture videos to notes written on tablets during class, instructors often seek to increase the variety of course material available online [1]. In a world where instructional material is rapidly being digitized, it is imperative to keep students engaged with the right form of media in mind. One type of instructional method that has yet to reach its full potential is video learning. The incredible success of platforms like Khan Academy signaled a great demand for minute-style instructional videos. Hitting ten million unique users in February 2014, the significant uptick of user traffic on the site has been described to have changed the landscape of education and educational platforms [2]. Likewise, Youtube has installed a sub-section specifically dedicated to educational materials in 2018 in response to user demand [3]. However, a consistent bottle neck across all video-sharing platforms is the inability to reduce the time spent looking for specific spoken topics and subjects within videos. As a result, our team proposes to develop an upgraded video searching system which parses and classifies segments of recorded instructional videos for users seeking quick and relevant information, ultimately aiming to optimize and streamline the process of online instructional learning through video and audio mediums.

As students who often engage in the use of multimedia for educational purposes, we recognize that the greatest challenge in learning through recorded instructional videos is the task of finding the exact location of relevant topics. Our system, called the QA Classifier, seeks to not only categorize video material by subject, but also provide time frames in which relevant keywords and topics are spoken. The idealistic instructional platform for recorded video and audio materials should not only return relevant results to the user, but also provide precise times in which certain subject matters are discussed. Because office hours typically take place in spaces that are inaccessible to students who cannot physically attend, instructors are often met with the tedious task of reiterating explanations for multiple students within the same class. Additionally, lectures and review sessions tend to happen in lengths of time that are not considered concise. For these reasons, our system seeks to retain spoken information discussed during office hours, lectures, review sessions, and other educational spaces in segmented video forms such that both students and instructors can easily search for questions and answers pertaining to their class. Menial details such as topic, search terms, and tags should not be required on the part of the user during the video upload process, but instead automated by the application for the purposes of streamlining the practice of uploading recorded instructional material online. Implementing such a system will require machine learning techniques, a web framework, and a method to store the uploaded materials. Prototyping this system can be achieved by employing open-source application frameworks such as Angular and Flask. This can be easily built using existing developer platforms today.

While the implementation of our system requires a relatively average combination of existing methods and frameworks, the return value is great. First, there exists no centralized system to fluidly identify audio content within videos and output relevant segments. Second, creating such a system would significantly reduce search time spent on looking for resources within lengthy clips in addition to reducing the time spent including searchable tags on the point of view of the instructor who chooses to upload videos. Some of the technical challenges associated with building our application include implementing the proper machine learning algorithm to correctly classify videos within the system and ensuring the fluidity of our user interface. Applying an algorithm of low accuracy will slow down the classification of audios and videos within our system and create more difficulty in searching for the right instructional material. Moreover, an unfriendly user interface will discourage video use and defeat the purpose of our mission. Because our system requires large sets of data to improve the accuracy of the machine learning algorithm, our system will ultimately require funding for successful completion. Despite these challenges mentioned above, we are confident that the integration of our working system into every day instructional courses will significantly increase productivity and engagement within the classroom. With enough support from investors and the development team, the QA Classifier may have the chance to bring the practice of learning through educational videos to its best potential.

Works Cited

[1] “The digitization of the classroom,” *Education Dive*, 17-Jul-2018. [Online]. Available:

<https://www.educationdive.com/spons/the-digitization-of-the-classroom/527576/>.

[Accessed: 10-Sep-2019].

[2] “Research on the Use of Khan Academy in Schools: SRI International,” *Research on the*

*Use of Khan Academy in Schools | SRI International.* [Online]. Available:

<https://www.sri.com/work/projects/research-use-khan-academy-schools>. [Accessed:

10-Sep-2019].

[3] P. Nast, “Youtube for Educators,” *NEA*. [Online]. Available:

<https://www.nea.org/tools/lessons/50803.htm>. [Accessed: 10-Sep-2019].

Weiming Long

The Internet has become irreplaceable in the field of education that it grants access to everyone with its huge amount of resources. It’s simple for educators to record videos of different fields of study and post them on their YouTube channels as well as other educational videos website. Both teachers and students can benefit from these videos for research purposes and individual study. Websites like YouTube, Khan Academy, MIT OpenCourseWare, and many other educational websites grant everyone easy access to study from millions of educational videos. Several meta-analyses have shown that technology can enhance learning, and multiple studies have shown that videos, specifically, can be a highly effective educational tool. However, with this exponential growth in the number of educational videos, one can find it overwhelming to find a suitable and effective video to study from. The name of our project is called QA Classifier and our purpose is to make a study using online educational video resources.

As a team of college students, we all have been watching videos to tackle difficult problems during our study. Since there are so many educational video resources we can access, it sometimes seems inefficient and time-consuming to find the video that we need. It seems almost impossible for us to choose from so many educational videos websites and so many video websites. A good classification of different topics should be added. The other thing that’s always annoying to us is that many educational videos can be as long as one and a half hours or more. Traversing through the video to find some specific key points is just challenging as finding needles in a haystack. Forwarding the video too fast can easily skip the key points we are looking for while forwarding slowly will be too time-consuming and exhausting. These problems of using current online educational video resources really lowered our productivity and this is the main reason why we want to bring new changes.

In order to use those online resources in a better way, we plan to build a QA classifier that can analyze educational videos and make specific knowledge points much easier to find. Our system is going to be capable of doing audio to text conversion. We first need to let our system to access different educational videos and take out the audio part from those videos. It would also be tricky to convert audio to text precisely due to frequent occurrences of terminologies from different subjects. The clarity of the audio and background noise are crucial problems that we need to solve. After getting scripts from different videos, searching for specific key-terms in long educational videos will be much more accessible. Other than just converting audio to text, our system will also utilize machine learning to mark different key-terms and classify them. It’s a challenge for us to train to system how to identify which words are important and will be searched for. There will be many redundant words that exist in the script. We will implement our algorithms to make the system to identify terms like “Singular Value Decomposition” that belongs to intermediate Linear Algebra. Our system will also use machine learning to analyze the topic and description of the video to make tags and keywords to make classification more accurate. The machine learning part would require a lot of computing power such that we plan to use cloud computing services to achieve our goal. We are going to generate an enormous amount of data that we are also going to build a well-designed database to store our results. The database will have unique IDs for different videos and their links. For each video, there will be tags and keywords for classification as well as the time of some terminologies’ occurrence time. The UI of our system will be user-friendly such that users can search for different subjects and keywords and have the video player right in the middle. The occurrence time of specific keywords will be interactive that users can just one-click to go to the point in a long video. Our system will dramatically increase the productivity of every learner and which is a positive impact on our society.

Our system proposed by the above plan will bring huge benefits for students and those who want to extend their knowledge. Finding the right educational video and even specific part in that video will make online learning much more efficient and effective than ever before. This system can go even further into different fields to extract and classify information from videos. Our system will benefit not only students but also every single person in our society that want to seek knowledge. We need your generous funding to support our server and database running. Please consider funding our system for better education for our society.

Comparison with similar projects:

The QA classifier as defined in writing 1, is a video and audio classification system that classifies a video based on its content in a database. Over the past decades, constant research and studies in the field of Machine Learning and Artificial Intelligence have led to the creation of a multitude of software similar to the QA classifier that provides video and audio analysis and classification. However, software that provides the same functionality as the QA classifier have yet to be found.

Although our system can be applicable in many fields such as Human Resources, and interviews, its main focus is in Education. Software that provides functionalities similar to those of the QA classifier has applications in many fields including sports, government, and financial institutions. For instance, Kinovea is a software company whose core missions relates to the study of human motion through capture, observation, annotation and measurement.

Similarly to the QA classifier, kinovea provides a database where users can upload videos online and after throughout analysis. The software classifies the uploaded videos into different categories to enhance the user’s search experience. Kinovea, does and in-depth imagery analysis of videos. Kinovea is used in sport to provide feedback on sport performance among athletes. For example, in a video with an athlete weightlifting, Kinovea analyzes the images and provides an analysis of proper weightlifting techniques. Kinova adds “basic annotations like labels and numbers, lines and arrows, curves, multi-line paths, rectangles, markers, freehand drawings” (MISSING CITATION).

The QA classifier and Kinovea differ on the type of data utilized for the analysis. While the QA classifier utilizes, audio data from videos, kinova utilizes videos image data.

Another software with functionalities similar to our system is CallRail. CallRail analyses and interpret recorded phone conversation to provide companies valuable information on the state of sales and service organization [1]. Companies that provide telephone call services are in the constant need to improve customer satisfaction and service quality. Callrail filters Calls by Duration, utilizes call tags, and sorts calls by Agent. All those implementations help in the feedback process and employee training leading to proficiency and effectiveness improvement then greatly helping a company revenue . The QA classifier implements those same functionalities. Uploaded video lectures in our system transcribes audio into text, and based on the Machine Learning and text analysis algorithms used, videos will be tagged automatically and classified by topic.

Because our goal is to improve the education system, the video will be tagged based on specific topics within a class. For example, instead of a video being categorized as operating system, each video will be specific to particular topics in operating system such as synchronization, C - programming and so on. Many concepts can be covered in a lecture. Therefore, our system will be able to label fragments of a video where a specific topic is mentioned. If a Biology lecture was uploaded in our system and in that lecture, the professor could talk about many topics among which the theory of revolution. If a student was to search for the theory of revolution, instead of going through a lengthy Biology video, the system will return the time frames from videos in our system where the Theory of Revolution is mentioned starting from most relevant to least relevant video.

Currently, there does not exist a software similar to the QA classifier in the education system. As shown, above, there are companies that implement similar concepts and ideas as us but with a focus not in educational system and do not provide all the functionalities our program provides. The QA classifier will greatly improve efficiency and productivity in the educational system. The implementation of our system on a daily basis in the educational system will make the life of students and instructors easier. Instructors will not have to repeat their explanation of the same concept every time or manually tag all the videos uploaded online. Student will be efficiently learn the materials covered in class and easily review exams.

**Work Cited:**

[1] “How to Analyze call recordings”CallRail, September 22 2016,[Online].Available: [**https://www.callrail.com/blog/how-to-analyze-call-recordings/**](https://www.callrail.com/blog/how-to-analyze-call-recordings/)

[Accessed: 23-Sep-2019].

Target Audience:

Video has become an important part of education. It is integrated as part of traditional courses, serves as a cornerstone of many blended courses. Our system’s main target audience is all kinds of students. Nowadays, students from different age groups tend to make use of new technologies to enhance their study. Internet services and portable devices like cell phones and laptops have become so common in students’ daily lives. Besides using the internet for social and entertainment purposes, using the internet for learning has also become more and more popular among students. There are tons of educational video resources online throughout different subjects and fields that can surely be used to extends one’s knowledge. Those educational video resources range from homemade videos, lecture recording posted by instructors as well as open courses from different universities. We, as college students, have always been facing the situation when we didn’t quite understand some specific topics covered during a lecture. As we want to study that specific topic, notes taken during lectures are not enough. Then online educational video seems to be the best solution to tackle the difficulties. However, finding a suitable video is time-consuming that there are so many different websites and instructors posted their videos and one specific topic is like a needle in a haystack in so many hours-long videos. Our system seeks to provide an optimal experience in finding a suitable video that will dramatically reduce the time spent on finding educational videos thus increase the productivity in the study. Our system will meet most student’s needs for an easy and efficient way to find the right timestamps in those long videos thus it would be popular among students that are looking to make use of online educational video resources.

On the other side, as the online educational video market is booming, the remote teaching opportunities are also expanding exponentially. Educators can also be using our system for uploading their videos to share their knowledge. Videos uploaded from educators will be analyzed and classified by our system for the student to access them. There are many educators who have posted their videos on YouTube that couldn’t get many views. Our system is going to provide those educators with a better platform and will encourage them by paying those educators who are making high-quality videos that are useful to student users. With our plan targeting both students and educators, we need to have a good business model to make our system work.

To make our system free to every student, our system’s business model is going to be an optional subscription business model that customers are going to pay a recurring price at regular intervals for getting premium access in our system. The access to our system will be free for everyone as it would be more preferable by most students. We are making our system free since it will certainly bring positive impacts to our society. With students having better education, we will have a more prosperous society and social welfare. There would also be a subscription option to get premium access to our system which will get all the ads removed for a better experience. We are going to use the profits from premium subscription to reward those educators that are making useful and helpful to our student users. This will become a benign cycle that educators are going to produce more high-quality educational videos while the profits from premium subscriptions are going to be used to rewards those video creators. How will you create awareness among your target audience?

Social and Global Impact:

One of the most important outcomes with the rapid development of technology is that it allows for the creation of tools and devices that save large amounts of time [1]. Although many different sub-fields of technology have significantly improved in time-saving abilities within the last few decades, searching through the contents of videos is a process that has always lagged behind in advancement. Our QA Classifier application seeks to address this issue through an implementation of video parsing centered around educational videos. Just as we are able to perform instant search operations of keywords through text documents using a few keyboard commands, our system has the potential to speed up the process of searching for specific words contained inside video contents with the click of a button. More importantly, the QA Classifier is meant to revolutionize the way we approach the use of video and audio mediums in the field of education. The use of instructional learning through video is still considered quite traditional or absent throughout many educational institutions; instructors will often upload lengthy clips of lecture which requires students to spend a significant amount of time searching in order to find topics of interest. Despite the growing number of institutions incorporating the use of video and audio mediums within their classrooms, the challenges associated with its use is often the same. If implemented correctly, our system can accelerate the process of learning through video and audio mediums by enabling wider and more convenient online access to specific instructional material made by instructors through recordings. With this new system, instructors will then have the opportunity to direct students to large records of topics discussed within lectures, office hours, and review sessions, and the students, in turn, will have the tools to search for specific keywords within these videos without spending significant amounts of time searching through them. This process, we hope, will place more emphasis on swift learning and information absorption through video and audio mediums rather than emphasis on searching and scrolling through material online.

TransitionSince our system is built as a web-application, the QA Classifier may be available to any student or educational institution that has internet access. This is a wonderful characteristic of our application as it does not limit the use of the system to specific communities. Foreign institutions that wish to incorporate accelerated learning through video may choose to use the QA Classifier on the web. Furthermore, because our system is meant to capture most of the information shared within closed educational spaces on a given educational setting, it has the potential to greatly improve the experience of distance learning students worldwide.

Although our system is specifically centered around educational development, the invention of this system will have greater implications in the worldwide realm of technology. The QA Classifier has the potential to be applied to any system which incorporates the use of a large database of recordings. If applied in another context, the system’s algorithms can be trained to pick up keywords of interest of a different field. For example, presidential candidates are known to receive widespread media coverage through live interviews and debates but often fluctuate on their stance over certain issues [2]. Our system can be used to search and organize recordings of presidential debates, interviews, and speeches to look for the use of certain key terms such that the analysts do not need to spend large amounts of time searching through all the videos to look for a specific response. The QA Classifier has the potential to be a powerful tool, and thus there may be a few negative repercussions if used incorrectly. Because the QA Classifier is dependent on the data over which it is trained, feeding the algorithm incorrect or falsified data can produce a faulty system. However, because the QA Classifier is meant to only find the key terms and its synonyms inside the videos rather than to attach meaning to the clips, we predict that misuse with our system alone will be rare and will not require significant regulation. Overall, the QA Classifier has the potential to be an extremely useful and versatile tool because of its ability to parse and classify video and audio mediums, and while the general framework of our system may be applied to other fields to support the classification of non-educational recordings, our team hopes to increase the impact of educational learning through video by using our application worldwide.

Works Cited:

[1] L. Dormehl, “Technology has given us more time than ever … to waste on technology,”

*Digital Trends*, 23-Feb-2018. [Online]. Available:

<https://www.digitaltrends.com/cool-tech/does-tech-really-make-our-lives-easier/>.

[Accessed: 02-Oct-2019].

[2] “Political Candidates Don’t Always Tell the Truth (And You Can’t Make Them),” *The Pew*

*Charitable Trusts.* [Online]. Available:

[https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2019/03/21/political](https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2019/03/21/political-candidates-dont-always-tell-the-truth)

-[candidaes-dont-always-tell-the-truth](https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2019/03/21/political-candidates-dont-always-tell-the-truth). [Accessed: 02-Oct-2019].