DATS 6202 – Machine Learning 1

Summer 2019

Facial Recognition Algorithms

Final Project Proposal

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What problem did you select and why did you select it?

We selected facial recognition which is a technology used to identify a person by scanning and mapping their facial features using a computer.

It works by creating a geometrical map of the unique facial features of a person such as wrinkles, texture, shape, position, and distance between points in the face. This technology is mainly used for police and law enforcement purposes.

We can also find this technology in popular social media platforms and apps such as Facebook, Instagram, Snapchat and the latest craze Faceapp which can predict accurately how a person will age.

What database/dataset will you use? Is it large enough to train a deep network?

In the beginning of 2019 there was an academic event which was presented at a think tank in Washington D.C. called: How China and the U.S. are advancing artificial intelligence?

At the event it is mentioned how AI is being deployed by United States and China, what are the new developments, opportunities, and risks.

One of the biggest areas of advancement has been in facial recognition. This type of identification is currently being used for the police for safety and control purposes.

Additionally, one of the speakers mentioned that for the year 2020, China is going to have 450 million surveillance cameras in place. Now they are using recognition based in how people walk which is in addition to facial recognition.

Giving that information and everything that is happening in facial recognition, we would like to study and research about how this technology works. We also would like to implement the appropriate algorithm to try to identify images.

Also, we are interested in learning about the limitations of facial recognition that creates big problems with identification such as low-resolution images, movement and tracking, facial expressions, different angles of the face, change in style such as glasses, hats and facial hair.

What database/dataset will you use? Is it large enough to train a deep network?

We will create our own data set having 3 classes called “Cristina” and “Gregg”. We’ll create data sets from different angles and different lighting to create a large enough and diverse data. We are also open to feeding a dataset from other sources and identifying people from a video.

What deep network will you use? Will it be a standard form of the network, or will you have to customize it?

So far, we are considering using algorithms related to NN or K-NN. The following are some of the algorithms that we could use in this process:

- Neural Networks
- K-NN

However, at this point, it’s too early to tell because we cannot be sure whether we will have to customize the code or use the standard.

What framework will you use to implement the network? Why?

For this project, we will use Pycharm running over Anacondas and possibly OpenCv. The packages to be used are the following:

- Numpy
- Dlib
- Face_recognition

What reference materials will you use to obtain sufficient background on applying the chosen network to the specific problem that you selected?

- Rosebrock, A. (2018, June 18). Face recognition with OpenCV, Python, and deep learning. Retrieved from https://www.pyimagesearch.com/2018/06/18/face-recognition-with-opencv-python-and-deep-learning/
- He, K., Zhang, X., Ren, S., & Sun, J. (2016). Deep Residual Learning for Image Recognition. *2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. doi:10.1109/cvpr.2016.90
- Geitgey, A. (2016, July 24). Machine Learning is Fun! Part 4: Modern Face Recognition with Deep Learning. Retrieved from https://medium.com/@ageitgey/machine-learning-is-fun-part-4-modern-face-recognition-with-deep-learning-c3cffc121d78.

How will you judge the performance of your results? What metrics will you use?

We can judge the performance of the algorithm according to the of the identification of the image. Also, we are going to use the accuracy score to determine the precision and analyze the performance of the algorithm.

Provide a rough schedule for completing the project.

Activities	Week 07/22	Week 07/29	Week 08/05	Week 08/12	Week 08/20
Search DataSet					
Problem specification					
Problem understanding					
Proposal elaboration					
Code Planing					
Install libraries and packages					
Task2					
Task3					
Task4					
Task5					
Evaluation					
Testing					
Final Report					
Individual Report					
Presentation					

Resources:

https://www.lifewire.com/how-does-a-computer-recognize-your-face-4154178
https://towardsdatascience.com/an-intro-to-deep-learning-for-face-recognition-aa8dfbbc51fb