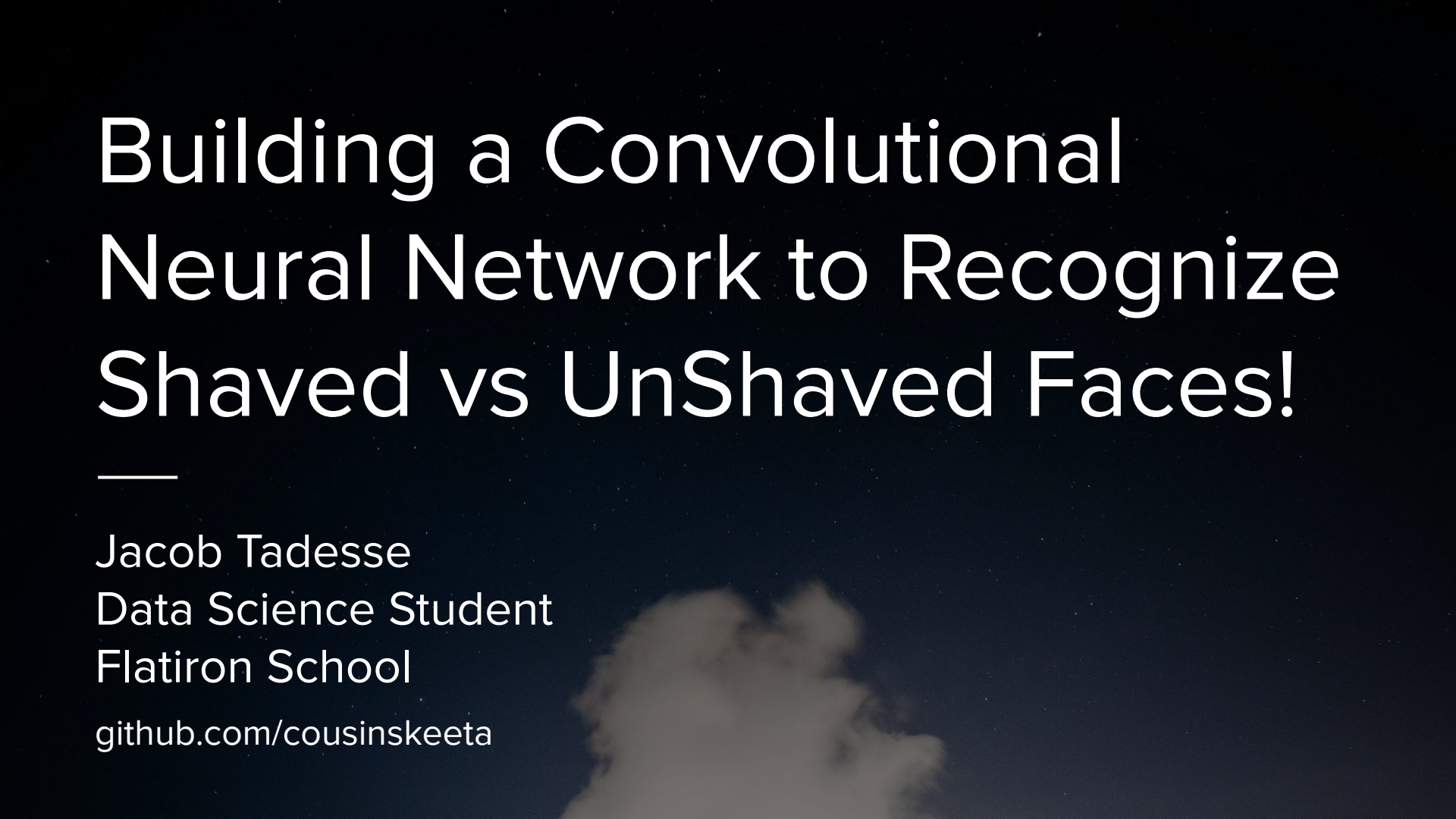
Building a Convolutional Neural Network to Recognize Shaved vs UnShaved Faces!

Jacob Tadesse
Data Science Student
Flatiron School

github.com/cousinskeeta



To Shave, or Not to Shave?

As everyone is stuck in the perpetual groundhog day loop, I find myself joining conference calls with no idea my beard had grown so much!

The hypothesis

By collecting images of Shaved and Unshaved faces, we can train a program classify faces as Shaved or Unshaved!

Research

The goal of my research is to classify faces that are shaved or unshaved using a Convolutional Neural Network and computer vision to create a baseline CNN model, to compare and deploy a pretrained model from Kera KGG16:

CRISP-DM Methodology

Cross-Industry Process for Data Mining.

- Business understanding
- Data understanding
- Data preparation
- Modeling
- Evaluation
- Deployment

Business Understanding

Stage 1

- In the virtual classroom, and some professional settings, facial hair is not allowed.
- This raises the question: **“Can we leverage machine learning and computer vision to detect facial hair?”**

Data Understanding

Stage 2

- In the virtual classroom, and some professional settings, facial hair is not allowed.
- I created a Python script to download stock images from Google Images, Unsplash, Pexels, and more to build a custom imageset.

Data Preparation

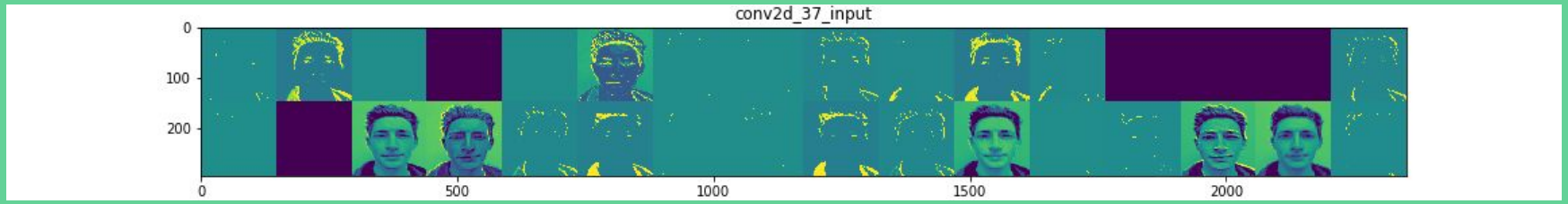
Stage 3

- Using Python and Selenium, I scraped various websites for images; converted these images into numbers; and stored the numbers in an table.
- With the help of two humans, we classified each photo as shaved or unshaved; removing photos that did not fit our guidelines.

Modeling

Stage 4

- To start, I built a baseline model to classify faces in images as shaved, or unshaved.
- Using transfer learning, I built additional models by tuning pre-trained models from Keras.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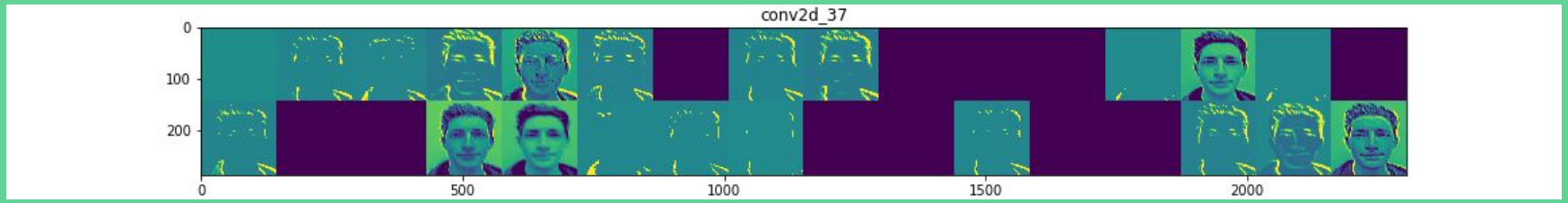
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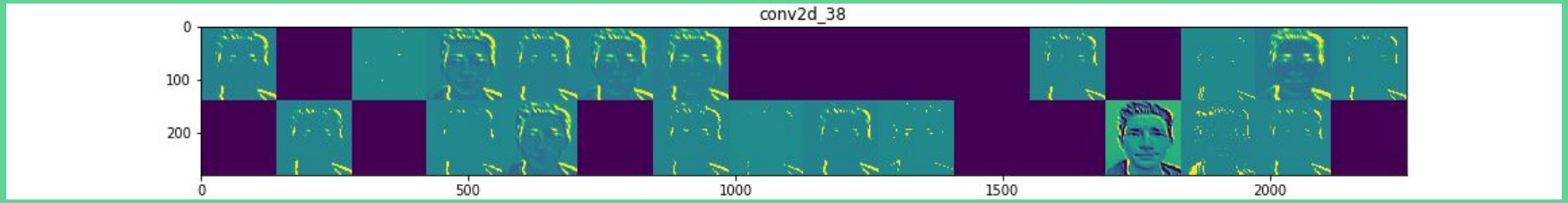
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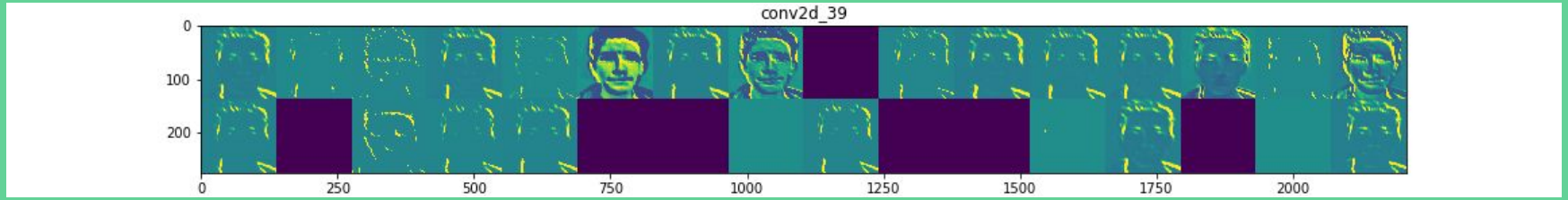
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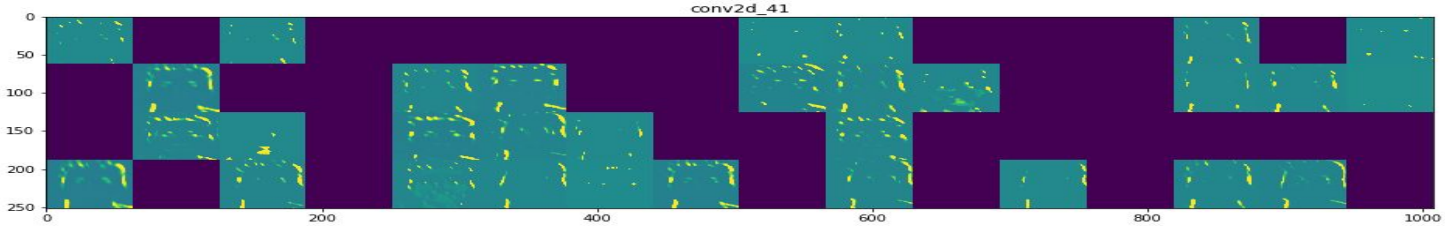
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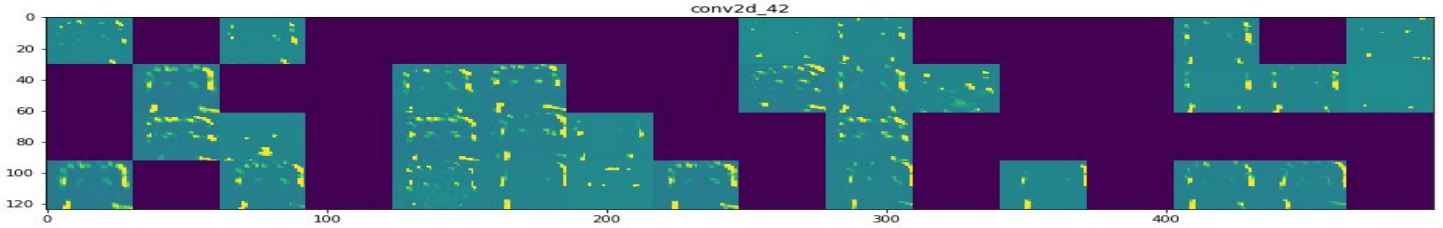
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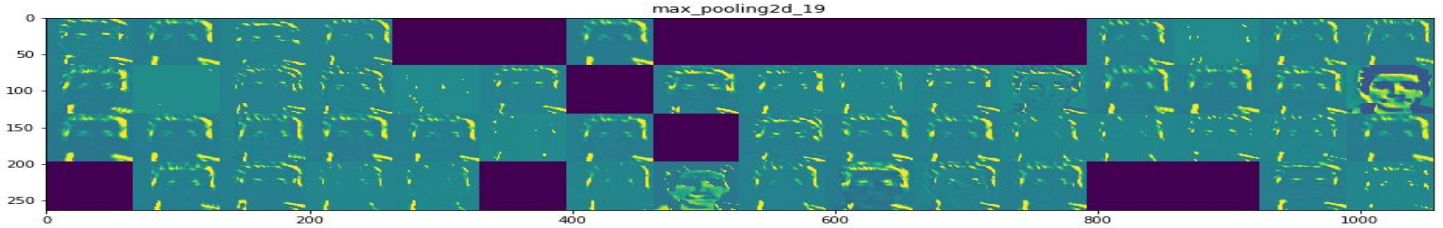
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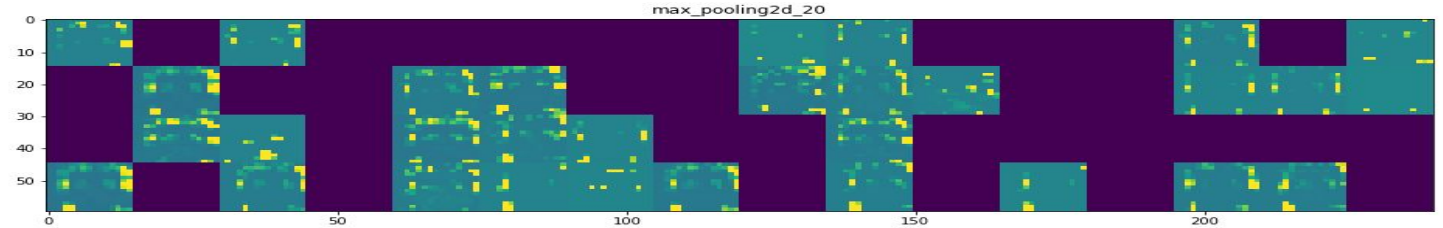
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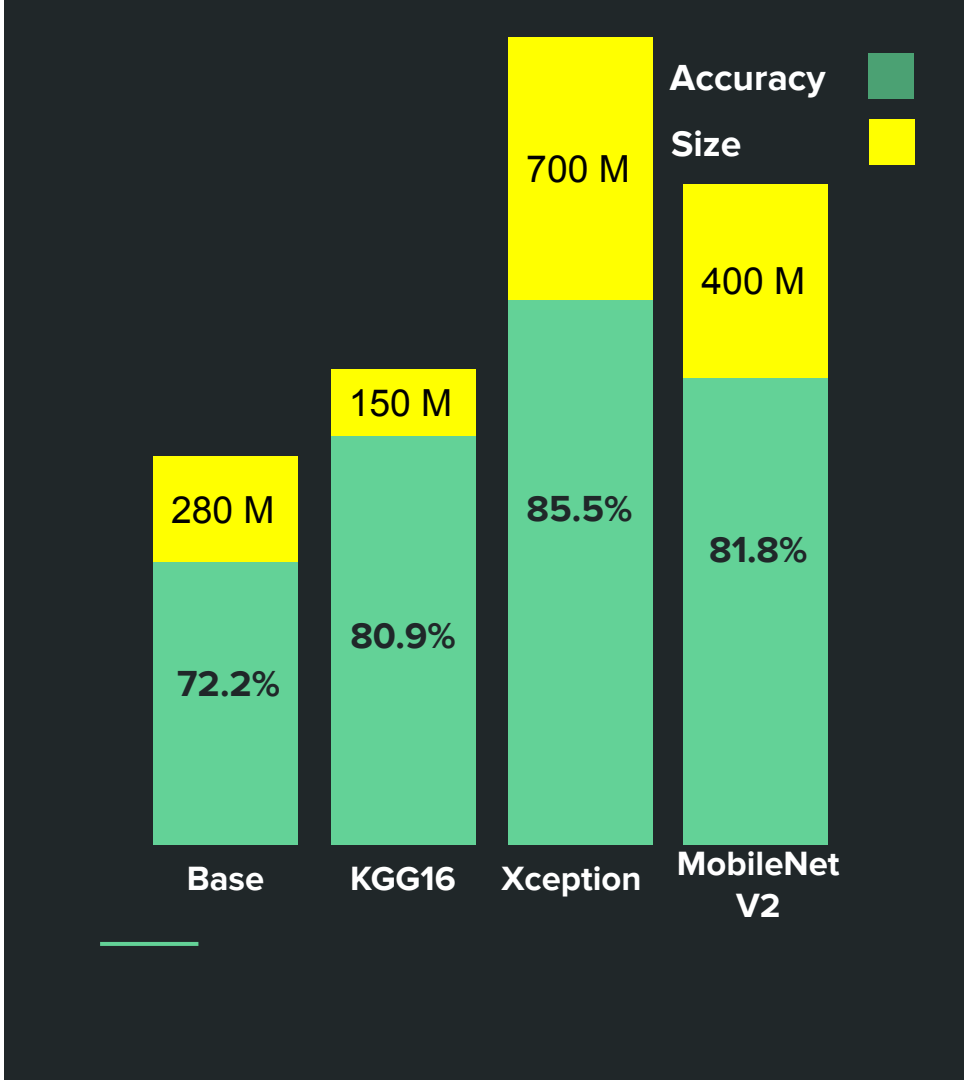
Model Evaluation

Stage 5:

Evaluating model accuracy and size



Deployment

1. I built an application for public interface using Flask
2. I deployed the application using PythonAnywhere.com
3. Check out the model here: jtadesse.pythonanywhere.com

Conclusion

I was able to train a program to classify faces as shaved or unshaved; we were able to deploy the model for public interface, providing the highest accuracy of classifications based on unseen faces in our study.

This model can be used by high school administrators to help enforce student policies requiring students to shave facial hair, while attending remote classes via video.

Future Work?

This model can be applied in workplaces with similar policies as they relate to facial hair.

This model can be improved or changed to detect anything in an image, like scarfs, caps, or any prohibited items at school or work.

This model can also be deployed using live video or photo feeds for an interactive experience.