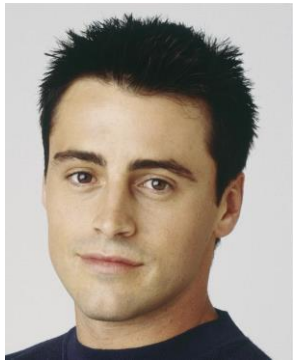
Final Project

Marie Lattelais
Data Analytics
December 16, 2019

Do you know these people?

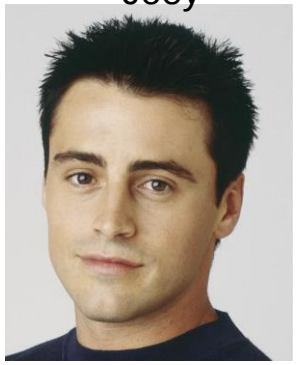


F·R·I·E·N·D·S

Rachel

Chandler

Joey



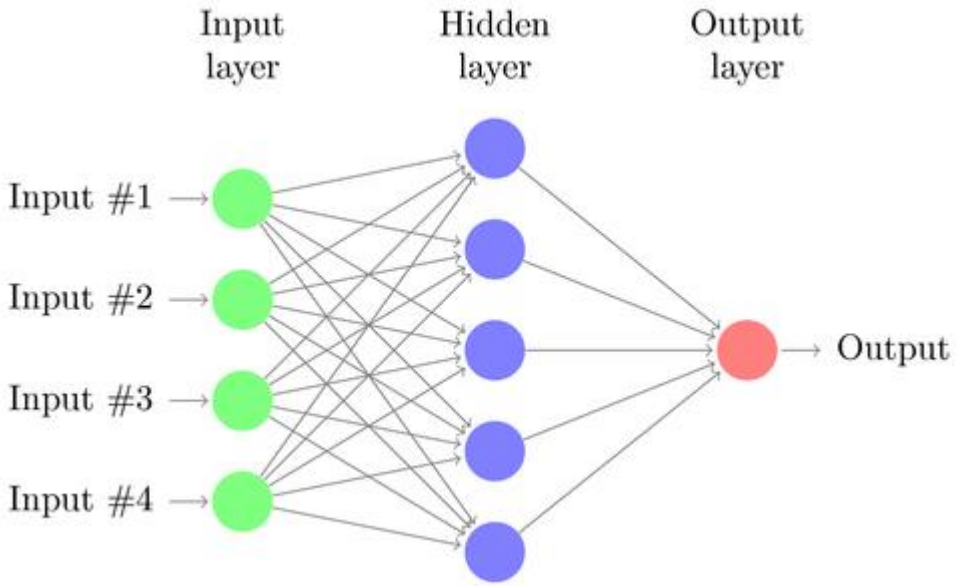
Phoebe

Monica

Ross

How can my computer recognize images?

Neural Network (NN)



First Approach: Building and training my NN

1. Prepare data

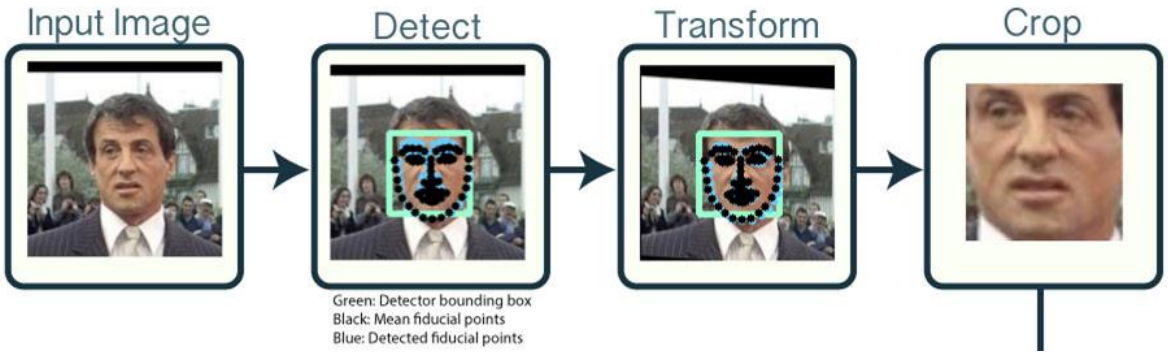
- Needs a big dataset:
  - Web Scraping images on IMDB

(BeautifulSoup)

First Approach: Building and training my NN

1. Prepare data

- Needs a big dataset:
  - Web Scraping images on IMDB
- Find and crop faces
  - Using already trained convolutional NN *(PyTorch, OpenCV)*

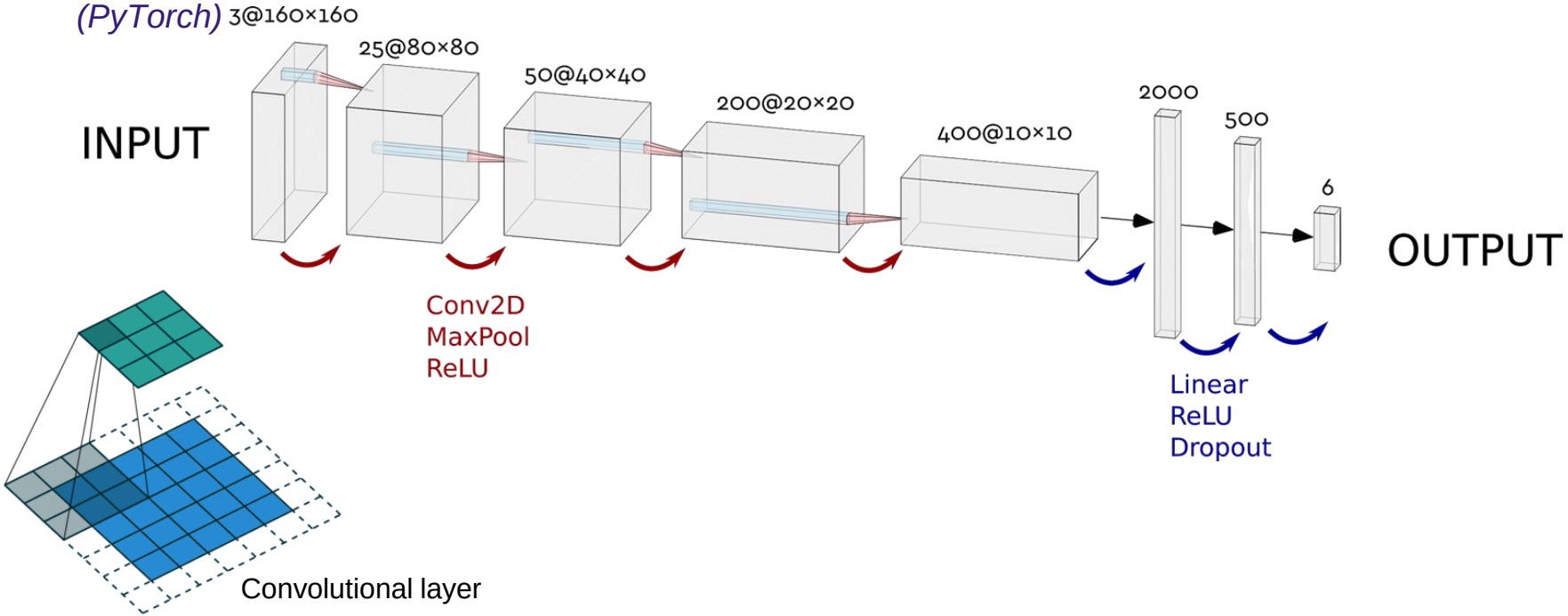


https://github.com/timesler/facenet-pytorch

First Approach: Building and training my NN

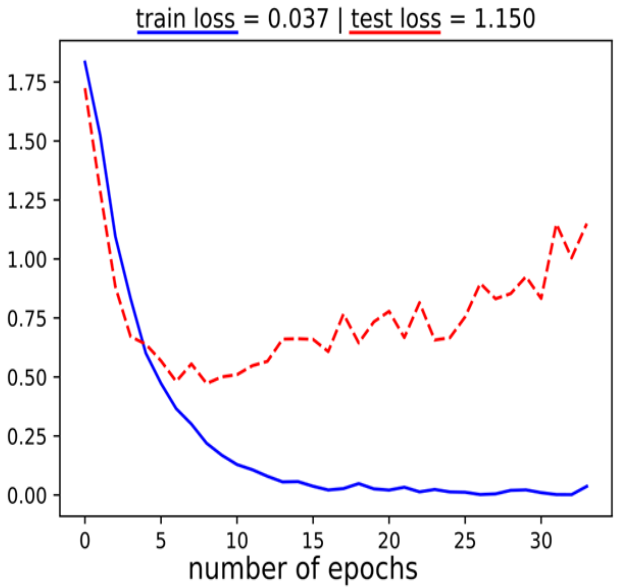
2. Build NN

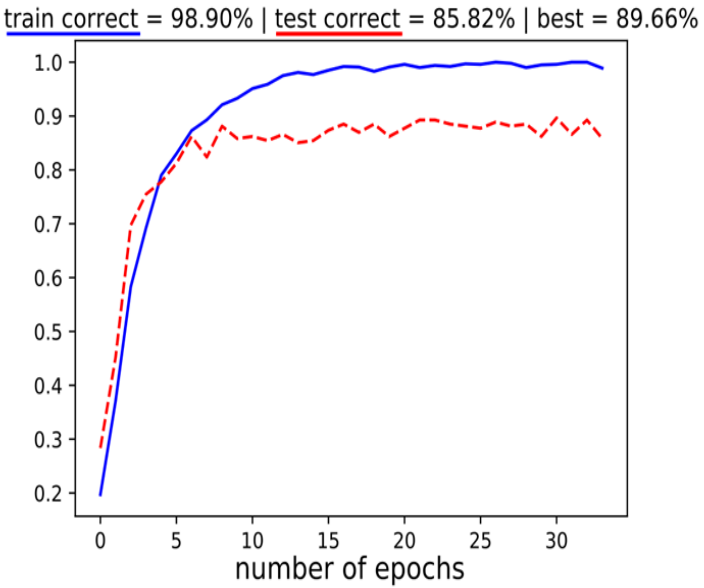
(PyTorch)



First Approach: Building and training my NN

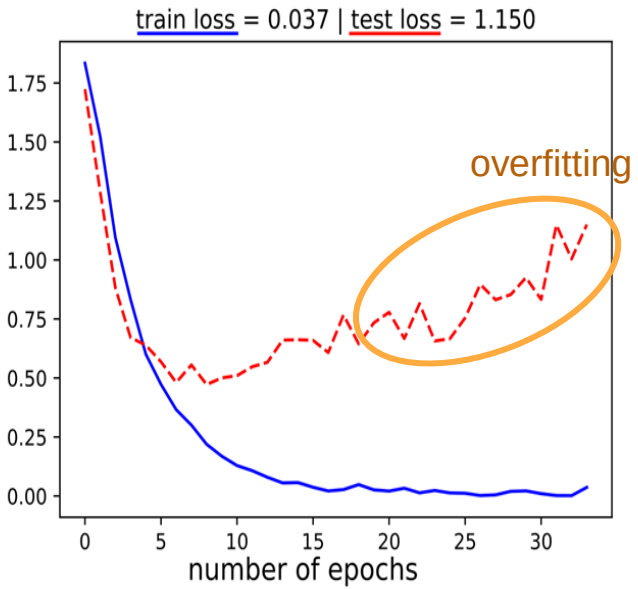
3. Train NN

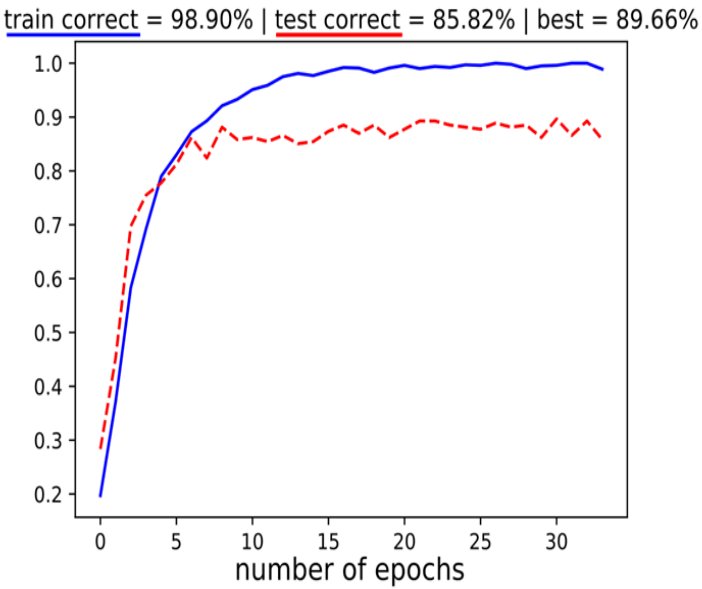




First Approach: Building and training my NN

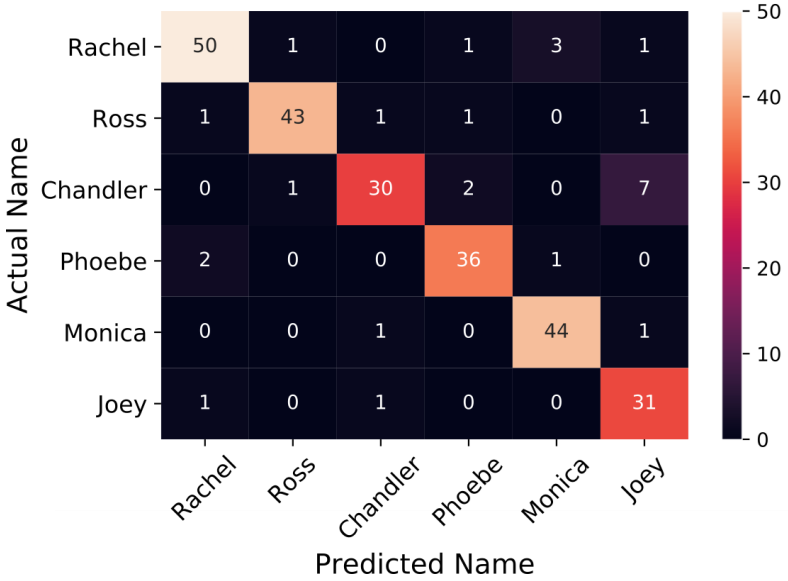
3. Train NN





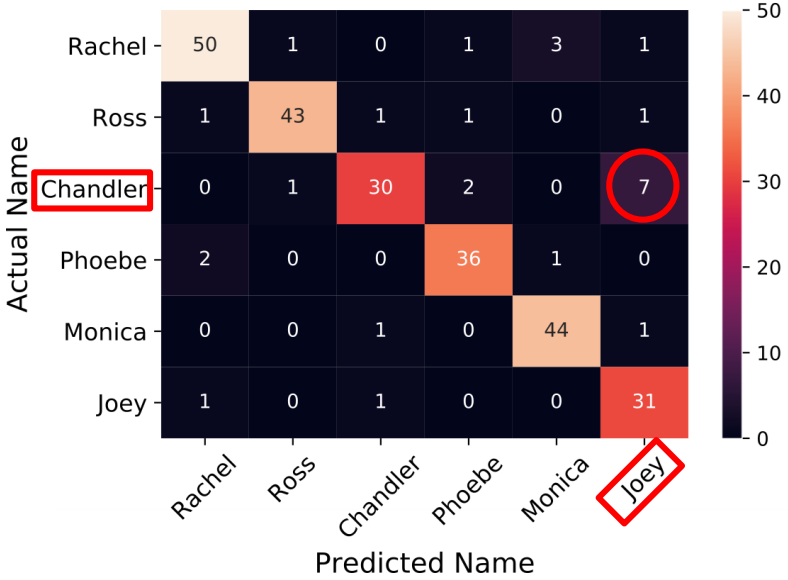
First Approach: Building and training my NN

4. Evaluate model *(Scikit-Learn, Seaborn)*



First Approach: Building and training my NN

4. Evaluate model



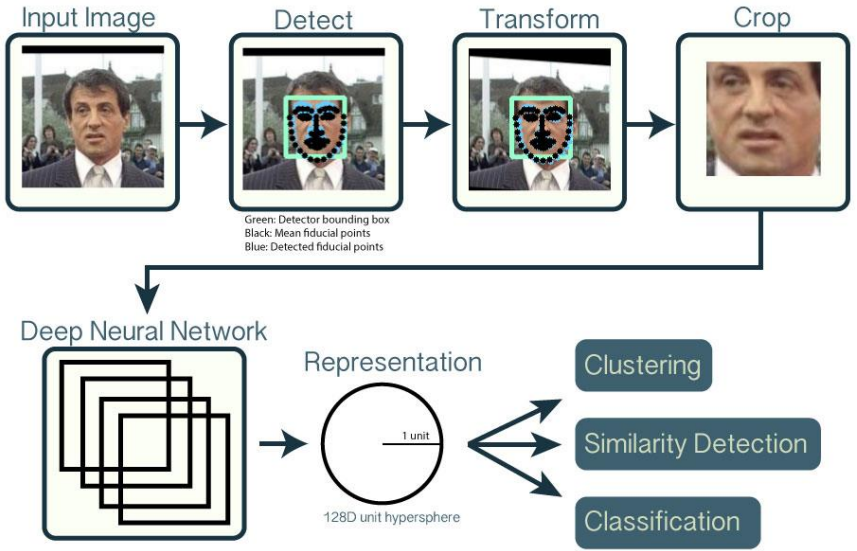
Second Approach: Using a trained NN + classification

1. Prepare data *(PyTorch, OpenCV)*

- Needs a much smaller dataset:
  - 20 pictures of each character alone

- Find and crop faces
  - Using already trained convolutional NN

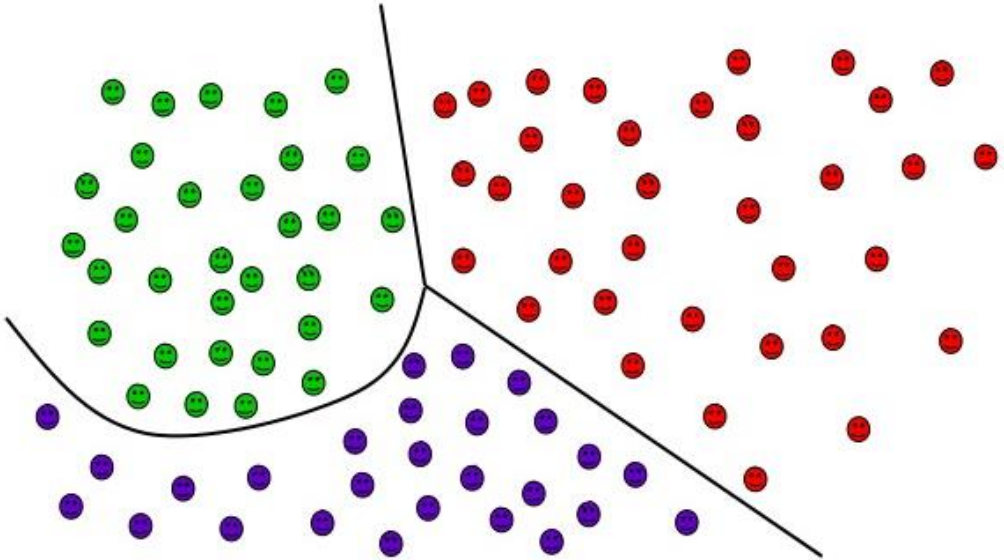
- Get a vector encoding face features
  - Using pre-trained Deep NN
  - Maximizes distances between “people”



https://github.com/timesler/facenet-pytorch

Second Approach: Using a trained NN + classification

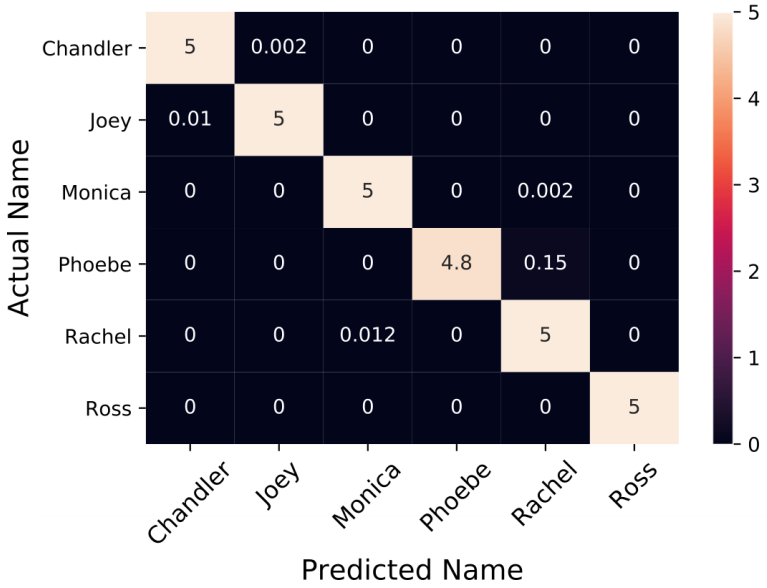
2. Classify vectors with Support Vector Machine (SVM) *(Scikit-Learn)*



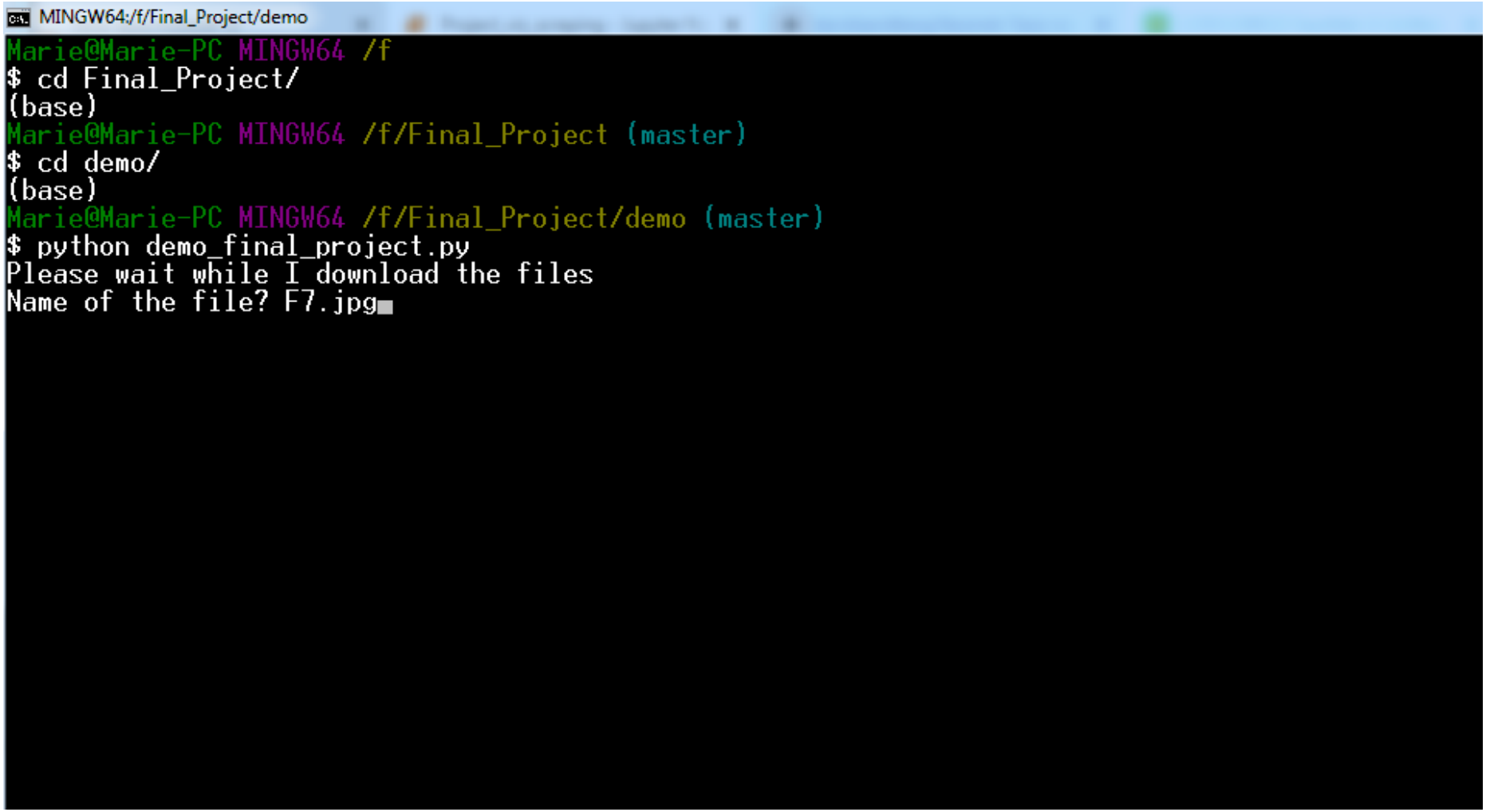
Second Approach: Using a trained NN + classification

3. Evaluate model: K-Fold Cross validation *(Scikit-Learn / Seaborn)*

Average accuracy: 99.39%



Demo


MINGW64:/f/Final_Project/demo
Marie@Marie-PC MINGW64 /f
$ cd Final_Project/
(base)
Marie@Marie-PC MINGW64 /f/Final_Project (master)
$ cd demo/
(base)
Marie@Marie-PC MINGW64 /f/Final_Project/demo (master)
$ python demo_final_project.py
Please wait while I download the files
Name of the file? F7.jpg

MINGW64:/f/Final_Project/demo


```
Marie@Marie-PC MINGW64 /f
$ cd Final_Project/
(base)
Marie@Marie-PC MINGW64 /f/Final_Project (master)
$ cd demo/
(base)
Marie@Marie-PC MINGW64 /f/Final_Project/demo (master)
$ python demo_final_project.py
Please wait while I download the files
Name of the file? F7.jpg
Loading the picture...
Detecting and cropping faces out of the picture...
Calculating the vectors corresponding to the face features...
Predicting the names using SVM prediction
Predicting the names using my NN
Clipping input data to the valid range for imshow with RGB data ([0..1] for floats or [0..255] f
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MINGW64:/f/Final_Project/demo

```
Marie@Marie-PC MINGW64 /f/Final_Project/demo (master)
$ python demo_final_project.py
Please wait while I downloa
Name of the file? F7.jpg
Loading the picture...
Detecting and cropping face
Calculating the vectors cor
Predicting the names using
Predicting the names using
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Figure 1

MINGW64:/f/Final_Project/demo

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Marie@Marie-PC MINGW64 /f/Final_Project/demo (master)
$ python demo_final_project.py
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Figure 1

Thank you!