FAISAL KALEMA

A.G.E DETECTION (Age, Gender, Ethnicity)

Neural Networks

Agenda

- Data Collection
  - Features
- Data Cleaning
- Labeling
- Model
  - Model architecture
  - Customized Model
  - Training
- Model Evaluation
- Conclusion
- Further Improvements

Main Objectives

- Classification of face images in three categories; Age, Gender, Ethnicity
- Leveraging pretrained model using transfer learning to enhance accuracy

Data collection

- 62, 328 face images from Wikipedia dataset with age and gender labels.
- Features include; face_score, second_face_score, face_location, name, gender, full_path, photo_taken, dob.

- About 60,000 face images from gettyimages.com
- 100 pages
- Window (Before COVID-19)
- 1 person
- Headshot

Data Cleaning

Wiki Dataset

- Convert dob from Matlab serial date number format to Python datetime format.

Drop observations with:

- wrong dob
- no faces (face_score = inf)
- Second_face_score
- Face_score < 3
- No gender information
- Age more than 100
- Age below 0
- Unnecessary columns

Gettyimages Dataset

Delete images with:

- No face
- Facemasks
- Black and white images
- More than 1 face
- Unclear face
- Eye glasses

Labeling

Wiki Dataset

Age labels

- 0 to 100

Gender labels

- 0 for Female
- 1 for Male

Gettyimages Dataset

8 classes of Ethnicity

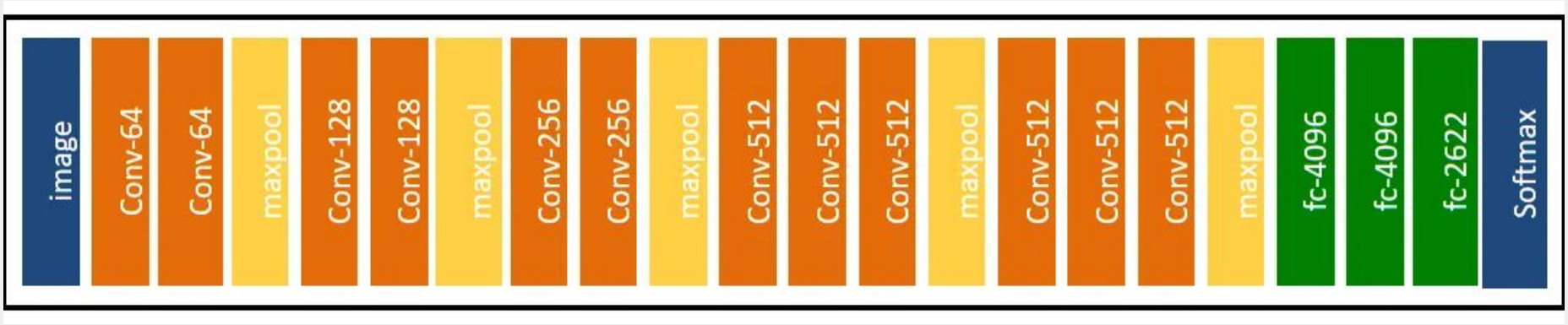
- Asian
- Black
- Caucasian
- Hispanic/Latino
- Mixed race
- Multi Ethnic group
- Native American
- Pacific islander

Model

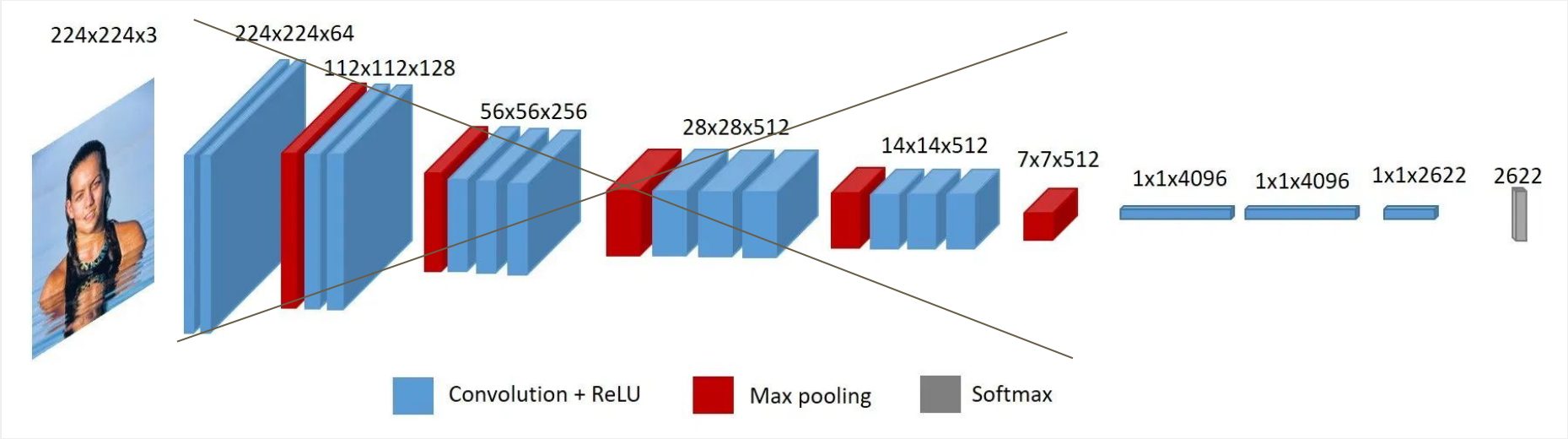
VGG-Face Model (22 layers) pre-trained on ImageNet

Pre_trained weights

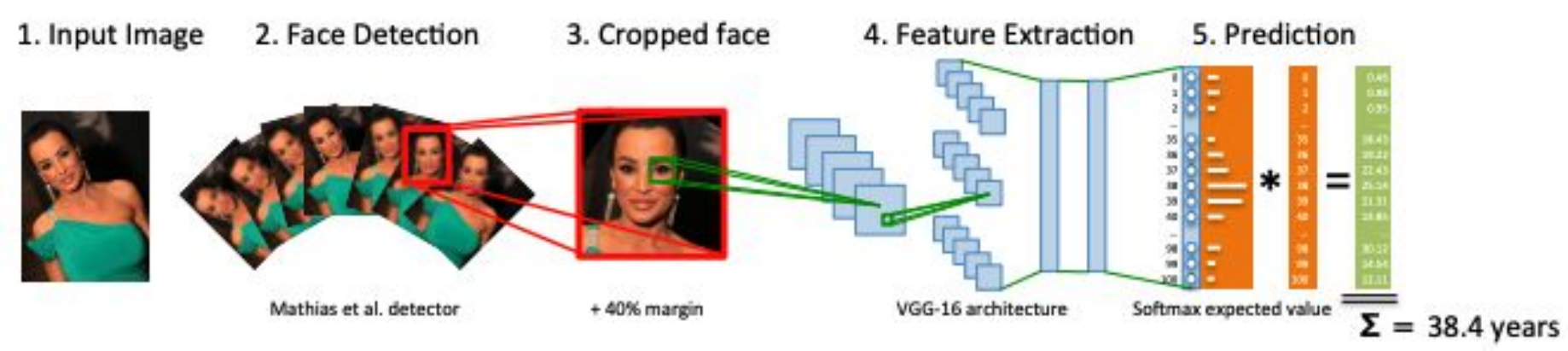
By Oxford Visual Geometry Group



Customized Model



Model Architecture



Training

	Classification type	Loss Function	Optimizer	Activation
Age	Multi-class	Categorical cross-entropy	Adam	Softmax
Gender	Binary	Binary cross-entropy	Adam	Sigmoid
Ethnicity	Multi-class	Categorical cross-entropy	Adam	Softmax

Model Evaluation

	Validation loss	Accuracy
Age	3.30	0.07
Gender	0.09	0.98
Ethnicity	1.23	0.55

Age

MAE = 5.4

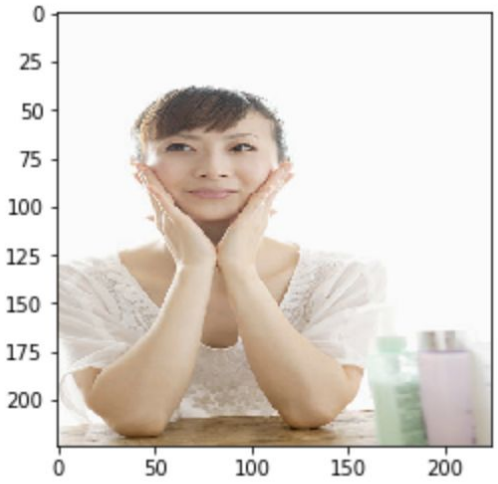
Evaluation of Model on gender

	Predict Female	Predict Male
Actual Female	1283	27
Actual Male	32	3086

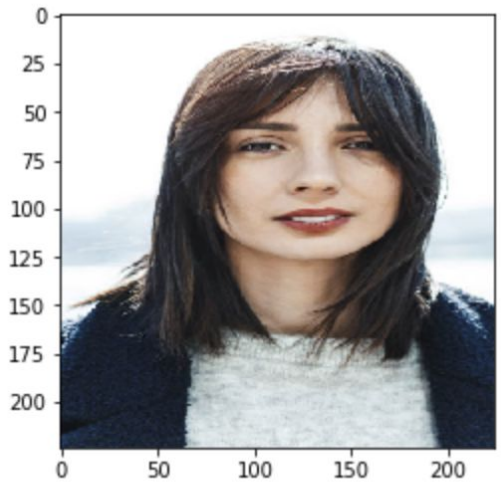
Precision: 0.979

Recall : 0.975

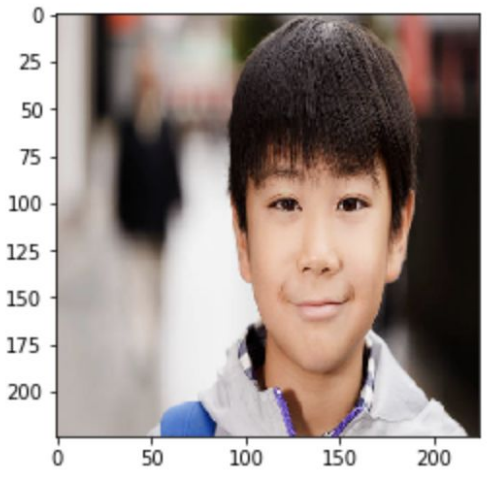
Ethnicity results



Actual: asian
Predicted: asian

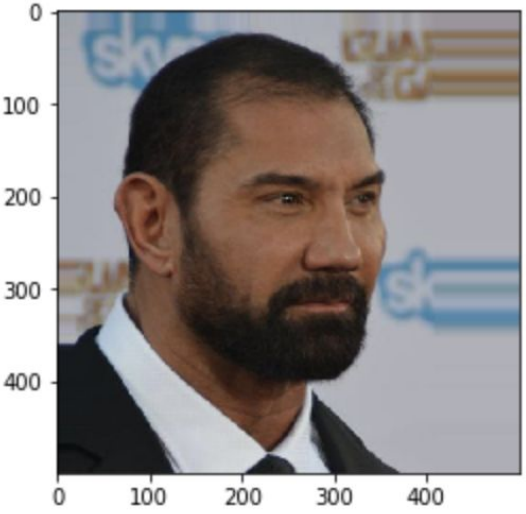


Actual: asian
Predicted: caucasian

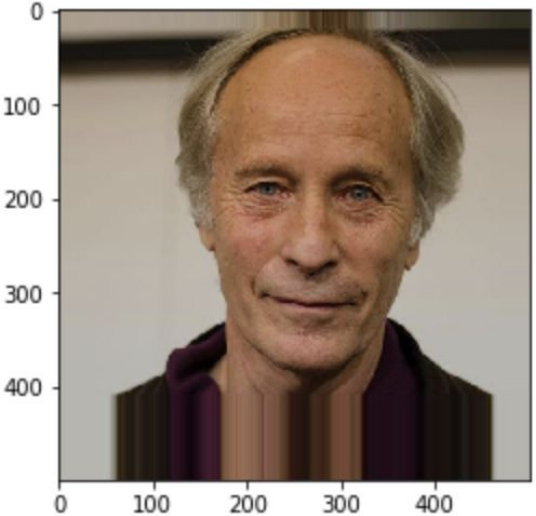


Actual: asian
Predicted: asian

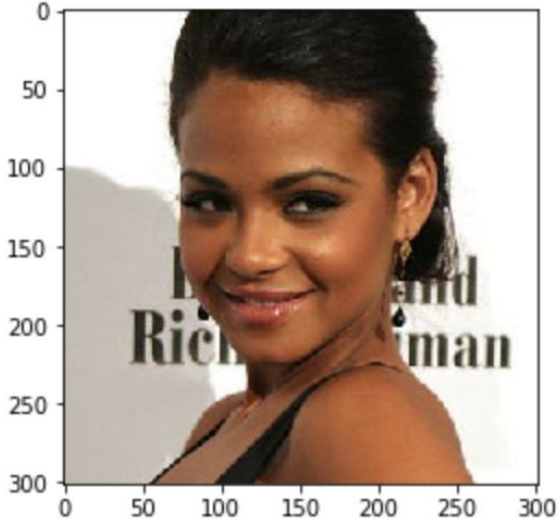
Age results



Predicted : 44
Actual Age: 44

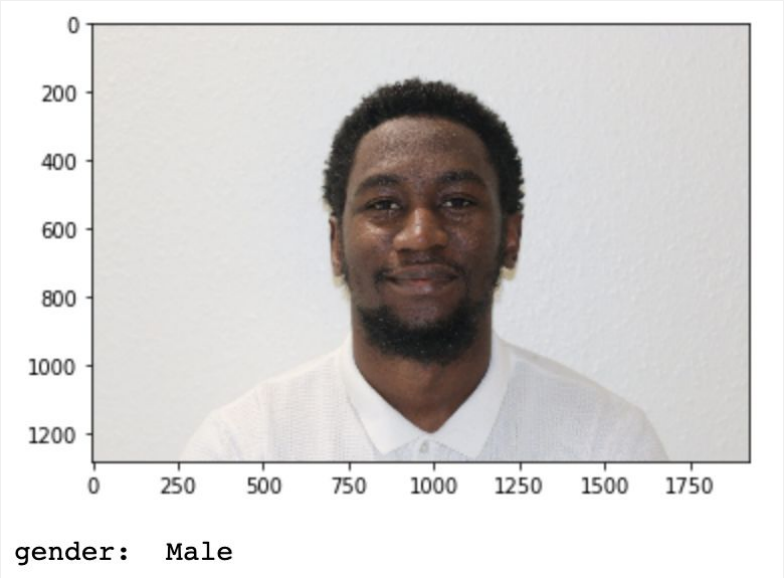


Predicted : 63
Actual Age: 62

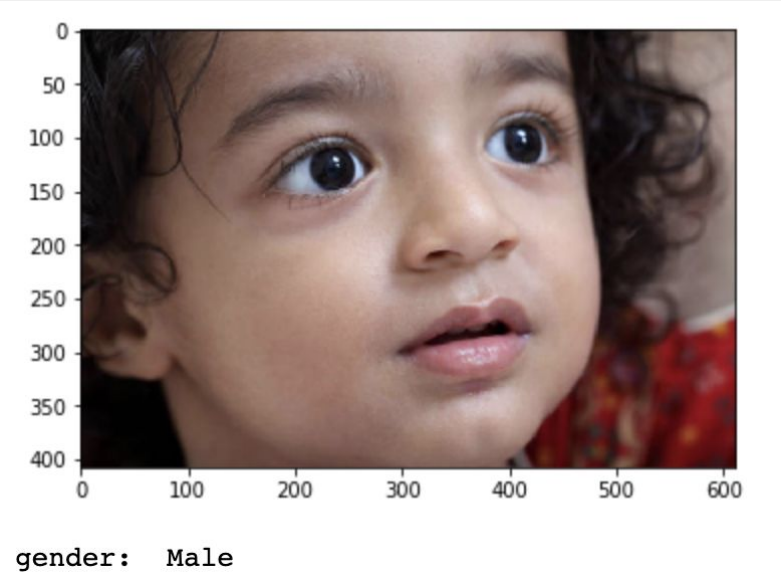


Predicted : 25
Actual Age: 28

Gender results



gender: Male



gender: Male

Further Improvements

- More data to avoid unbalanced classes
- Build a Multi-Output Model