

Face Detection and Recognition

Group Number: 25

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Introduction

- ▶ Application in numerous fields^[1]
 - ▶ Security: recognizing fraud detection
 - ▶ Marketing: recognizing customers as they enter (such as the Facedeals APP)
 - ▶ Digital make-up: recognizing face and applying digital make-up
 - ▶ ...
- ▶ Our project:
 - ▶ Detect faces in class photos
 - ▶ Recognize detected faces

Pre-Process Dataset

- ▶ Resized all training images to 1024*720
- ▶ Unified names of training images: format is face_01_uid
 - ▶ No uid
 - ▶ Different name, such as yqs1.jpg, IMG_201802281.jpg
 - ▶ Upper 'U' to lower 'u'

Face Detection^[2]

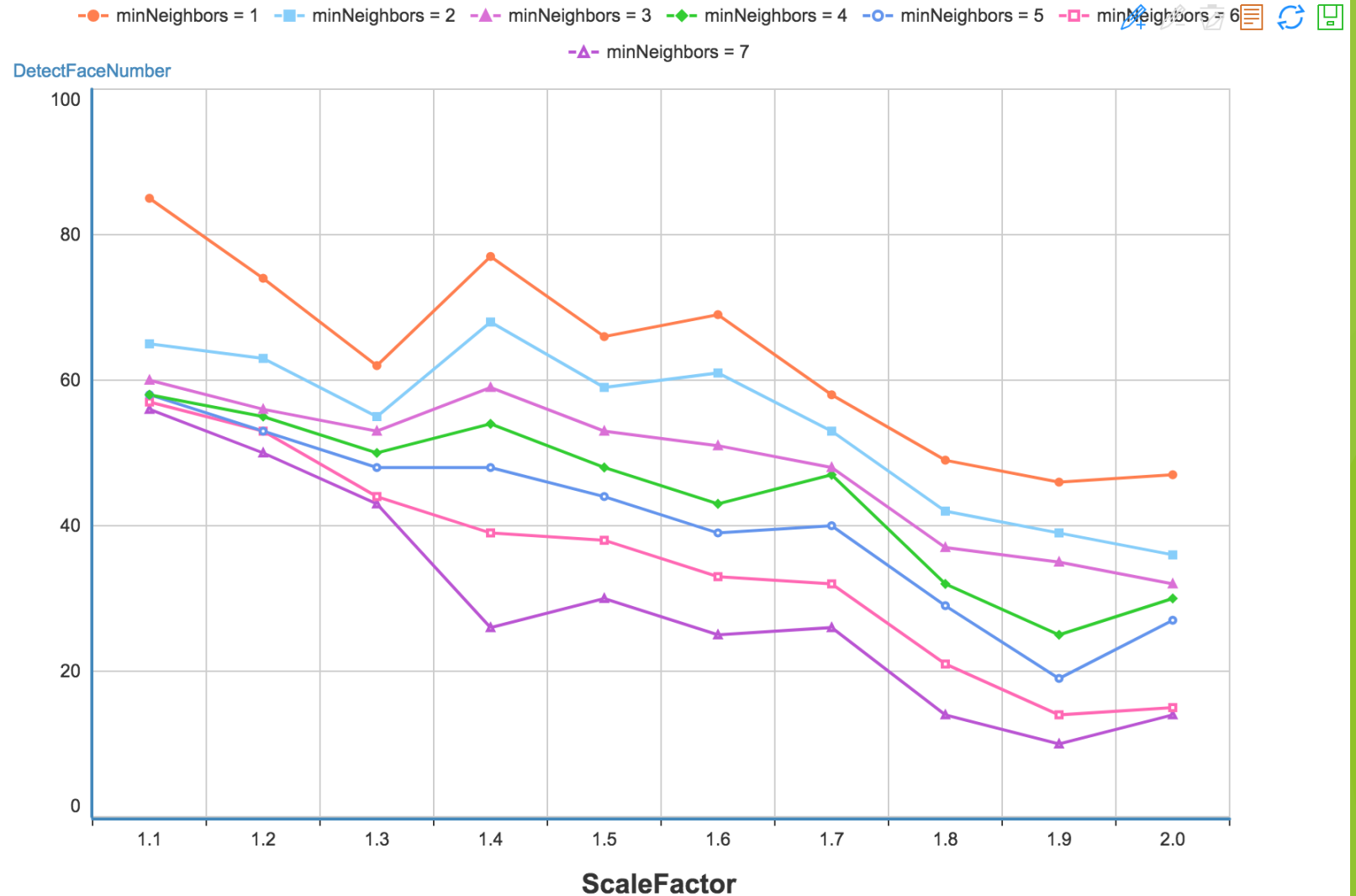
► Algorithms (OpenCV):

- Haar Cascade Classifier
- LBP Cascade Classifier

► Accuracy: $58/72 = 81\%$

► Compare Parameter:

- Minimum neighbors
- Scale factor



Face Recognition^[3]^[4]

- ▶ 58 faces are detected (in IMG_1820.JPG)
- ▶ Faces are resized to 150*150
- ▶ Performance of different algorithms:

Algorithm	Correctly recognized faces	Consumed time (including detection)
Local Binary Patterns Histograms (LBPH)	4	< 1 minute
EigenFaces	6	< 1 minute
FisherFaces	7	< 1 minute
ResNet	30	> 2 minutes originally. But < 20 seconds after our improvement (i.e. caching face encodings)

Result



Click [here](#) to view the result in browser

References

- ▶ [1] K. Sennaar, "Facial Recognition Applications - Security, Retail, and Beyond", TechEmergence, 2018.
- ▶ [2] R. Raja, "Face Detection using OpenCV and Python.", SuperDataScience - Big Data | Analytics Careers | Mentors | Success, 2017.
- ▶ [3] R. Raja, "Face Recognition using OpenCV and Python.", SuperDataScience - Big Data | Analytics Careers | Mentors | Success, 2017.
- ▶ [4] "Welcome to Face Recognition's documentation! — Face Recognition 1.2.2 documentation", Face-recognition.readthedocs.io, 2017. [Online]. Available: <https://face-recognition.readthedocs.io/en/latest/index.html>.
- ▶ [5] "Jupyter Notebook Viewer", Nbviewer.jupyter.org, 2018. [Online]. Available: http://nbviewer.jupyter.org/github/krasserm/face-recognition/blob/master/face-recognition.ipynb?flush_cache=true.
- ▶ [6] He, K., Zhang, X., Ren, S., Sun, J. (2016). Deep residual learning for image recognition. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 770-778).