DataFace

A Facial Recognition Joint

State of the art facial recognition has surpassed the accuracy of human beings:

- Google's FaceNet Accuracy Score = .9964
- Facebook's DeepFace Accuracy Score = .9735
- Baidu (Minwa) Accuracy Score = .9977
- Homosapien -- AUC Score

Benchmarked using the LFW Dataset (labeled faces in the wild)

Deep learning convolutional neural networks were used and trained with:

Facebook used ~4.4 million images,

Google used ~100-200 million images of over 8 million unique individuals

Questions:

- What kind of results are achievable using publicly available resources?
- Are these results valuable?
- What’s next?

Data:

- 4,324 images (only 3,218 made it out of neural net)
- 12 different people
- > 2.5 minutes of total video

Summary:

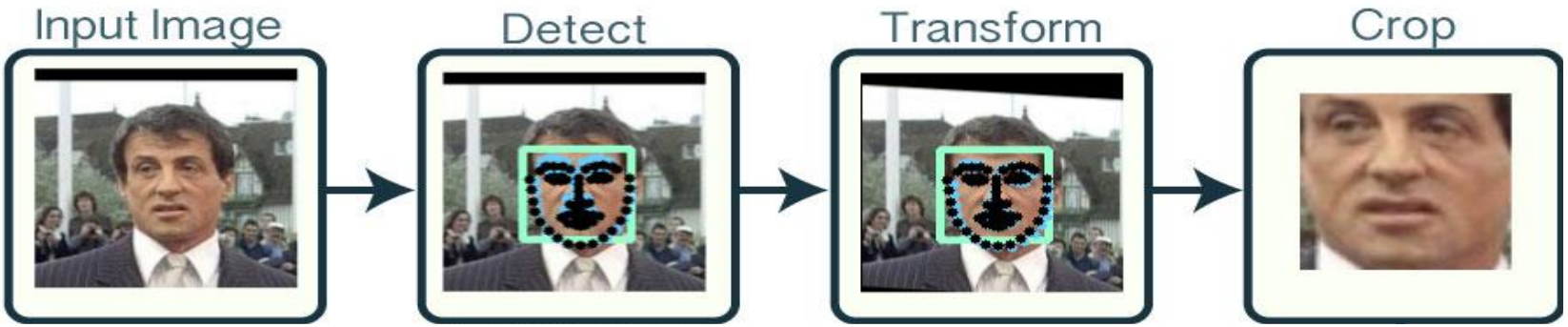
--Colin Clemence - 169 images/~5 sec, --John Marin - 476 images/ ~11 sec, --Leslie Pham - 129 images/~2 sec,

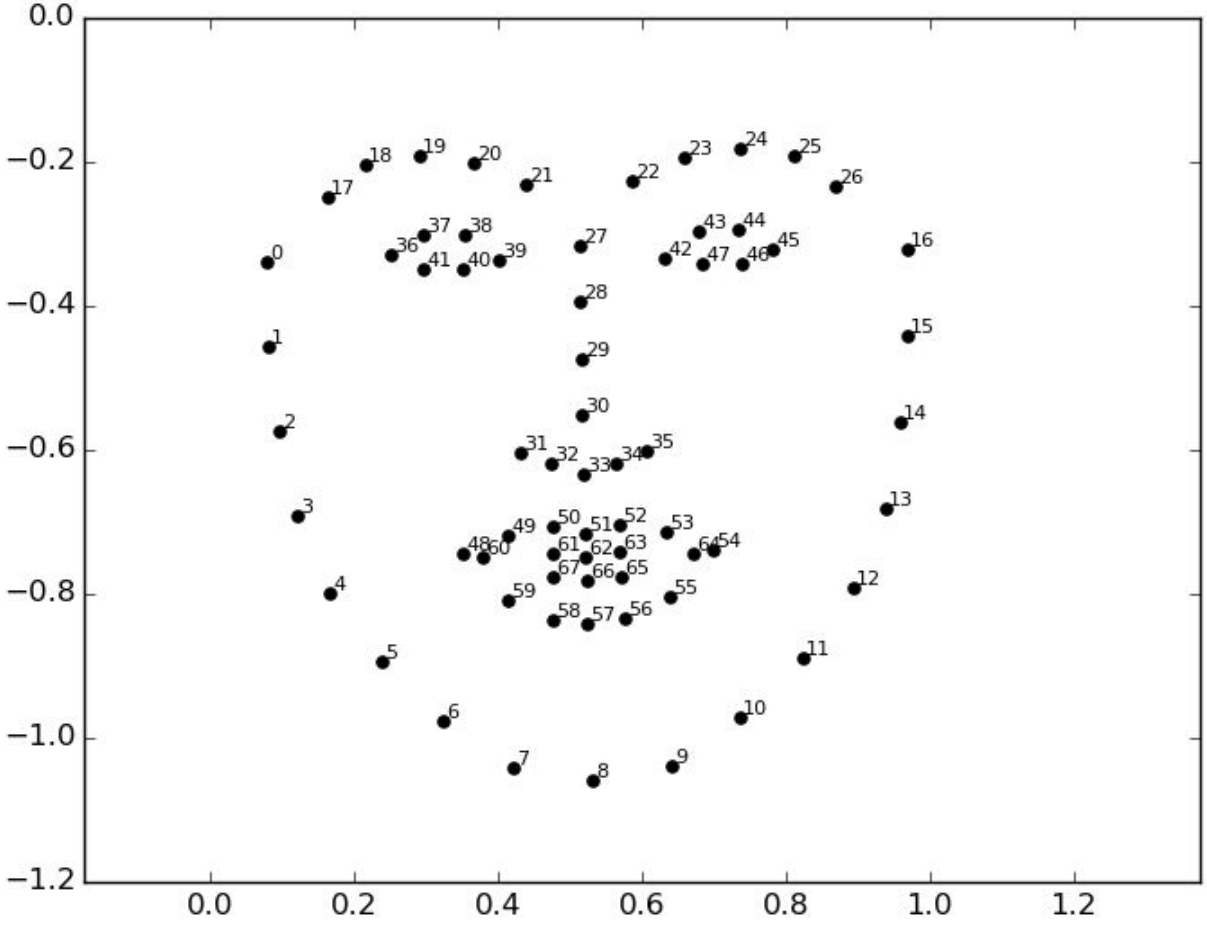
--Lucy Smoot - 311 images/~10 sec, --Michael Gat - 38 images/~3 sec, --Mike Frantz - 270 images/~6 sec,

- Mike Ludwig - 244 images/~4 sec, --Paul Trichon - 571 images/~17 sec, --Pauline Chow - 567 images/~9 sec,

- Robbie Smoot - 1,203 images/~22 sec, --Roshanak Omrani - 178 images/~3 sec, --Ryan Gin - 296 images/~5 sec

Pre-processing:




0.0
−0.2
−0.4
−0.6
−0.8
−1.0
−1.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67

OpenFace's Convolutional Neural Net:

Spatial convolutions

ReLUs

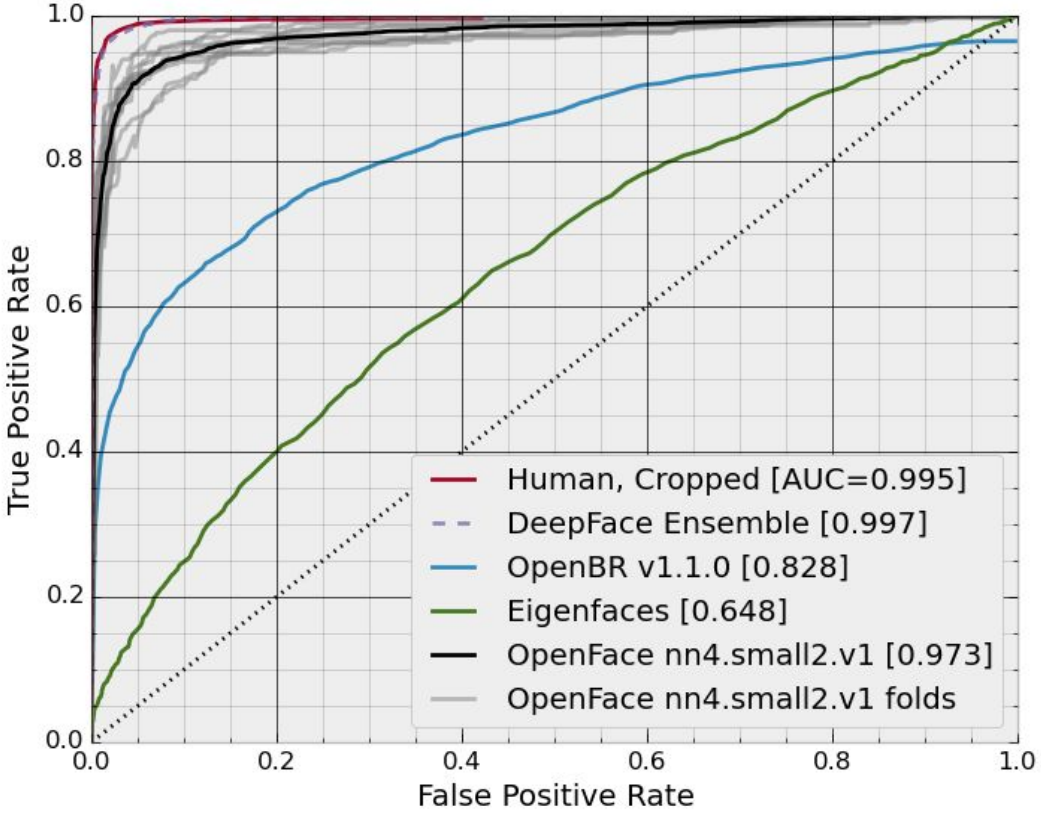
Pooling

Triplet loss function

FaceNets Inception model

Trained with 500K images

Uses Torch



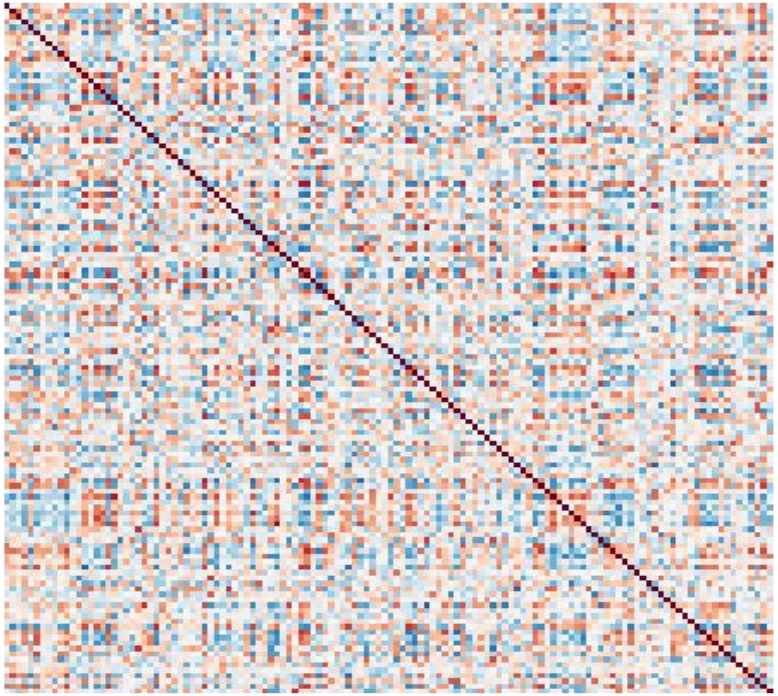
Embeddings → PCA & SVM:

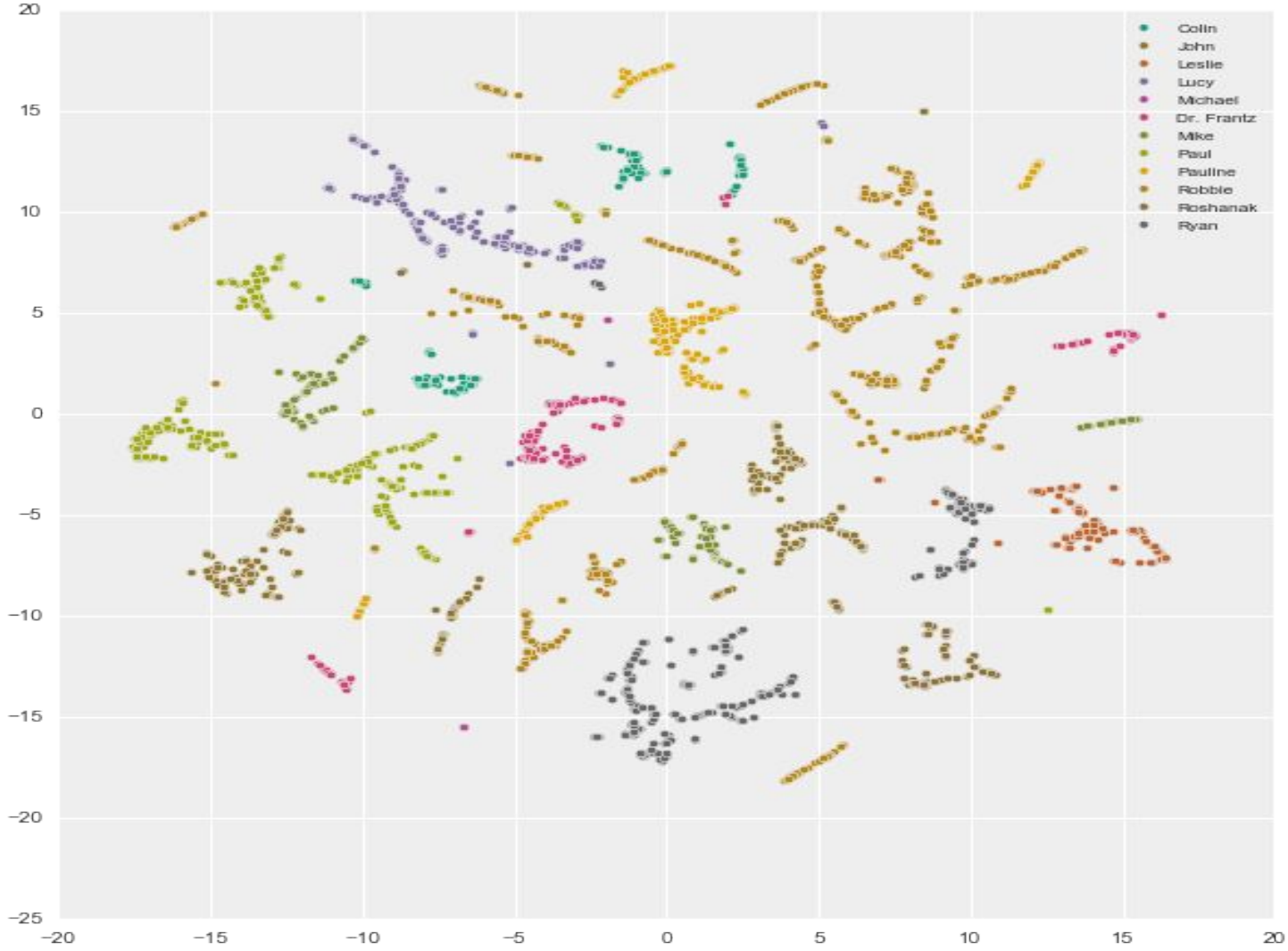
Low-dimensional face representations

Generated embeddings (3,218 X 128)

12 classes

Using train/test/split the accuracy score is .997




Colin
John
Leslie
Lucy
Michael
Dr. Frantz
Mike
Paul
Pauline
Robbie
Roshanak
Ryan
20
15
10
5
0
−5
−10
−15
−20
−25
−20
−15
−10
−5
0
5
10
15
20

Demonstration:

Wait for it….

VALUE ?

These results are pretty good, right? It’s difficult to judge since we don’t really have a test and the model was trained on particular data. Performance is highly dependent on training input.

What's next?

Supervised vs. Unsupervised Learning:

- Facial recognition is still a supervised classification problem requiring labels
- How can we minimize the need for labels?

  -pseudo labels

  -temporary labels

  -users input

Acknowledgments:

★ Dr. John Marin, Pauline Chow, Mike Ludwig and everyone @ GeneralAssembly

★ OpenFace @ https://github.com/cmusatyalab/openface

★ Dlib @ https://github.com/davisking/dlib