Finding Jonathan in an Ocean of Pictures

Tracy Song-Brink
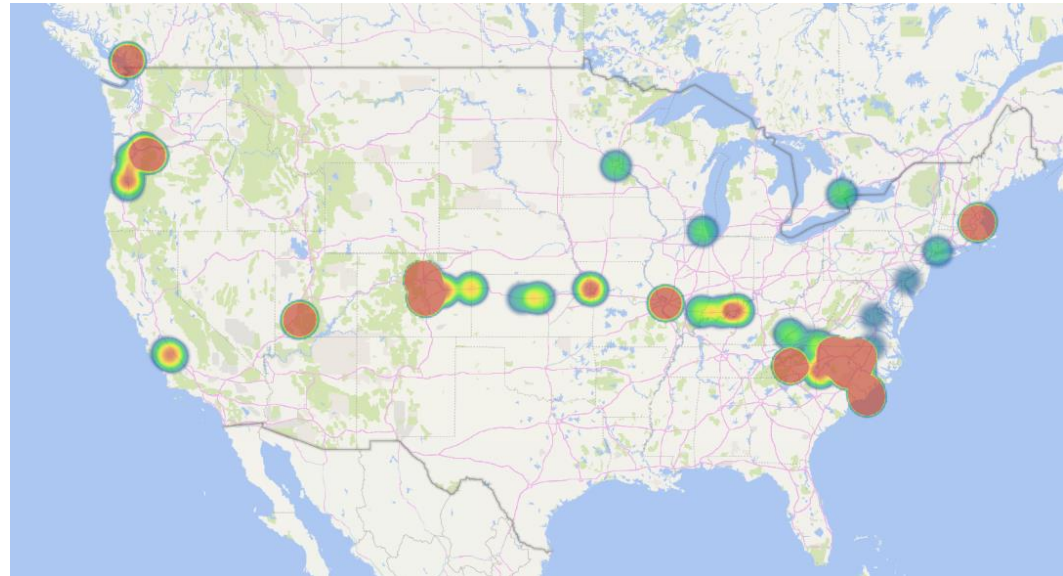
01/04/2019

Our Pictures Taken in 2018

- 14,414 pictures taken in 2018 (on average 39 a day!)
- Most in one day: May 8 -> 346 pictures
- Sunday had the highest frequency
- Most pictures were taken in the evening (after 6PM)
- 10 days had zero pictures
- April -> most, September -> least

EXIF Information

{34853: {0: b'\x02\x03\x00\x00',
1: 'N', 2: ((35, 1), (44, 1), (2399, 50)),
3: 'W', 4: ((78, 1), (49, 1), (909, 25)),
5: b'\x00',
6: (1347, 10),
7: ((0, 1), (42, 1), (1891, 100)),
12: 'K', 13: (0, 1), 16: 'T', 17: (72819, 389),
23: 'T', 24: (72819, 389), 29: '2018:11:27',
31: (65, 1)},
 296: 2, 34665: 194,
271: 'Apple', 272: 'iPhone 8',
305: '11.2.5', 274: 6,
306: '2018:11:26 19:42:24',
36864: b'0221', 37377: (23917, 4049),
37378: (13166, 7763),
36867: '2018:11:26 19:42:24',
40961: 65535, 37386: (4, 1),
40962: 4032, 40963: 3024, ...

GPS:
Latitude: 35.74666111
Longitude: -78.82676667

Device:
Apple iPhone 8

Date and Time:
11/26/2018 19:42:24

Size:
4032*3024

Goal: Find Jonathan Pictures

Jonathan

Tracy

Austin

Jason

Face Recognition – Facebook Example

Process

Language: Python
Packages: PIL (Python Imaging Library), face_recognition, pandas, shutil

Prepare pictures
- Import picture files from phones to computer
- Convert .HEIC files to .JPG

Generate thumbnails for all pictures
- 4,277 faces detected

Recognize Jonathan from all thumbnails
- Model against a given picture

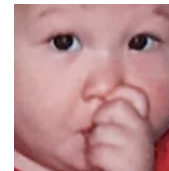**Organize pictures of Jonathan in a folder**
- 175 found
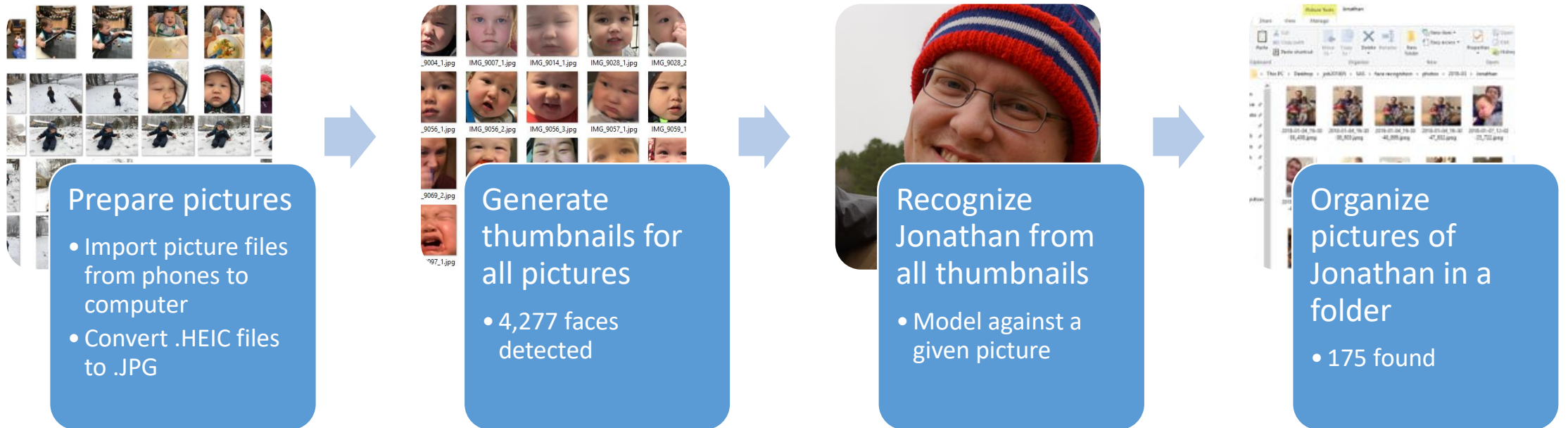
Face Detection

Top: 1158, Left: 835,
Bottom: 1381, Right: 1058

Top: 825, Left: 1003,
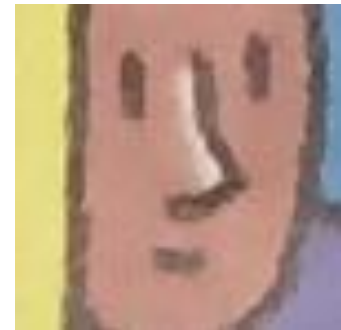Bottom: 1093, Right: 1270
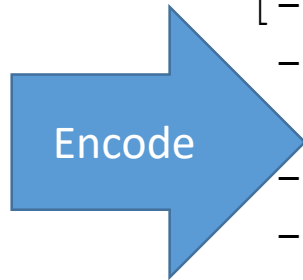
Top: 1171, Left: 1707,
Bottom: 1357, Right: 1893

Top: 795, Left: 2162,
Bottom: 1063, Right: 2429

```
face_locations = face_recognition.face_locations(image)
top, right, bottom, left = face_location
face_image = image[top:bottom, left:right]
pil_image = Image.fromarray(face_image)
```

Face Detection Failures

Face Recognition

[-0.13315731, 0.09502431, 0.03977413,
-0.00823091,-0.11107925,-0.01417934,
0.05303492,-0.08295398, 0.08961742,
-0.13456964, 0.11910781,-0.03070789,
-0.31954247,-0.02683202, 0.07342206, ...

Compare

[-0.06281977, 0.02983128, 0.01266909,
-0.07148403,-0.01431941,-0.06246716,
-0.00986109, -0.15918503, 0.0759
-0.14017105, 0.22113454,-0.132
-0.22393497,-0.05222775,-0.08073391, ...
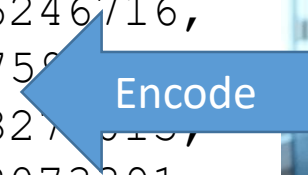
```
jonathan_face = face_recognition.face_encodings(jonathan_image)[0]
unknown_face = face_recognition.face_encodings(unknown_image) [0]
results = face_recognition.compare_faces([jonathan_face], unknown_face)
```
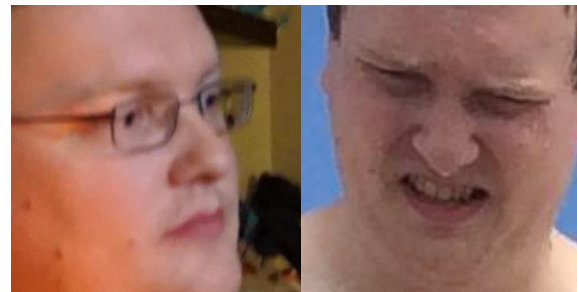
Results

	Jonathan Thumbnails	Non Jonathan Thumbnails	Total
Reconigzed as Jonathan	163	12	175
Reconigzed as Not Jonathan	5	4097	4102
Total	168	4109	4277

Misclassification Rate: 0.4%

Type 1 Error Examples:

Type 2 Error Examples:

Thank you!