**FACE RECOGNIZER TESTING REPORT**

# Face Detection Testing

1. The result after detecting an image 100 times is the same.
2. Below is the report about performance, accuraccy of each HaarXML files. (Each HaarXML file is created by running Haar Training).

The bold text are the best result among four XML files.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **HaarXML Files** | **Alt** | **Alt2** | **Alt\_Tree** | **Default** |
| Time to run 100 detections.  Image resolution:  750 x 500.  (This is the resolution of facebook image.) | 108s  Average Time: 1.08s | 86s  Average Time: 0.86s | **55s**  **Average Time: 0.55s** | 82s  Average Time: 0.82s |
| Time to run 100 detections.  Image resolution :  2200 x 1500.  (This is the resolution of camera image) | 1071s  Average Time: 10.7 s | 901s  Average Time: 9s | **561s**  **Average Time: 5.6s** | 724s  Average Time: 7.24s |
| Time to run 100 detections. Image resolution :  2200 x 1500.  The image is resized to 1100 x 750 px before detecting. | 235.5s  Average Time: 2.35s | 181.7s  Average Time: 1.82s | **116.5s**  **Average Time: 1.16s** | 137.5s  Average Time: 1.38s |
| Sample Image : 100 images, contains 222 faces.   * Accuracy (Detect all faces in images). * Missing Hit (Can’t detect enough face in image) * Over Hit ( Detect more face than in image) | **Accuracy: 70%**  Missing: 11%  Over: 19%  Face detected: 233/222 faces  **Real face detected:**  **206/222 faces.**  **Real face detect ratio:**  **92.8%** | Accuracy: 62%  Missing: 9%  Over: 29%  Face detected: 248/222 faces  Real face detected:  204/222 faces.  Real face detect ratio: 91.9% | Accuracy: 67%  Missing: 30%  **Over: 3%**  Face detected:  179/222 faces  Real face detected:  173/222 faces.  Real face detect ratio: 77.9% | Accuracy: 38%  **Missing: 7%**  Over: 55%  Face detected: 324/222 faces  Real face detected:  206/222 faces.  Real face detect ratio:  92.8% |
| Sample Test: 140 images, number of face unknow.  Testing the ratio of real face detection | Detected: 450 faces.  **Real face: 401 faces.**  Error: 49 faces  Ratio: 89.1% | Detected: 477 faces.  Real face: 401 faces.  Error: 76 faces  Ratio: 84.07% | Detected: 338 faces.  Real face: 326 faces.  **Error: 12 faces**  **Ratio: 99.4%** | Detected: 645 faces.  Real face: 399 faces.  Error: 246 faces  Ratio: 61.86% |
| Conclusion | Worst performance.  The number of real face detected is biggest.  -> This HaarXML should be used when admin upload image for adding data. The error doesn’t matter much here. | So-so performance.  The same number of real face detected as alt1 | Best performance.  Best real face detection ratio.  -> This HaarXML should be used when instructor upload image for checking attendance. | So-so performance.  Lowest accuracy.  Lowest real face detection ratio. |

# Face Recognition Testing

For face recognition, we will test with three difference face recognizers: Eigen Face Recognizer, Fisher Face Recognizer, LPBH Face Recognizer. Each Recognizer is setup with 3 diffent threehold.

|  |  |  |  |
| --- | --- | --- | --- |
| **Face Recognizer** | **Eigen Face Recognizer** | **Fisher Face Recognizer** | **LPBH Face Recognizer** |
| Training Data with 600 images, 30 ID.  Recognize 200 faces | Image Load Time: 9 ~ 13s.  Training Time for 9 Recognizer: 113s. | | |
| Time: 0.37s | **Time: 0.12s** | Time: 9s |
| Training Data with 250 image, 25 ID.  Recognize 200 faces | Image Load Time: 3 ~ 5s.  Training Time for 9 Recognizer: 11s. | | |
| Time: 0.36s | **Time: 0.08s** | Time: 4.1s |

About accuracy report:

- Training Data: 64 faces of 6 people: Bao, Hoang, Dung, Hoa, Minh, Sen. (Each person with 9~11 faces).

- Test Data: 78 faces of those 6 people. 16 unknown faces.

We begin with the training data of 4 images for each person, then 6, 8, 10 images.

The graph compare the accuracy of each algorithm:

For detail report, check the txt files.