

Classification Accuracy For a Facial Recognition Application

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Objective: To find the accuracy of a facial recognition program

•To stream facial images from Google Glass onto a computer and test to see how well a facial recognition application¹ does with accurately recalling a face.

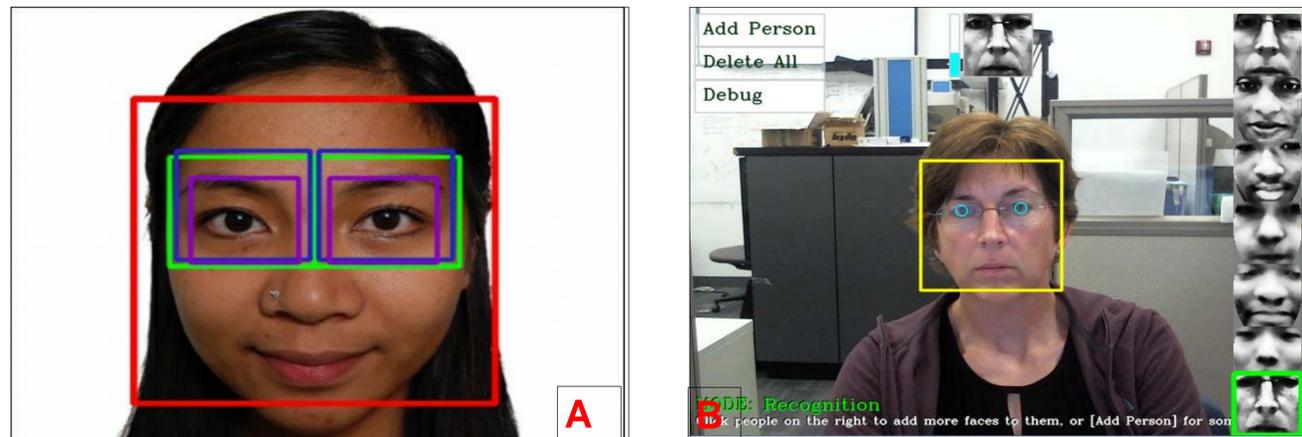


Figure 1 (A) The facial recognition program uses eye features to help recognize faces. (B) Recognition part of the program. Yellow box shows what image the program is capturing. Blue circles shows where the eyes are on the face. Images on the right show all the faces the program was trained on. Image above face and the green outlined box to the right shows what face the program has recognized as being correct.

Importance: Personal goal

To inspire students, especially girls, to consider engineering and computer science as a possible career.

Problem Statement: Create a model to be used as an employee identification model

- Access into work spaces or schools is becoming more restricted. Could we use a facial recognition program to help us ID employees or students?



Figure 2 (A) We can train the program with a fixed number of people and test it accuracy or (B) train it with a fixed training set, but change the number of faces it needs to recognize.

Results: Low training sets still create high facial recognition accuracy when looking straight ahead with a neutral face.

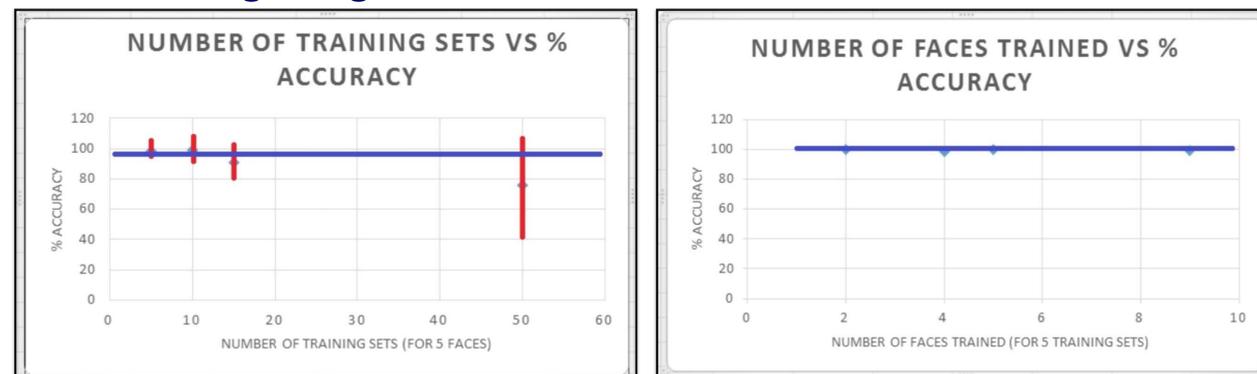


Figure 3: Graphs of the results for fixed number of images trained (left graph) and for fixed training sets (right graph) where all the training and testing samples were very similar (looking straight ahead, neutral face).

Conclusions and Activities to Engage with Students

- This experiment used only very still faces and neutral facial expressions, which gave a high accuracy of recognition because there was little movement of each face.
- Introduce this experiment to students and have them come up with different experiments using this model.
- Future projects could include changing the program to identify food and give nutritional information about the foods it identifies.

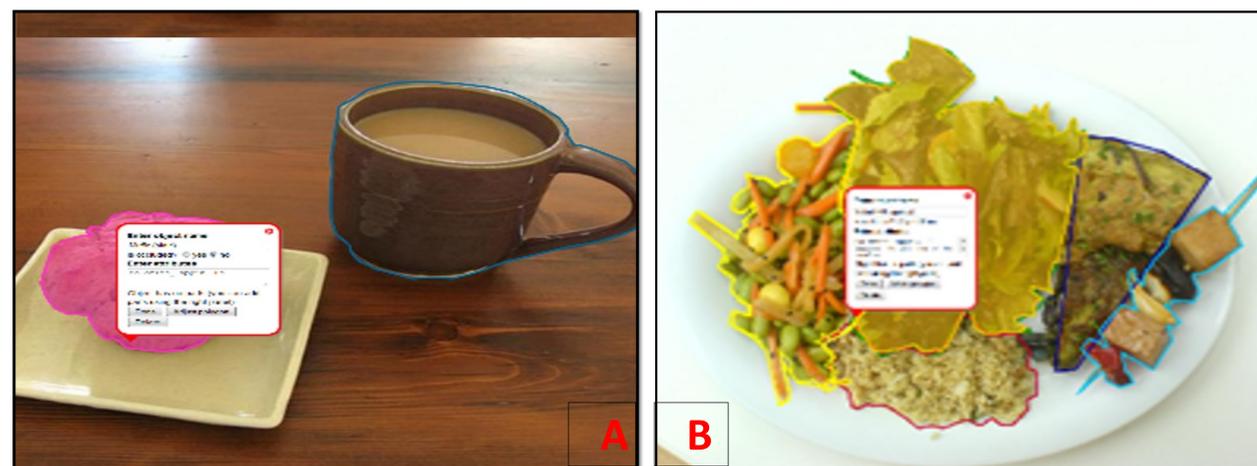


Figure 4: (A) An image of coffee and a muffin labeled in LableMe (B) Dinner plate labeled in LabelMe.

References: ¹ Baggio, Daniel. *Mastering OpenCV with Practical Computer Vision Projects: Step by step Tutorials to Solve Common Real-world Computer Vision Problems for Desktop or Mobile, from Augmented Reality and Number Plate Recognition to Face Recognition and 3D Head Tracking*. Birmingham: Packt Pub., 2012.