Assignment 3: Design and Evaluate Face Recognition System

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We used open source code of face recognition, and we tested different open source which introduction of assignment suggested, and we found that Face++ has best identify score than other open source provided, and we chose Face++ to do all dataset screening.

For dataset chosen, we picked 2 frontal faces without blur each person and one photo as gallery and another photo as probe. We random chosen person with glass and without glass.

Because the limited access of free API key for Face++, we designed over access handle to deal this situation and screen 145x145 face comparation and using confidence parameter as value to determine two face similar score.

The genuine distribution(Figure.1) is around 89 to 97 for 145 persons, and majority of number is around score 96; The impostor distribution(Figure.2) is around 5 to 91, and majority number is around score 30.

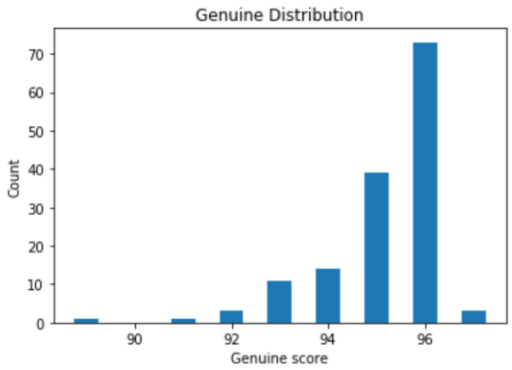

Figure.1 Genuine distribution

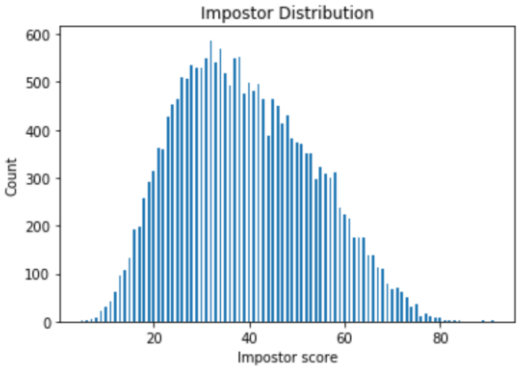

Figure.2 Impostor distribution

The genuine and impostor distribution(Figure.3) has overlap from 89 to 91.

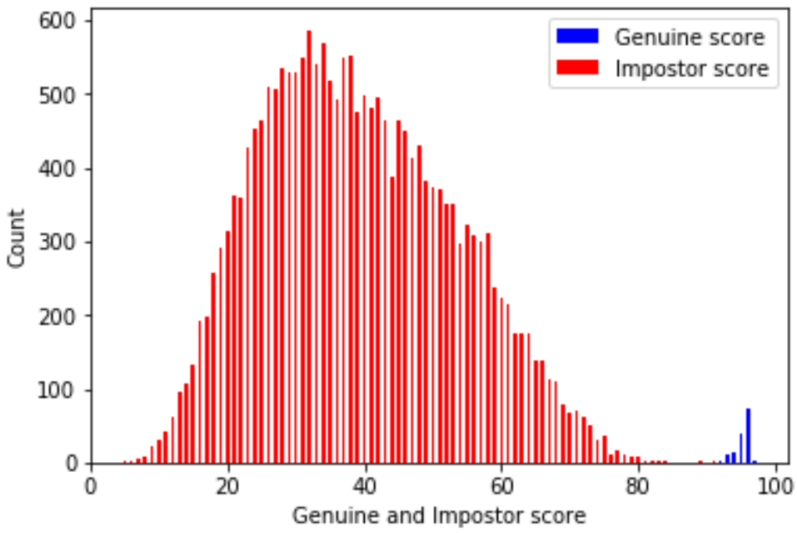

Figure.3 Genuine and Impostor distribution

For face verification, while we set thresholding as 90 and 91, false positive rate is 4.78e-5 and true positive rate is 0.993. As ROC curve(Figure.4) shows below, it seems perfect ROC curve, literally it's not perfect ROC curve. In the left corner, it has a very tiny curve around there, it's not observed. When we zoom in(Figure.5) left top corner of ROC curve, we can see it has curve there.

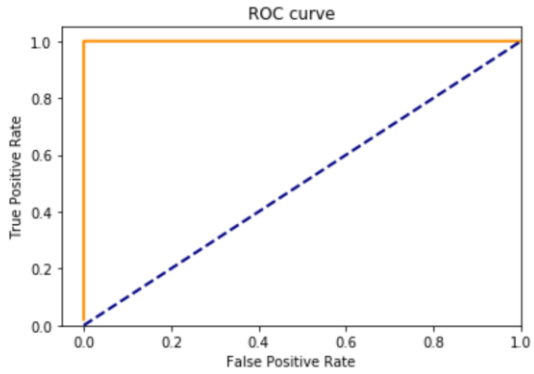

Figure.4 ROC curve

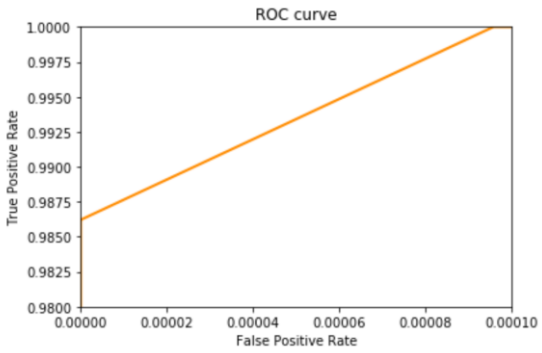

Figure.5 ROC curve zoomed in left top corner

For face recognition, we used the first 145 different faces group as gallery and second 145 different faces as probes, and plotted CMC curve(Figure.6), this is true perfect CMC curve and it can recognize each person in gallery very well.

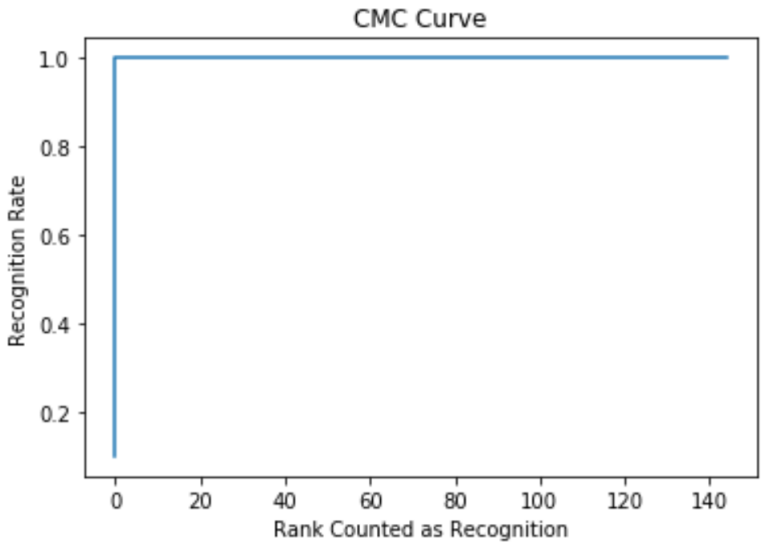

Figure.6 CMC curve