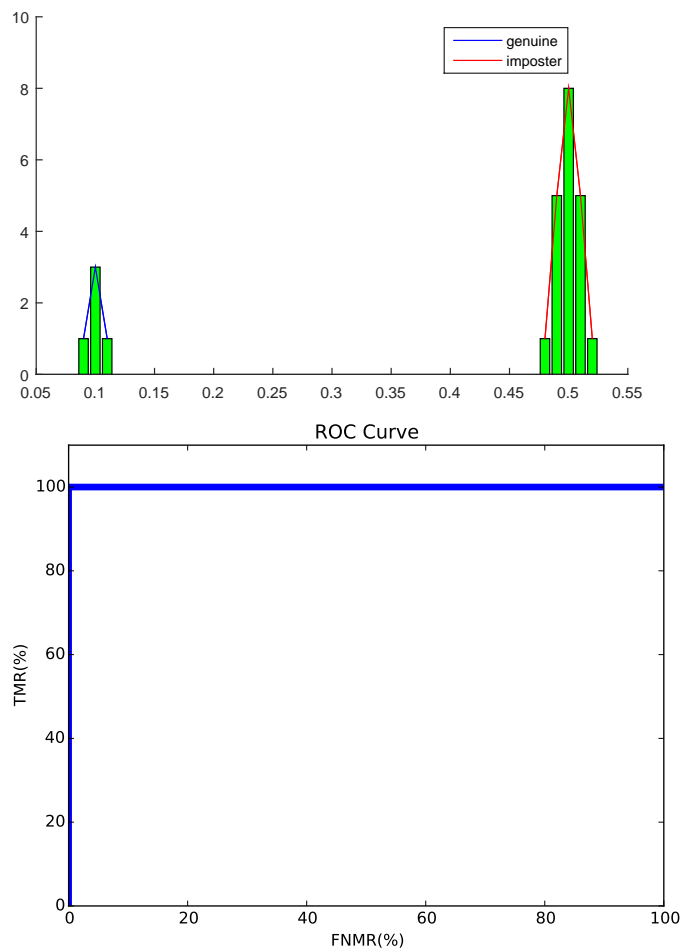


EECS 495 Biometrics Assignment1

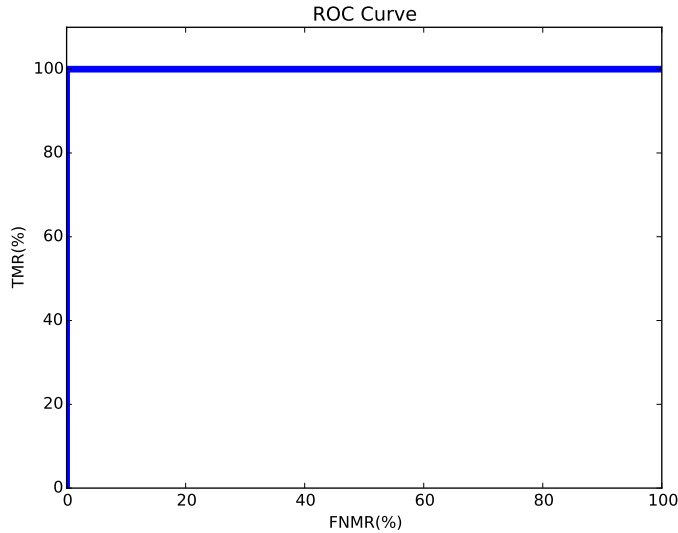
Qinglin Li, EMPL ID: 2923742, Net ID: qlt073

Nianzu Li, EMPL ID: 2906237, Net ID: nld118

Problem 1



Problem 2



Problem 3

Yes, we can estimate recognition error rates from verification error rates. First, view error rates as probabilities.

Suppose there are n people on the list.

For any person P on the list.

$$\begin{aligned}\Pr(\text{False Negative}) &= \Pr(P \text{ is not recognized as himself}) \times \Pr(P \text{ is not recognized as other } n-1 \text{ people on the list}) \\ &= \text{FRR} \times (\text{TRR})^{n-1} = \text{FRR} \times (1 - \text{FAR})^{n-1}\end{aligned}$$

For any person P not on the list.

$$\begin{aligned}\Pr(\text{False Positive}) &= \Pr(P \text{ is recognized as someone on the list}) \\ &= 1 - \Pr(P \text{ is not recognized as anyone on the list}) \\ &= 1 - \text{TRR}^n = 1 - (1 - \text{FAR})^n\end{aligned}$$

Recognition is challenging, for the following reasons

- To avoid mixing people up, we may need more accurate algorithms to verify each pairs of people in recognition problems.
- Since we have to compare one person with multiple persons every time in recognition, it is more difficult to make a recognition system efficient.