SIL775 BIOMETRIC SECURITY
ASSIGNMENT 2: ONLINE SIGNATURE VERIFICATION SYSTEM

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For implementing the “online signature verification system” we have used SVC2004 task2 and sample datasets. We have taken 100 signature files that contain .txt files.

PRE-PROCESSING

For pre-processing, firstly we calculated the centre of mass and then determined the normalized coordinates by using these centre of mass coordinates (xg, yg). Then Gaussian filter is applied for smoothing of these obtained normalized coordinates. After this step, we obtained the x-y filtered coordinates.

FEATURE EXTRACTION

There are 12 features that are to be extracted from the dataset. The dataset contains Pen pressure, altitude, and azimuth angles.

For speed, using x-y coordinates and time stamps(t) we calculated speeds in x and y directions (vx, vy) by using vx=x/t, vy= vy/t.

For absolute speed, v= sqrt(vx,vy).

For acceleration (ax, ay), these features are calculated by ax=vx/t and for ay=vy/t.

For absolute acceleration, a=sqrt(ax,ay)

Derivative pressure wrt t: dp/dt, where dp=p2-p1 and dt= t2-t1

Derivative of pressure wrt x: dp/dx, where dp=p2-p1 and dx= x2-x1

Derivative of pressure wrt y: dp/dy, where dp=p2-p1 and dy= y2-y1

weight of each feature:

to find the weights of features, we have used the machine learning model Adaboost classifier method, and the training and testing dataset is taken to be 60:40

the weighted similarity score between two signatures using DTW

DTW is used to calculate the distance between 12 features for the best alignment, after that similarity score is calculated by taking the summation of the product of weights and lengths of each extracted feature.