Projects & Data

ITCS 6156 / ITCS 8156 – Fall 2015

The data for each project can only be downloaded from the UNCC network. While the data isn't private, do not make it publicly-available or use it for something other than the final project for this course without permission.

1. Social Gesture Classification

The goal of this project is to predict the gesture performed by a user wearing an Axivity AX3 smartwatch. The AX3 Watch contains a tri-axial MEMS accelerometer. The data consists of the x-, y-, and z- components of the accelerometer readings sampled at 50Hz with a ±4G gravity threshold and was collected from multiple volunteers, who performed 12 different actions.

Data: Each data sample is a sequence of x-, y-, z- accelerometer readings from a smart watch worn on the hand of one of 31 different participants. The data segments have be segmented to correspond to a single "action".

http://orwell.uncc.edu/6156/project1.mat

Predictions should be integers (1-13) corresponding to the following actions: {'FistPump', 'HighWave', 'HandShake', 'FistBump', 'LowWave', 'PointStraight', 'PointLeft', 'PointRight', 'PointUp', 'MotionOver', 'HighFive', 'Clap', 'HeadScratch'}

2. Gender Estimation from Fingerprints

The goal of this project is to predict the gender of subject from an optical scan of the subject's fingerprint. The data set consists of fingerprints from 500 users of varying age, gender, and ethnicity. Fingerprints were acquired using both live-scan devices and ink-based ten-print cards and are saved as 500dpi bitmap images.

Data: Each bitmap image is from one of 500 participants using either an optical scan device or scanned paper. Fingerprints were collected from up to 10 digits for each participant and each sensor.

http://orwell.uncc.edu/6156/project2.tar (20GB)

Predictions should be values representing the likelihood of "Female". The performance metric is *Area Under Receiver Operating Characteristic Curve (AUC).* A detailed explanation for how AUC is calculated can be found here. The short version is that your solutions can take many forms (e.g., {0,1}, [0,1], [0, 100]) as long as the higher the number means the greater likelihood for the example being in the class "Female".

3. Algorithm Runtime Estimation

The goal of this project is to predict the runtime of a sparse matrix-vector multiplication (SpMV) algorithm given a sparse matrix. SpMV is the primary underlying operation for many applications, and the runtime for SpMV algorithms depends on the structure of the sparse matrix, which isn't available

until runtime. The data set consists of ~1,000 sparse matrices extracted from various application areas including meshes of physical systems, social networks, physics particle interactions, geographical information systems, purchasing logs from online stores.

Data: The inputs are sparse matrices from the University of Florida Sparse Matrix Collection. The labels are the runtime of the algorithm described in Section 2 of this paper.

http://orwell.uncc.edu/6156/project3.tar (30GB)

Predictions should be real numbers representing algorithm runtime (in ms). The performance metric is *Mean Absolute Error (MAE)* from the ground truth values.