README

The files and description for the same are as follows.

- **RunHMMProject3.m** - This is the main file that runs the training of the HMM models for all the gestures.

  Functions called by RunHMMProject3.m
  - **LOAD_ALL.m** – Loads the data from the matfiles, prunes the excessive redundant data and returns a concatenated cell Ggesture that has the IMU files with only accelerometer and gyroscope data for all the gestures.
  - It Loads the Centroids from the matfile saved as 'Centroids_vec.mat'
  - **findcentroid.m** – compares all the incoming data(IMU) to the cluster centroids and assigns them cluster numbers.
  - **initializeLambda.m** – initializes values for A,B,Pi.
  - **EM.m** – This function runs the EM algorithm to find best A,B,Pi.
    Functions called by **EM.m**
    - **HMM_forwatdBackward.m** – runs the forward backward procedure on the data, using current A,B,Pi and returns alpha, beta scaling constant and Loglikelyhood of a model given the observation sequence.

- **finaltest.m** – This function loads the data to be tested, here I had used the examples from training set itself during the leave one out cross validation.
  - This function loads the models of all the gestures stored in 'models1.mat' and the centroids from 'Centroids_vec.mat'
    This function calls **HMM_forwatdBackwrad.m** on allthe models and computes the log-likelyhood of the models and ranks them as the most probable models.

Other Files:

For plotting the data:

- testcircle.m – plotting the quantized data over the original IMU data for gesture 'circle'.
- testfugure8.m – plotting the quantized data over the original IMU data for gesture 'figure8'.
- fishtest.m – plotting the quantized data over the original IMU data for gesture 'fish'.

- testHammer.m – plotting the quantized data over the original IMU data for gesture ‘hammer’.
- testpend.m – plotting the quantized data over the original IMU data for gesture ‘pend’.
- testwave.m – plotting the quantized data over the original IMU data for gesture ‘wave’.