

SAMPLE REPORT

Datasets:

A total of 415 gesture csv files were provided which belonged to 6 different categories namely: Buy, Communicate, Fun, Hope, Mother, Really

The rows of each csv file correspond to a frame.

The Columns correspond to key points and their respective scores.

Pre-Processing:

We found a lot of dataset had less than 150 frames. We appended the dataset by repeating the frames from initial state of the dataset to normalize to 150.

Approach1:

In pre-processing stage, we used PCA for feature extraction as we wanted to focus on specific features. We dropped the scores of all the key points and the frame numbers. Moreover, we observed that key points below hip level were irrelevant for the model.

We were thus left with 11 joints and thus 22 key points.

We tuned number of components for PCA decomposition to arrive at an optimal value. Currently the PCA selects top 12 features which have the max variation.

Approach2:

We tried detecting which features needed to be extracted by trying out the pose net live demo for the 6 given gestures.

For Instance:

We build the pre-processing module to detect the Communicate gesture based on the sinusoidal variation of rightWrist_x and rightWrist_y

Not Communicate feature was built upon taking samples from all other dataset and using the same preprocessing technique as of Communicate

We used SVM with labels Communicate and Not Communicate.

Comparison:

Accuracy for Approach1 Using SVM Model: **95%**

Accuracy for Appraoch2 Using SVM Model: **56%**

The PCA gave good accuracy on test data and thus we went ahead with PCA.

Model Accuracy and Hyper Parameters: Approach1(PCA Based)

The hyperparameters of the 4 models were tuned to achieve optimal accuracy

We split the data into train and test in the ratio of 67:33 randomly

1. Neural Network:

Hyper Parameters:

hidden_layer_sizes = (90, 40, 6), max_iter=100, activation='relu', solver='adam', random_state=1

Accuracy: 98.7%

2. KNN:

Hyper Parameters:

n_neighbors=200

Accuracy: 89.93%

3. Random Forest

Hyper Parameters:

max_depth=10, random_state=0

Accuracy: 95.73%

4. Linear SVM

Hyper Parameters:

kernel='linear'

Accuracy: 95.61%

Result:

Neural Network performed the best for the test data with 98.7% Accuracy.