CSE 535: ASSIGNMENT PART-2

ABSTRACT
This report summarizes the results of four machine learning algorithms classifying given input skeletal points to one of the following classes: Buy, Fun, Hope, Really, Mother, Communicate. Also this part of assignment aims to develop a REST API using the trained models to classify a given input into one of the above categories.

DATASET

The data was collected as part of the previous assignment where we recorded each sign language using the mobile app that we developed for assignment part-1. Also we had some additional data. In total we have approx ~50K frame skeletal point values.

FEATURES USED
Only the upper body skeletal points has been used for training purposes. We discarded the lower body part skeletal points such as ankle_x, ankly_y, knee_x, knee_y etc. as it doesn't seem important for our final objective. The feature which we considered for training are:
nose_x, nose_y, leftEye_x, leftEye_y, rightEye_x, rightEye_y, leftEar_x, leftEar_y, rightEar_x, rightEar_y, leftShoulder_x, leftShoulder_y, rightShoulder_x, rightShoulder_y, leftElbow_x, leftElbow_y, rightElbow_x, rightElbow_y, leftWrist_x, leftWrist_y, rightWrist_x, rightWrist_y
These above feature directly impact the result of our task and hence can be important to train our ML models.

ALGORITHMS
We have used four classification algorithms for this task which are listed below :

1. **Logistic Regression**
2. **Decision Tree**
3. **Random Forest Classifier**
4. **Support Vector Machine**

Scikit-learn python library was used for the above model implementation. The following table summarizes the accuracies for each model.

Model	Accuracy
Support Vector Machines	84.02
Logistic Regression	73.24
Decision Trees	97.53
Random Forest	91.78

REST SERVICE

The train models then saved and used by our rest service to predict the output for an input frames. The REST API takes the input as json object via a POST call and returns the predicted values as JSON values as given below:


```
{
  "1": "buy",
  "2": "fun",
  "3": "mother",
  "4": "mother"
}
```


We used flask python library for the development for out REST API and hosted it on AWS Elastic Beanstalk.

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