Research Seminar at the IMS

A study on emotion recognition from body gestures using Kinect sensor

S. Saha, S. Datta, A. Konar and R. Janarthanan

Motivation

- Classify basic emotions (Anger, Fear, Happiness, Sadness and Relaxation).
- Features obtained from body gestures with the help of kinetic sensors.
- Compare different machine learning models.
- Improve human-computer interaction.

Data

- Ten subjects in the age group of 25±5.
- 60 seconds video of each emotion acquired from each subject.
- Kinetic sensor acquires the data @ 30 frames per second.
- Each frame is a 3-D human skeleton represented by 20 body joints.

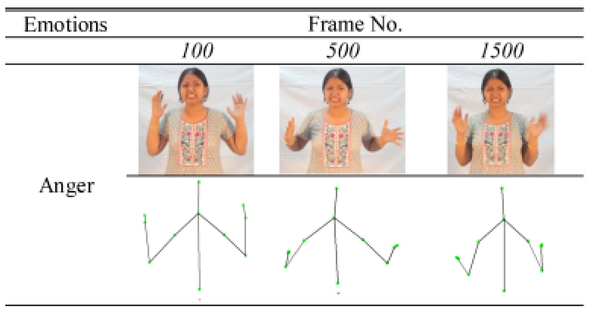

Figure 1: RGB images and skeletons of body gestures.

Feature Extraction

Following **nine features** were extracted using eleven joints in the **upper body**.

- The Euclidean distance between hand and elbow. (2 features)
- Maximum acceleration of hand and elbow with respect to spine. (4 features)
- Angle between head, shoulder center and spine. (1 feature)
- Angle between shoulder, elbow and wrist. (2 features)

Modeling

Classifiers: Decision Tree, AdaBoost, KNN, SVM, Neural Network

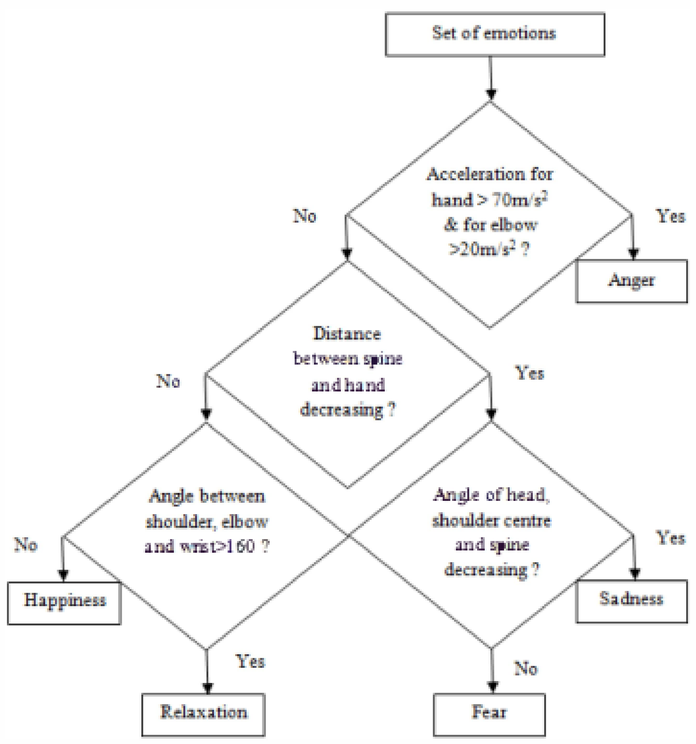

Figure 2: Scheme of Decision Tree based classification.

Results

- AdaBoost achieves the highest average accuracy of 90.83%.
- However, it is worst in terms of computation time.

Classifier	Avg. Accuracy
Decision Tree	76.63
AdaBoost	**90.83**
KNN	86.77
SVM	87.74
NN	89.26

Table 1: Average accuracy of classifiers.

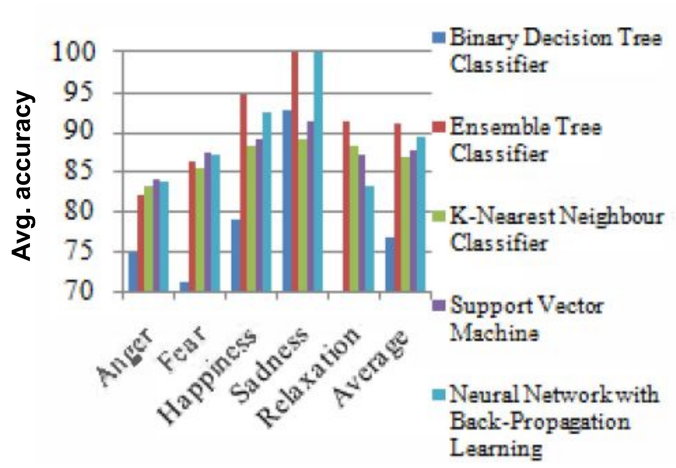

Figure 3: Comparison of accuracies for classifiers.

Limitations

- Body gestures depends on many factors such as culture and gender.
- Very small dataset size (10 participants).
- Features from lower body not considered.

References

[1] S. Saha, S. Datta, A. Konar, and R. Janarthanan. A study on emotion recognition from body gestures using kinect sensor. In *2014 International Conference on Communication and Signal Processing*, pages 056–060, 2014.