Report

Period: Oct. 31 - Nov 6, 2014

Task: **Simulating and estimating multimodal emotion recognition using different multimodal emotion databases**

Subtasks: **SVM training and classification, Performing simple actions on NAO, Analyzing facial and vocal data**

1 Task 1

I have estimated the SVM binary classification performances for 'angry', 'fear', 'disgust', 'neutral' and 'surprise' emotions. The recognition rates are shown in the Table 1. According to the results in Table 3, the performance of SVM binary classification by using pitch and intensity pair for 'Surprise' is 96.67% and is the highest among other emotions while for 'Disgust' this value is the lowest again since the pitch and intensity are the essential features in vocal emotion recognition. Also, I have measured the overall recognition accuracy of SVM binary classifier for each of 7 emotions using majority voting technique where SVM RBF is used as a kernel function where sigma=1. For this simulation 9 most important feature pairs where chosen with at least one of the acoustic features in (pitch, intensity) pair. The results are shown in Table 2.

Table 1. SVM Binary Classification Performance for all 7 emotions using only Pitch and Intensity Feature Pair

Emotion	Recognition rate (%)
Happiness	74.76
Sadness	71.11
Angry	86
Disgust	62.22
Fear	64.44
Neutral	91.67
Surprise	96.67

Table 2. Vocal emotion recognition accuracy using (pitch, intensity), (pitch, first bandwidth), (pitch, second formant), (pitch, third formant), (pitch, fourth formant), (pitch, mean noise-to-harmonics ratio), (pitch and standard deviation), (intensity and second formant), (intensity and mean autocorrelation) feature pairs and majority voting technique

Emotion	Recognition Accuracy (%)
Happiness	70.7895
Sadness	70
Angry	83.9474
Disgust	79.7368
Fear	77.8947
Neutral	65
Surprise	73.9474

2 Task 2

Using Choregraph program perform simple action on the NAO humanoid robot.

3 Task 3

Analysing the facial and vocal emotion recognition by AV clips recorded on the Kinect camera.

Tasks for the Next Week

1. **I am planning to estimate the vocal emotion recognition accuracy by using data fusion techniques such as mean rule, and weighted sum rule.**
2. **Simulating the results of Multimodal Emotion Recognition of four and five categories by using ensemble of trees of binary SVM classifiers.**