Model Classification

I ran several models with Weka on the training data for classification of the robot’s emotions directly.

To classify all emotions simultaneously, I generated a combined dataset of all emotions that were positively classified, namely I removed all training interactions where an emotion was played and the user did not meet the ‘passing’ criteria for the task. I processed the combined dataset through Weka with logistic regression, neural nets, k-nearest neighbors.

The confusion matrices represent the model applied onto the data set.

**Logistic regression**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Classification** | | | | |
|  | **Class** | Happy | Interested | Sad | Worried | Stern |
| **True Class** | Happy | 6 | 1 | 2 | 2 | 1 |
| Interested | 1 | 0 | 3 | 5 | 2 |
| Sad | 3 | 3 | 2 | 1 | 1 |
| Worried | 3 | 0 | 2 | 6 | 1 |
| Stern | 1 | 0 | 1 | 2 | 5 |

Correctly Classified Instances 19 35.1852 %

Incorrectly Classified Instances 35 64.8148 %

**K-nearest neighbors**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Classification** | | | | |
|  | **Class** | Happy | Interested | Sad | Worried | Stern |
| **True Class** | Happy | 12 | 0 | 0 | 0 | 0 |
| Interested | 1 | 10 | 0 | 0 | 1 |
| Sad | 4 | 0 | 6 | 0 | 0 |
| Worried | 3 | 0 | 0 | 9 | 0 |
| Stern | 0 | 0 | 1 | 0 | 8 |

Correctly Classified Instances 45 83.3333 %

Incorrectly Classified Instances 9 16.6667 %

**Neural net**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Classification** | | | | |
|  | **Class** | Happy | Interested | Sad | Worried | Stern |
| **True Class** | Happy | 4 | 2 | 5 | 1 | 0 |
| Interested | 2 | 3 | 4 | 1 | 1 |
| Sad | 3 | 0 | 7 | 0 | 0 |
| Worried | 2 | 2 | 2 | 6 | 0 |
| Stern | 1 | 0 | 1 | 0 | 7 |

Correctly Classified Instances 27 50 %

Incorrectly Classified Instances 27 50 %

Out of the three methods, Knn so far worked ‘best’. It might work better with more input data. Right now, the problem I see is that when we gather data, we check each emotion’s response as true or false (based on passing criteria), but for this to work in the multi-emotion models, I can only use the true classification.

I need to do further research on the methods available in Weka to see if there are other methods I can try to use. Also, if I use cross-validation or validation set split on the data, the performance decreases since the size of the data available is reduced.