# Speech Emotion Recognition (SER) project

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Presentation

# Crema-D dataset

- 91 speakers : 48 males, 43 females
- 4 classes of interest : happy, neutral, sad, angry
- 4900 sample points
- 136-dim vector per speech sample
- Each speaker contributes about 14 happy, sad, angry instances and 12 neutral (few exemptions exist)

- Speaker independent training/validation/test sets
- training set : 66 speakers ($\backsim$ 72%)
- validation set : 16 speakers ($\backsim$ 18%)
- test set : 9 speakers ($\backsim$ 10%)

# Dataset visualization : PCA

Transform points according to the first 3 principal components.


Figure 2.1

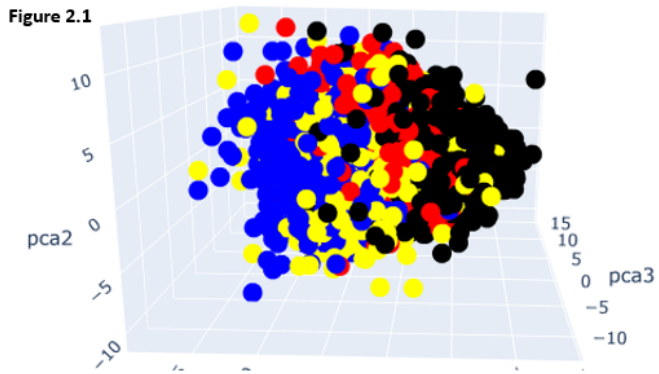



Figure 2.2

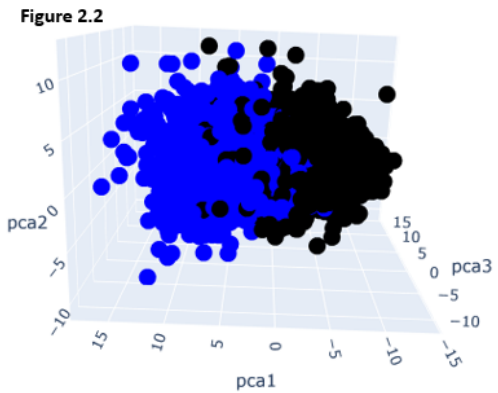



Figure 2.3

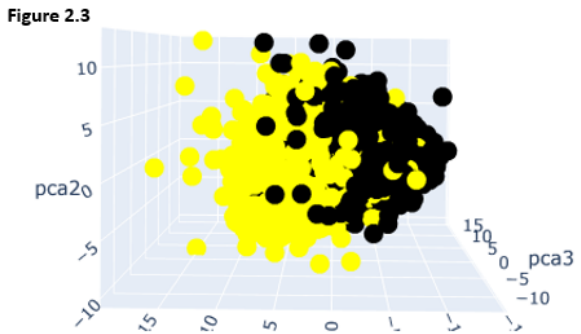
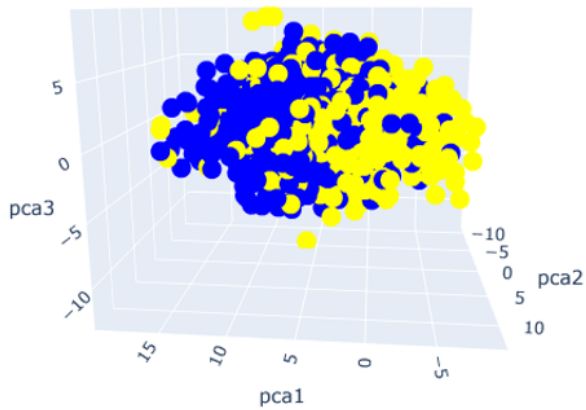
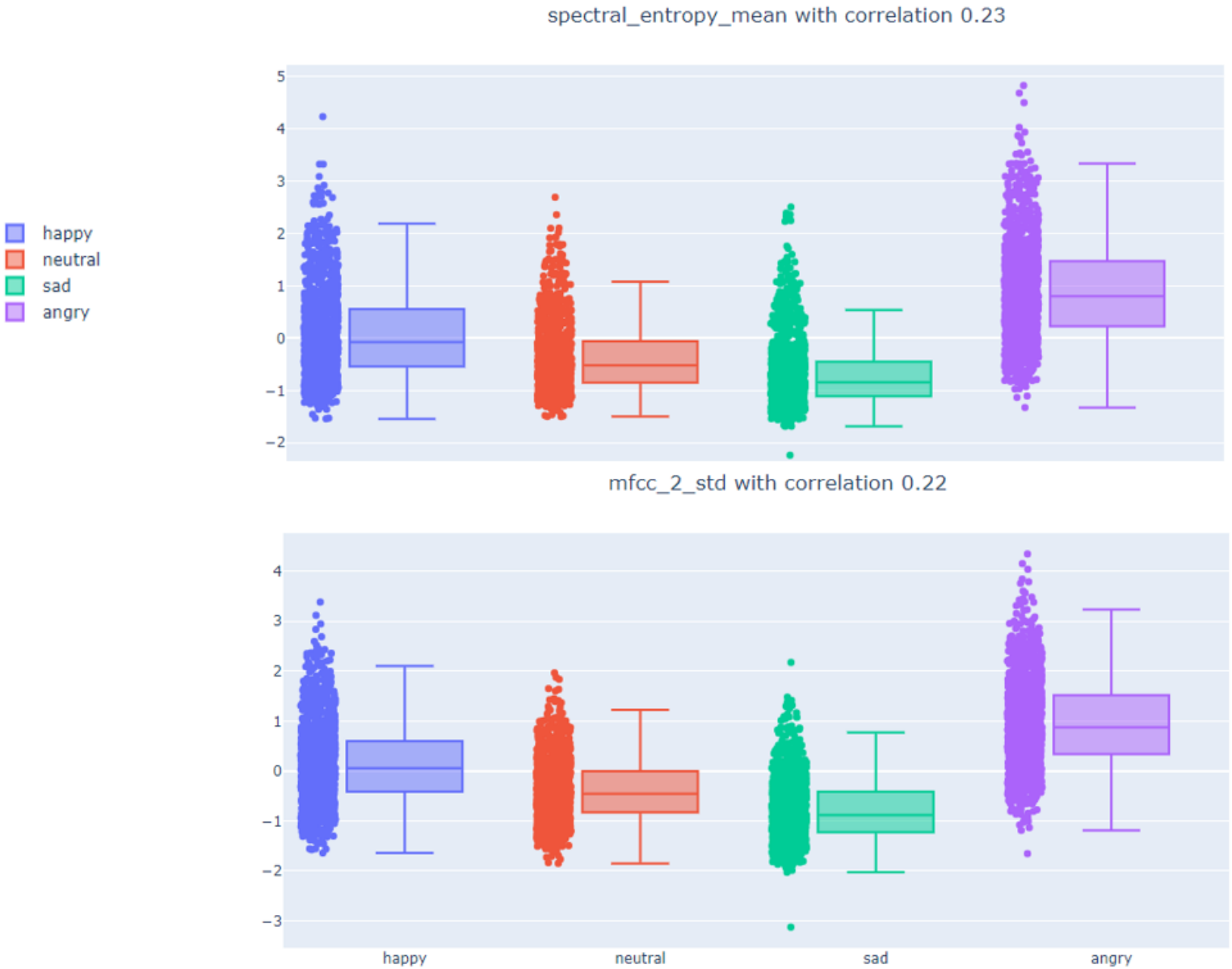



Figure 2.4



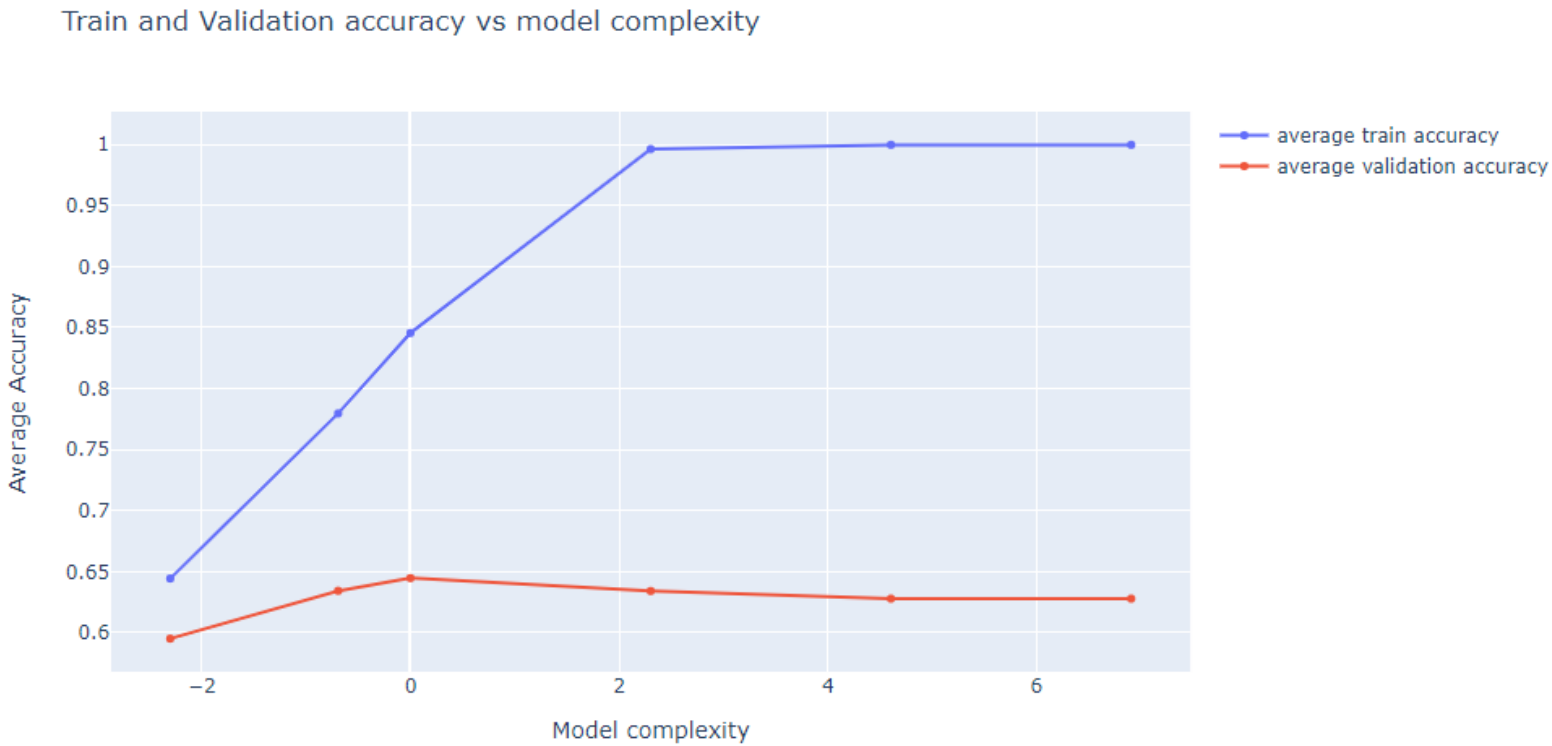
# Values Distribution : Boxplots

Examine correlations between features and target.



# The optimal model

- After conducting 20 experiments (train/validation splits) and examining multiple feature-target correlation levels, the optimal model is a SVM with $C = 1$, average validation accuracy 0.645 and average F1-score 0.641 (the selection criterion).



# Testing

- Confusion matrix

| | happy | neutral | sad | angry |
|---|---|---|---|---|
| happy | 74 | 25 | 11 | 16 |
| neutral | 21 | 60 | 19 | 8 |
| sad | 13 | 21 | 91 | 1 |
| angry | 32 | 14 | 4 | 76 |

Classification report

| | precision | recall | f1-score | support |
|---|---|---|---|---|
| happy | 0.53 | 0.59 | 0.56 | 126 |
| neutral | 0.50 | 0.56 | 0.53 | 108 |
| sad | 0.73 | 0.72 | 0.73 | 126 |
| angry | 0.75 | 0.60 | 0.67 | 126 |
| accuracy | | | 0.62 | 486 |
| macro avg | 0.63 | 0.62 | 0.62 | 486 |
| weighted avg | 0.63 | 0.62 | 0.62 | 486 |