



# EMO

## Together we will prevent FRUSTRATION



### Goals:

**Make accurate estimation of current emotional state of user**, through webcam input by using of multiple approaches to emotion recognition

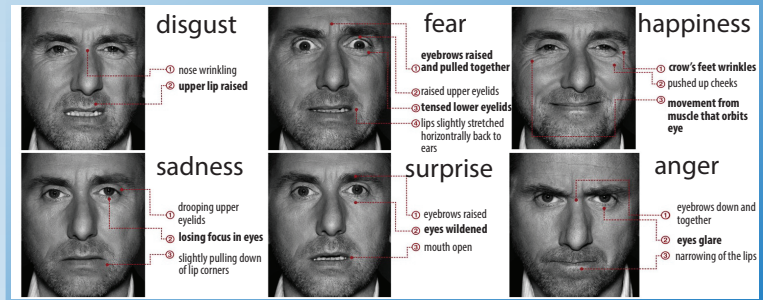
**Help to get rid of negative emotional states** by means of multimedia content and color variation

**Inclusion of our solution into bigger project** that deals with monitoring of employees actions on computer

**Providing REST API** for third party use

### How does it work?

Despite human face uniqueness, every emotional state has its typical characteristics that occur on human face. This characteristics can be calculated from various face points. In our project, we are actually processing 66 face points by using of webcam input.



### Theory in practice



**NEUTRAL STATE METHOD:**

HAPPINESS: 100%  
 ANGER: 0%  
 SADNESS: 0%  
 YAWN: 0%

**NEURAL NETWORK METHOD:**

Anger: -0.136152379894388  
 Disgust: 0.393802667881256  
 Fear: 0.125611776022929  
 Happiness: 0.8503843595787  
 Sadness: -0.030122130718  
 Surprise: -0.308892095057

**LibSVM method:**

Anger: 0.0829517858108097  
 Disgust: 0.223957134770233  
 Fear: 0.147293261154985  
 Happiness: 0.272804704694  
 Sadness: 0.1534262707517  
 Surprise: 0.1195668428176

happiness99  
 -0



**NEUTRAL STATE METHOD:**

HAPPINESS: 0%  
 ANGER: 85.17893%  
 SADNESS: 0%  
 YAWN: 0%

**NEURAL NETWORK METHOD:**

Anger: 0.219506742692682  
 Disgust: 0.73910005618079  
 Fear: 0.0196720604672722  
 Happiness: 0.0331322558897  
 Sadness: 0.11491808714121  
 Surprise: -0.0069514103256

**LibSVM method:**

Anger: 0.354632881180779  
 Disgust: 0.12602939606013  
 Fear: 0.087748221218516  
 Happiness: 0.0766116954793  
 Sadness: 0.24886024671051  
 Surprise: 0.10611755934732

anger95  
 happiness2.59011005377895  
 0

#### Neutral state

- Neutral state can be described as face proportions of user in calm state
- When neutral state is retrieved, we can compare it to current face proportions and find out displacements against calm state
- Some displacements are typical for each emotion, so emotional state can be recognized by these displacements
- Neutral state is retrieved for each user separately, this fact ensures accuracy of this approach for every user
- This approach was fully developed by ourselves**

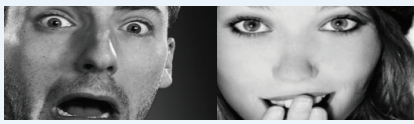
#### Machine learning

- This approach exploits potential of machine learning, which stands for powerful methods that can perform classification of real data on the basis of some kind of training data
- Training data are received from dataset that contains pictures of more than hundred people who are showing off different kinds of emotional states
- Real data are subsequently received from webcam and processed through machine learning methods
- We are actually using 2 methods for machine learning
  - Neural networks
  - SVM (support vector machines)

#### Accuracy

- With triple classification methods, we make estimations of emotional states far more accurately than by using of only one method.
- Emotional state is calculated in a complex method that process sequence of emotions in certain time periods

- Practical demonstration shows calculation of emotional probabilities
- Output of probabilities is from 3 mentioned methods (Neutral state, Neural network and SVM)
- The last output is combination of these methods



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