

Emotion Detection with Machine Learning

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Overview

Emotion detection through bio-signals is the process of analyzing biological changes occurring with emotion changes. Bio-signals include heart rate, temperature, pulse, respiration, perspiration, skin conductivity, electrical impulses in the muscles, and brain activity. For example, a rapidly increasing heart rate indicates a state of stress or anxiety. These physiological changes or bio-signals help get insight into the psychological state of humans. But the challenge is that a single bio-signal is not enough because it can indicate multiple emotional possibilities. Also, there is noise (artifacts) in the bio-signals that we have to alleviate. Then, we use Machine Learning algorithms to classify such bio-signals, including convolutional neural networks (CNN), Reinforcement learning, etc. Data acquisition can also become quite convenient since we can record the bio-signals through wearable devices such as Muse and EEG caps.

Problem

In this research, we are mostly interested in analyzing brain signals, i.e., EEG signals, with Machine Learning algorithms to detect emotions. We can take advantage of Machine Learning time series in conjunction with other Machine Learning algorithms (Convolutional Neural Networks, Reinforcement Learning, etc.) in our approach to recognize and analyze users' feelings. Formerly, I had done a Sentimental and Opinion Mining project on Amazon reviews ^[2] using Clustering algorithms. Therefore, according to the type of data in hand, we can employ supervised or unsupervised methods for this problem.

Data Set

The data set we are planning to use is driven from whether the Muse device or the EEG caps. These collected data can also be Big data, which then are called Machine data. Using these Machine data from such devices in the form of CSV files or images, we can implement the mentioned Machine Learning algorithms to find emotion patterns.

References in the Text:

1. Market and Markets website: <https://www.marketsandmarkets.com/PressReleases/emotion-detection-recognition.asp>
2. Amazon reviews project GitHub link: <https://github.com/Tina-Gh/Data-Mining/tree/master/Amazon%20Reviews>