Emotional State Classification with Biometric Sensor Data

Group 4:

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Project Description

Our objective is to develop a model that will evaluate wearable-generated biometric information and return a prediction of the user's current level of stress or excitement, defined by three potential states;

- Neutral
- Stress
- Amusement

Prior Work

The original WESAD work will be our primary reference material, along with other related research.

Introducing WESAD, a Multimodal Dataset for Wearable Stress and Affect Detection

Schmidt, Philip & Reiss, Attila & Duerichen, Robert & Marberger, Claus & Van Laerhoven, Kristof. (2018)

https://dl.acm.org/doi/10.1145/3242969.3242985

Datasets

WESAD (Wearable Stress and Affect Detection) Data Set

Https://uni-siegen.sciebo.de/s/pYjSgfOVs6Ntahr/download

Each member of our team has an independent copy of the source data.

Proposed Work

Data Cleaning:

During our preliminary review of the data there were not any major data quality issues noted. Infrequent null values will be resolved through imputing a windowed average.

Data Preprocessing:

We will likely need to evaluate the sensor data through a time-series approach, and need to transpose a historical time slice on to each record.

Data Integration:

We may need to integrate the base physiological measurements on to the sensor data to improve the performance of the model.

Tools

Python

- pandas
- numpy
- matplotlib
- sklearn

Evaluation

We can evaluate our model through several means;

- Confusion matrix
- ROC area under curve score
- Cross Validation