Design of an AI-Enabled self-monitoring and automated alert system based on Sensor Data for Safety of Women

For sensor based emotional state detection and analysis we have used the **WESAD (WEarable Stress and Affect Detection) dataset**.

Following are the contents:

1. Dataset
2. Gender based binary classification
3. Emotional state classification based on Labels
4. Result with code

Dataset- WESAD (WEarable Stress and Affect Detection) database has 15 subjects (12 male and 3 female)

- Initially the dataset contained sensor readings for 17 subjects but due to sensor malfunction 2 were discarded.
- 2 sensors data readings (chest-word RespiBAN and wrist-worn Empatica E4).
- All samples for RespiBAN were sampled at 700 Hz.
- For Empatica E4 device; BVP, EDA, Body Temperature, 3 axis accelerometers were sampled at 64Hz, 4Hz, 4Hz and 32Hz respectively.
- 2 gender (Male and Female) and 4 emotion states classified (Baseline, Meditation, Stress, Amusement).

Official Link for the dataset (*Size: 2.1GB*): https://ubicomp.eti.uni-siegen.de/home/datasets/icmi18/

Gender based binary classification - For each subject approximately 600 pre-processed features were extracted. A total of 34 such parameters were identified. This is done using the various statistical methods like mean, min, max… etc. A few of those features extracted are – net_acc_mean, ACC_x_std, Resp_min, EAD_max, BVP_peak_freq, TEMP_slope …etc.

PATH to CSV file - https://github.com/saomyachaudhury/WESAD_Sensor_Data_Analysis/tree/main/WESAD_pre_processed_data

Emotional state classification based on Labels – An accurate classification was also done using the same the features.

4 emotional states are classified (Path to Notebook): https://github.com/saomyachaudhury/WESAD_Sensor_Data_Analysis/blob/main/WESAD_subject_gender_state_analysis.ipynb

PATH to CSV file - https://github.com/saomyachaudhury/WESAD_Sensor_Data_Analysis/blob/main/WESAD_subject_gender_state.csv

LINK TO GITHUB REPOSITORY: https://github.com/saomyachaudhury/WESAD_Sensor_Data_Analysis