Predicting Personality Traits Using Multimodal Data

Know-how for using the repository:

Feature Extraction

1. The AMIGOS dataset is provided by the Institute for Visualization and Interactive Systems, University of Stuttgart, after signing the End User License Agreement. The dataset is stored at /bigpool/datasets/faprak2020/AMIGOS path of GPU1.

2. The physiological signals data is provided in the .mat files for all the 40 participants (Data_Preprocessed_Pxx.mat). The frontal HD videos of the 40 participants for all the 16 short videos and the timestmaps for video stimuli is provided in zip files (Exp1_Pxx_face.zip and Exp1_Pxx_timestamps.zip). The participant personality scores are also provided (Metadata_xlsx.zip). Note: xx indicates participant number.

3. Store the Data_Preprocessed_Pxx.mat in your required folder. The physiological signals of participants 9, 12, 21, 22, 23, 24, 33 are missing and the personality annotations of the participants 8 and 28 are not available. So, remove the data of these participants.

4. Update your path in Feature_extraction/Feature_Extraction_ECG_20s.py, Feature_extraction/Feature_Extraction_EEG_20s.py, Feature_extraction/Feature_Extraction_GSR_20s.py. These files will extract the required features.
   Usage: Run 'python3 Feature_Extraction_ECG_20s.py', 'python3 Feature_Extraction_EEG_20s.py', 'python3 Feature_Extraction_GSR_20s.py' from the point in memory where it is located.

5. Update the path in Feature_extraction/Feature_Extraction_Gaze_20s.py based on 'output directory path' (see section **OpenFace**) to extract gaze features.
   Usage: 'python3 Feature_Extraction_Gaze_20s.py' from the point in memory where it is located.

6. The extracted and normalized features of all the modalities will be stored in Data/Features_zzz_20s.csv. Note: zzz indicate the data modality.

7. The Data_fusion.py file will combine the extracted features of all the data modalities (EEG, ECG, GSR and Gaze) and save it at Data/Features_All_20s.csv.
   Usage: Run 'python3 Data_fusion.py' from the point in memory where it is located.

8. Extract the files from Metadata_xlsx.zip and save the path of Participants_Personality.xlsx in Binning.py. The binned personality will be saved at Data/Binned_Personality.csv
   Usage: Run ‘python3 Binning.py’ from the point in memory where it is located.

9. Combine_Personality.py will provide the participant’s personality for all the samples of a participant and will store it at Data/Final_Personality_20s.csv
   Usage: Run ‘python3 Combine_Personality.py’ from the point in memory where it is located.

10. ids_Generation.py will generate the participant ID and will store it at Data/ids_20s.csv
    Usage: Run ‘python3 ids_Generation.py’ from the point in memory where it is located.

Classifier

1. conf.py will contain the constants and configuration needed to run the classifiers.

2. RF_Classifier.py, SVM_Classifier.py and XGB_Classifier.py will train the respective models and will output the accuracy and F1 scores of fusion of modalities.
   Usage: Run ‘python3 RF_Classifier.py’, ‘python3 SVM_Classifier.py’, ‘python3 XGB_Classifier.py’ from the point in memory where it is located.

3. To train and evaluate the classifiers on single modality update the data path in each classifier to respective modalities.
   For example: To train RF classifier on gaze modality update the path in RF_Classifier.py to 'Data/Features_Gaze_20s.csv'.

4. Hyp_Opt.py will out the optimized hyperparameters
   Usage: Run ‘python3 Hyp_Opt.py’ from the point in memory where it is located.

OpenFace

1. We extracted the gaze features from OpenFace installed on Linux platform (GPU8) provided by the Institute for Visualization and Interactive Systems.

2. Run the command line command ‘./OpenFace/build/bin/FeatureExtraction -f “input file path/Exp1_Pxx_face/Pxx_yyy_face.mov" -out_dir "output directory path" ‘ to extract features from the folder which has OpenFace installed.

3. Where xx is participant number and yyy is video ID.
   ‘input file path’: Path where Exp1_Pxx_face.zip is extracted.
   ‘output directory path’: The directory is which the features extracted from OpenFace are stored.