

Investigating Relation Between Five Factor Personality Traits and Facial Action Units

Ritika Sharma, Master of Science in Computer Science
University of Dublin, Trinity College, 2022

Supervisor: Dr. Carl Vogel

Since the invention of Artificial Intelligence, researchers have aimed to create machines that can replicate human intelligence, which is not just confined to mathematics or analytical but is also emotionally aware and intelligent. Having emotionally aware systems is especially beneficial for Human-Computer-Interaction as they aim to enhance the user experience of using computers. Personality Computing is an example of such an effort made, based on the belief that the way users use technology relies heavily on their personalities.

This research is based on the branch of Personality Computing -Automatic Personality Recognition. It aims to find if there exists any relationship between Five-Factor Personality Traits and Facial Action Units and also if the above-mentioned relationship varies gender-wise. The Five Factor personality traits consist of Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism.

The facial action units of an individual are collected from the video files present in the MULTISIMO dataset. The Big Five Inventory (BFI, 44 items) generate the personality trait scores. The video files are processed through the PyFeat library to extract facial action unit features. Feature Engineering is applied to the dataset to make it more resilient before passing to different classifiers, decision trees and random forests. Random Forest generated the best accuracy out of the two. The data was non-parametric; thus, the Mann-Whitney U test was applied to verify the results. The results produced are promising. There is a clear association between each five personality traits and the 20 different action units considered in this research.

The approach used in this research can be applied to any real-time dataset to identify an individual's personality traits and leverage it to make the system adapt according to the user's personality traits or use it in career development applications.