1. Detecting stress and anxiety in films using facial clues

**Authors**: G. Giannakakis, D.Manousos, F. Chiarugi

Through video-recorded face clues, this research creates a framework for detecting and analysing stress/anxiety emotional states. Through a range of external and internal stresses, a complete experimental methodology was designed to produce systematic diversity in emotional states (neutral, calm, and stressed/anxious). In order to measure emotion expression more objectively, the study focused mostly on non-voluntary and semi-voluntary facial signals. Eye-related events, mouth activity, head motion characteristics, and heart rate assessed via camera-based photo-plethysmography were also investigated. In each experimental phase, a feature selection technique was used to pick the most robust characteristics, followed by classification algorithms that discriminated between stress/anxiety and neutral states with reference to a relaxed condition. In addition, a ranking transformation based on self-reports was presented to study the relationship between face attributes and a participant's reported stress/anxiety level. Specific facial signals generated from eye, mouth, head, and camera-based cardiac activity acquire excellent accuracy and are acceptable as discriminative markers of stress and anxiety, according to the findings.

2. Detection of Stress Using Image Processing and Machine Learning Techniques

**Authors**: Nisha Raichur, Nidhi Lonakadi, Priyanka Mural

Stress is an uncomfortable state of emotional arousal that individuals feel in settings such as sitting in front of a computer for lengthy periods of time. Computers have become a way of life; we spend so much of our time on them that we are more impacted by the ups and downs they create. One cannot totally avoid using computers for work, but one should at least limit his or her use if he or she is concerned about being stressed at a certain moment. Monitoring a person's mental state while working in front of a computer for an extended period of time is critical for their safety. This research uses real-time nonintrusive movies to assess a person's emotional state by analysing their facial expression. Each video frame contains a distinct feeling, and the stress level is determined in the hours after the video recording. We use a method that enables us to train a model and compare differences in feature prediction. Theano is a Python framework aimed at speeding up the execution and development of the linear regression model, which is employed as a deep learning technique in this case. The results of the experiments reveal that the devised method works effectively with a generic model of all ages.

3. Techniques for Predicting Stress in Working Employees Using Machine Learning

**Authors**: U. S. Reddy, A. V. Thota and A. Dharun

Stress problems are a widespread problem among today's working IT professionals. Employees are more likely to experience stress when their lifestyles and work environments change. Despite the fact that many sectors and corporations provide mental health-related programs and attempt to improve the office environment, the problem remains out of Control. In this research, we will use machine learning approaches to examine stress patterns in working people and to identify the elements that have a significant impact on stress levels. Data from the OSMI mental health survey 2017 answers of working professionals in the IT sector were used to help with this. After proper data cleaning and pre-processing, we used a variety of Machine Learning approaches to train our model. The accuracy of the models mentioned above was determined and compared. Among the models used, boosting had the best accuracy. Gender, family history, and the availability of health benefits in the job were found as key characteristics that impact stress using Decision Trees. With these findings, businesses may focus their efforts on reducing stress and providing a more pleasant working environment for their workers.

4. A sternal ECG is used to classify acute stress using linear and non-linear heart rate variability analyses.

**Authors**: Tanev, G., Saadi, D.B., Hoppe, K., Sorensen, H.B

The diagnosis of chronic stress is crucial in predicting and lowering the risk of cardiovascular disease. This project is pilot research with the goal of establishing a technique for identifying short-term psychophysiological alterations using HRV properties. The goal of this pilot project is to identify and acquire insight into a collection of characteristics that might be utilized to detect psychophysiological alterations associated with chronic stress. Images, noises, mental activities, and rest were used to evoke four distinct forms of arousal, which were then identified using linear and non-linear HRV characteristics from electrocardiograms (ECG) obtained by the wireless wearable ePatch recorder. Sample entropy, detrended fluctuation analysis, and normalized high frequency features were used to get the greatest identification rates for the neutral stage (90 percent), acute stress stage (80 percent), and baseline stage (80 percent). It was discovered that standardizing nonlinear HRV variables for each participant was a crucial component in improving classification outcomes.

5. Healthy Office: Using smartphones and wearable sensors, employees may recognize their moods at work.

**Authors**: Zenonos, A., Khan, A., Kalogridis, G., Vatsikas, S., Lewis, T., Sooriyabandara

Workplace stress, anxiety, and depression are detrimental to employees' health and productivity, and they are costly. Sensor technologies, such as smartphones and wearables with physiological and movement sensors, have been the focus of recent research in this field. In this paper, we look at the feasibility of deploying such gadgets for mood detection in the workplace. Every two hours, we propose a new mood detection framework that can recognize five intensity levels for eight distinct kinds of emotions. We also propose a smartphone app ('Healthy Office') that is meant to promote formal self-reporting and give data for our model. In a small scale user research, we gather wearable sensing data in an office setting to assess our technology. Our trials have shown encouraging results, enabling us to accurately distinguish different types of emotions.