Stress monitoring using a mobile application and state-of-the-art wearable sensors

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Project Description

Stress has become in a global epidemic according to the World Health Organization. Moreover, it has been proven that high stress levels compromise the security in risky jobs, reduce significantly our cognitive capacities and lead to a large range of diseases. The stress response triggers different physiological reactions in the body that can be detected from the measurement of heart rate, skin conductance, skin temperature, blood pressure, among others biosignals. The main goal of this project is develop a mobile app to collect and process biosignals coming from a wristband (via Bluetooth) and use them to monitor stress using a machine learning method. The complexity of this work can be adjusted according to the type of the project (Semester or Master).

The students’ tasks include:

1. Development of a mobile application to collect and process biosignals that are measured in a remote wristband.
2. Physiological data collection in an experiment that simulate stress situations.
3. Data processing and machine learning to detect stress levels.
4. Implement the data processing and the stress detection method in the mobile app.

This project will be based on one of the state-of-the-art smart wristband, i.e., E4 Empatica Band. E4 Band provides several biomedical sensors, including photoplethysmography sensor (PPG), 3-axis accelerometer/gyro, skin temperature sensor and galvanic skin response.

The project will be carried out at the Embedded Systems Laboratory of EPFL under the supervision of Prof. David Atienza, Dr. Adriana Arza and PhD student Giulio Masinelli.

Requirements:

1. Good knowledge of mobile application programming (Android/Java).
2. Basic knowledge of programming in MATLAB.
3. Basic knowledge of signal processing, machine learning, and software development.
4. Interest in biomedical applications.