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Stimulation of emotional states in Human-robot environment using physiological devices and analysis through machine learning algorithms.

ABSTRACT - Masterthesis

Stimulating the sensor data from the emotional states is becoming a major part of a user's context for wearable computing applications. This study has two major purposes:

(1) To collect the data from physiological sensors: Electromyogram(EMG) and Blood Volume Pulse (BVP) which were worn to the participant for:

   i) Initial study in a lab environment

   ii) Final study in a robotic environment

(2) To analyze the data from two studies through machine learning algorithms in WEKA tool.

The EMG sensor data was acquired from MYO armband and BVP sensor data from oximeter. State-of-the-art work has been focusing on the analysis of the physiological information, as collected through bio-signal acquisition sensors and related computational processing. The main aim of this thesis is to achieve better accuracy when the sensor data from the two studies were compared.

In an initial study, 15 participants were recruited and an experiment has been conducted in a lab such that no disturbances were made to the participant. Here, the physiological data (training data) was logged into the system from the devices worn by the participant and then machine learning algorithms were applied for further analyzing.

The final study was done in a robotic environment where the interactive communication was created between the robot and participant. Here, the physiological data (testing data) was logged into the system while some robotic actions were performed under the supervision of a controller at BIBA. Finally, the training and testing data was analyzed using WEKA tool and also evaluated the test set on training dataset.