

AUBADE

A wearable EMG AUgmentation system for roBust emotionAl unDErstanding

AUBADE project provides an innovative tool that will lead professionals to a deep study, analysis, understanding, and comprehension of neurological diseases and human emotions.

Objectives of the project

AUBADE project has developed an intelligent, multi-sensor and wearable system for the assessment of the emotional state of humans under special conditions. The project has involved the utilization of innovative technologies such as the recognition of the emotions after the processing of the following biomedical signals: EMG, obtained from the face of the users, ECG, skin conductivity and respiration rate.

AUBADE results in a modular and multifunctional system to be applicable in different areas. Initially it is being utilized in the health sector, primarily in the neurology and psychology areas, and also in the car racing sector.

AUBADE objective is the implementation of an intelligent, multisensorial wearable system that can ubiquitously monitor and classify the emotional state of users in near time using signals mainly obtained from their faces.

AUBADE platform incorporates a wearable system that obtains signals from multiple appropriate biosensors mainly placed on the face of the user (EMG, ECG, skin conductivity and respiration rate). The system is being used in a variety of healthcare applications mainly in the neurology and psychology field. Additionally, there are other areas of application, as the racing car sector.

AUBADE has been designed to be highly modular and can be easily adapted or break-up in stand alone modules, in order to accommodate a wide variety of neurological and psychological conditions.

Project Description

AUBADE has developed the next generation of the remote human emotions' monitoring systems, which is safe, easy-to-use, cost-effective and provides quality and accuracy at measurements.



AUBADE uses bio signals as an innovative method for determining the emotional state of subjects, instead of other traditional techniques, such as image processing. More specifically, EMG signals are measured as they constitute the basic information for classifying human emotions. Additionally other parameters are considered (ECG, respiration rate, skin conductivity) to obtain a more accurate emotional classification.

These signals are collected and transmitted to a centralised system. **AUBADE** has developed new and efficient methods for processing multisensorial signals based on sensor management and data fusion techniques.

In the centralized system, an Intelligent Emotion Recognition module, through its classification submodule, combines data from the user's health record along with the features extracted from the various sensors and with the aid of various intelligent classification techniques detects the psychological state of the user. In addition,

AUBADE implements a near real-time 3-D facial representation module, which animates a generic face model with the specific user muscle movements.

“AUBADE has developed the next generation of the remote human emotions’ monitoring systems”

The final system is being integrated, tested and validated in two differentiated pilots. First, the system is being applied to a medical pilot covering three neurological diseases (Huntington's disease, Epilepsy and Parkinson disease). In a posterior phase, the system will be adapted, tested and validated in a racing car pilot.

Expected Results & Impacts

AUBADE is being used in a variety of healthcare applications mainly in the neurology and psychology field. More specifically, the system assesses the emotional state of patients suffering Parkinson's disease, Epilepsy or Huntington's disease. Preliminary results demonstrate that the system contributes to improve the diagnosis and treatment procedures, as well as to get a better comprehension of the psychological status of the patients.

AUBADE will help healthcare professionals to understand their patient's physiological state and also to provide them with alternative treatments plans, and with further instructions and guidance. Additionally, the system will allow establishing relationships between facial signals and diseases, and it will help to increase efficiency and save time.

AUBADE system will also offer a considerable benefit to the car racing sector. The system will help them to gain parametric knowledge about car racing driver's fatigue limits in a wide range of severe environmental conditions, to reduce accidents that may occur due to mistakes of drivers when operating under extreme stress conditions and to contribute to the whole health monitoring of drivers.

A U B A D E

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Website: <http://www.aubade-group.com>

Project co-ordinator:
SIEMENS; S.A.

Contact person:

Mr. Angel Blanco

Tel: + 34 91 514 45 84

Fax: + 34 91 514 47 87

Email: angel.blanco@siemens.com

Partners:

- SIEMENS, S.A. (ES)
- AZIENDA UNITA SANITARIA LOCALE DI MODENA (IT)
- ANCO S.A. Agencies, Commerce & Industry (GR)
- University of Ioannina (GR)
- MASERATI S.P.A. (IT)

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