



leti



# Stress Observer

## Real time stress monitoring for wearable-based stress aware systems

### What is Stress Observer?

Stress Observer is a data fusion process, based on the user's motion and physiological signals. It analyzes the data to monitor stress levels. Users include both passengers and transportation professionals (racing drivers, truck drivers etc).

The device integrates data fusion processing that:

- Automatically estimates each person's stress levels regardless of the activity
- Uses sensors typically integrated into wearables

Automatic identification of stress levels allows:

- Specific action when high stress situations are detected
- Personalized coaching based on stress level and corresponding to specific activities

### Applications

Non-invasive, wearable-based stress monitoring measures the emotional state of a person. Designed for transport and mobility, it offers:

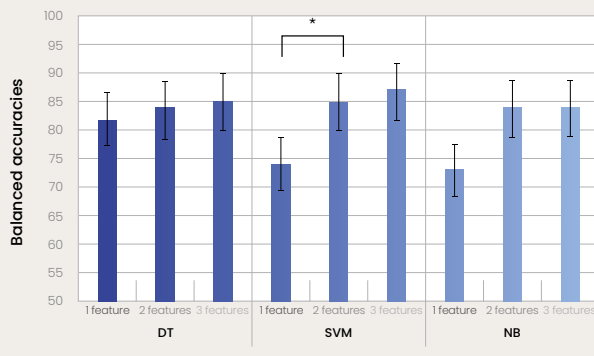
- Real-time journey planning specific to each traveller
- Smart emotion tracking to improve transport and mobility comfort and safety
- Awareness of mobility wellness for specific social groups
- Human-centric services and applications
- Professional driver monitoring and biofeedback during training and practice

## What's new?

- Well controlled multi-task multi-user experiment for database construction
- Validation from real life experiments
- Smartphone application estimating stress in real time

## How does it work?

- Feature extraction dedicated to wearable sensors
- Machine learning based on a multi-task multi-user experiment
- Baseline personalization



Performance of several classifiers  
(1. stressed 0. not stressed) and number of inputs

## What's next?

The "Bon Voyage" cooperation project, funded by the EU Horizon 2020 research and innovation program (Grant 635867), has successfully developed traveler stress level monitoring. During the "HADRIAN" cooperation project, funded by EU Horizon 2020, CEA-Leti will develop an observer of driving ability, for better use of automated vehicles.

Such data fusion methodology will be used to develop similar tools for assessing driver vigilance, individual panic detection and better biofeedback for transport users.

## Publications

- [1] O. Sakri et al., "A Multi-User Multi-Task Model For Stress Monitoring From Wearable Sensors", in 2018 21st International Conference on Information Fusion (FUSION), 2018, p. 761-766,
- [2] G. Vila et al., "Real-Time Monitoring of Passenger's Psychological Stress", Future Internet, vol. 11, n°5, p. 102, may 2019.

## Features

- Key feature extraction by motion and physiological sensor signal processing
- Machine learning
- Classification, estimation

## Interested in this technology?

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