AI Enabled Autonomous Nervous System Intelligent Monitoring (ANSIM)

Project Info

- Project Title: AI Enabled Autonome Nervous System Intelligent Monitoring (ANSIM)
- Project Acronym: ANSIM
- Institute/Lab: DLR Institute for Aerospace Medicine
- Contact Person: M.Sc. Timo Frett, +49 2203 601 3458, timo.frett@dlr.de
- Start Date: October 2020
- Expected Duration: 12 weeks
- Data location: data will be provided by DLR ME
- Costs: no additional costs

Project Description

The Department of Gravitational Biology at the Institute of Aerospace Medicine at DLR investigates human performance in extreme environments to gain deeper insights in physiology and develop new applications for manned space exploration and clinical practice.

In this particular project high resolution cardiovascular data will be used to find early markers and changes that could indicate a developing orthostatic instability or pre-syncope symptoms. Syncope affects around 5 out of thousand people each year and is common in older peoples and females. Nevertheless younger population (10-30 years) have the highest rate of vasovagal syncope. Serious cases are mostly caused by cardiovascular problems such as supraventricular tachycardia. Despite a long history of medical research the underlying causes are unknown in half of the cases. If syncope leads to treatment in an emergency department it has a poor outcome (4% mortality).

The Institute of Aerospace Medicine has a large pool of cardiovascular data from tilt table or human centrifuge studies. Volunteers that participate at human trials have to be passed a medical screening showing that they have a good cardiovascular fitness. By using tilt tables (especially in combination with a lower body negative pressure system) or human centrifuge vasovagal reactions have been triggered in healthy adults and recorded under supervision of a physician. These data sets can be used to develop and train an algorithm that can find early signs of performance drops and cardiovascular events before vasovagal symptoms occur. In combination with data from bed rest induced deconditioning (as in the latest 60 day AGBRESA study with NASA/ESA) ageing effects could be simulated as well.

Practical applications of such an algorithm are in wearable devices that continuously monitor cardiovascular data of risk patients as well as older people as preventive measure.

Summary of Project Goals

1. Structuring and extracting relevant cardiovascular data sets from recent human studies
2. Development and training of an algorithm to find early marker of developing vasovagal symptoms