Institut "Jožef Stefan", Ljubljana, Slovenija

center za prenos tehnologij in inovacij
na Institutu "Jožef Stefan"

Licensing opportunity

Stress-detection algorithm for wearable devices

Field of use
Technology Keywords:
01003003 Artificial Intelligence (AI)
01003006 Computer Software
01004001 Applications for Health

Current state of technology
Stage of Development:
Prototype available for demonstration

Patent status
TBA

Publication
TBA

Developed by
Jožef Stefan Institute

Reference
TBA

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Background

A Slovenian research institute is offering licensing of a computer implemented algorithm for stress detection. The algorithm was evaluated in a real-life setting and is integrated in a prototype application for managing mental health and well-being. The researchers are looking for a company active in the health and wellbeing market able to implement the algorithm in commercial wearable applications in the framework of a license agreement.

Description of the Invention

Continuous exposure to stress is harmful for mental and physical health. Solutions for efficient, accurate and user-accepted automated stress detection are still missing on the market. Artificial intelligence researchers from a Slovenian public research institute have developed and tested an algorithm for continuous detection of stressful events. The algorithm is using data from a wrist device which is capable of measuring users' heart rate (HR), blood volume pulse (BVP), galvanic skin response (GSR), skin temperature (ST), time between heartbeats (IBI) and accelerometer data. The offered technology is a computer implemented algorithm, however the proposed algorithm in a combination with appropriate wrist device (which must be provided by the partner sought) can constitute a competitive product for the health and well-being market. Authors of the algorithm are computer science experts specializing in development of proprietary methods and algorithms for analyzing wearable sensor data used mainly in the health domain but applicable to other domains as well. The team has been among finalists of the global competition for medical diagnostic devices. They have won the international competition for activity recognition. They are active in several projects for the development of smart watch monitors for independent living of seniors with dementia; detection of falls and abnormal behaviours for elderly; support older workers in reducing physical and mental stress using wristband and personalized advices and decision support to help patients with heart problems.

The researchers are looking for companies who are interested in obtaining a licensing agreement for the stress-detection algorithm. Companies should be able to cover and organize all commercialization services (marketing and sales, distribution, after sales support). In particular, the following companies from wellness and health sectors are sought:

- companies which develop and produce wearable wireless wellbeing, sport and fitness devices;

- companies which offer solutions for remote patient monitoring, on-site professional healthcare monitoring and home/office/work environment monitoring.

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»The investment is co-financed by the Republic of Slovenia and the European Union under the European Regional Development Fund.«
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Main Advantages

Most of the related artificial intelligence algorithms for monitoring stress are tested in laboratory scenarios for which they are specialized. However, when tested in the real-life scenarios their performance drops significantly. The offered algorithm in addition to the high performance in laboratory scenarios achieves high performance also in uncontrolled, real-life scenarios. This is thanks to the novel context-based machine-learning approach. The algorithm combines several machine-learning components to find out the context under which certain event happens, before it detects whether it is stressful or not. One of the components is a laboratory stress-detection classifier trained on laboratory data to distinguish between stress and no-stress physiological signals. Another component is a proprietary activity-recognition classifier which continuously recognizes user's activity and thus provides context information about real-life circumstances. The third machine-learning component is a classifier trained on real-life data which combines the outputs of the other two components (laboratory stress classifier and activity-recognition classifier) and provides the final decision whether a certain situation is stressful or not. The recognized user's activity and computation of features for stress detection from the above mentioned physiological signals (BVP, HR, ST and GSR) improves the ability to distinguish between genuine stress in real life and the many situations which induce a similar physiological arousal (e.g., exercise, eating, hot weather, etc.). This is the main advantage as opposed to other known approaches in the research community and on the market.

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