

PRESS RELEASE

PRESS RELEASEApril 26, 2022 || Page 1 | 2

Wearables for medical applications with AI-based evaluation methods

According to forecasts, the global market for medical wearables will reach around 94 billion US dollars in 2022. At this year's Sensor+Test trade fair, Fraunhofer EMFT will be presenting new approaches to solutions for medical wearables for early detection of pressure ulcers, for measuring blood pressure and for monitoring vital parameters during infectious diseases. In addition to the respective sensor technology, the focus here is on secure data transmission and AI-based diagnostic tools for the possible early detection of diseases.

The automated monitoring of vital parameters on the human body will be an essential part of the early detection of diseases or life-threatening situations in the future. **Medical wearables** play a crucial role here, as they permanently monitor and process vital parameters and transmit them. They can even be adapted to personal, individual risk factors and alert in the event of critical values. In this way, affected patients can partially regain flexibility and mobility that they had lost due to a particular health restriction. However, the demands on these little helpers are high: In contrast to the pure recording of vital parameters by means of wearables, which has already become a lifestyle trend today, medical wearables not only collect data, but also interpret them diagnostically. This requires suitable evaluation methods to process the data, preferably locally, and to be able to derive diagnoses from it. Another essential aspect is the secure, wireless and data-protection-compliant forwarding of sensor data.

At the Sensor & Test 2022 trade fair, Fraunhofer EMFT will be presenting three solutions for different medical applications from its current R&D activities at the stand of the Strategic Partnership for Sensor Technology e.V. cluster. (Hall 1, Booth 1-324).

For early detection of **pressure ulcers** affecting bedridden patients, the researchers are developing flat **sensor patches** that can be applied to vulnerable areas of the body to monitor relevant parameters such as oxygen saturation, pressure, movement and temperature. Via telemedicine solutions, the data will be transmitted directly to the care council developed by Monks, a web application for medical professionals. In addition, the project team is working on a prophylaxis tool based on machine learning methods.

Covid-19 is a current example of how rapidly the status of patients with infectious diseases can deteriorate. Researchers at Fraunhofer EMFT have designed a **modular sen-**

Contact

Franz Wenninger | Fraunhofer Research Institution for Microsystems and Solid State Technologies EMFT | Phone +49 89 54759-447 | HansasträÙe 27d | 80686 München | Franz.Wenninger@emft.fraunhofer.de | www.emft.fraunhofer.de

Lorenz Grünerbel | Fraunhofer Research Institution for Microsystems and Solid State Technologies EMFT | Phone +49 89 54759-437 | HansasträÙe 27d | 80686 München | Lorenz.Gruenerbel@emft.fraunhofer.de | www.emft.fraunhofer.de

sensor wristband that allows monitoring of relevant biosignals for early detection of **deterioration in the condition of infectious diseases**. The modular and mobile design of the proposed system with standardized, open interfaces enables easy integration into other platforms and applicability for various diseases, such as influenza, pneumonia and sepsis. Via an energy-efficient communication interface, data will be transferred online to a central database for dedicated analysis and further processing. To ensure the longest possible operating time, the system will also be equipped with its own energy storage so that the recorded values can be transmitted via Bluetooth. In parallel, tests are being carried out to determine the suitability of an energy harvesting solution to recharge the energy storage during operation and thus further extend the operating time.

PRESS RELEASE

April 26, 2022 || Page 2 | 2

As part of a project to provide medical care for patients with numerous injuries, researchers at Fraunhofer EMFT have designed a **sensor wristband with an integrated micropump for measuring arterial blood pressure**. The micropump pumps air into an integrated plastic reservoir, which then presses on the arteries. The systolic and diastolic blood pressure values are recorded and interpreted diagnostically on the smartphone/tablet of the healthcare professional using special evaluation methods. In the future, the sensor data will also be used to identify other medical conditions such as arrhythmias.

The presented applications show the broad potential of our hardware and software competences. The research teams are therefore looking for partners for the further development of the presented solution approaches as well as for the development of other topics in this area.



© Fraunhofer EMFT | Bernd Müller

Medical wearables for acquisition of vital parameters to monitor infectious diseases.

Fraunhofer EMFT conducts cutting-edge applied research on sensors and actuators for people and the environment. The over hundred employees in the three locations in Munich, Oberpfaffenhofen and Regensburg possess long-term experience and wide-ranging know-how in the fields of microelectronics and microsystem technology. The technology offering of the research institution ranges from semiconductor processes, MEMS technologies and 3D integration to foil electronics. These nano- and microtechnologies are the basis for the other competence areas at Fraunhofer EMFT: sensor solutions, safe and secure electronics, and micropumps.