Mobile Diagnostics by Smartphone and Image Analysis for Detecting Antibiotic Resistance

Fraunhofer-Institut fuer Angewandte Informationstechnik (FIT)

Fraunhofer FIT demonstrates a mobile wireless system that monitors the health of elderly people in their own homes, using miniature sensors, and also a novel optical system for detecting antibiotic resistance, which can determine in just two hours if bacteria react to a specific antibiotic.

Ambient Assisted Living (AAL) systems are increasingly being used to monitor age-related health risks. The systems will continuously monitor the patients' health in their homes and help to reduce the number of visits to the doctor. Miniaturized sensors integrated in mobile devices that are connected to medical centers can monitor and diagnose patients in their homes without reducing their quality of life.

At BIOTECHNICA 2013, Fraunhofer FIT demonstrates the first system that integrates three different sensors in one platform. A nano potentiostat measures biochemical information in a patient's assay, e.g. glucose, lactate or cholesterol levels. A fluorescence sensor is used to detect color-marked biomarkers. A SpO2 sensor monitors heart rate and arterial oxygen saturation. A smartphone app processes the data from the three sensors and transfers them to a server. For secure data communication, a Bluetooth connection with a specifically developed protocol is used.

"Our aim was to integrate, in one mobile device, several miniature sensors that measure relevant diagnostic parameters and communicate their data wirelessly", says Professor Harald Mathis, head of the department 'Biomolecular Optical Systems' of the Fraunhofer Institute for Applied Information Technology FIT. As devices that measure biometrical data do not use standardized protocols, we developed a sensor platform that takes the data from the different sensors, processes them and sends them to a smartphone. The smartphone can then transmit the data to the patient's physician.

The system was developed by Fraunhofer FIT in cooperation with Charité and T-Systems Deutschland in the BMBF/EU-funded project Nanoelectronics for Mobile AAL Systems – MAS.

Fraunhofer FIT's second exhibit is an image analysis system for bacteria diagnostics. Antibiotic resistance is a growing threat to our health. Many antibiotics are losing their effectiveness. Unfortunately, there are no universal flash tests for antibiotic resistance. FIT's new system uses an optical process that can determine in just about two hours if bacteria react to a specific antibiotic.

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