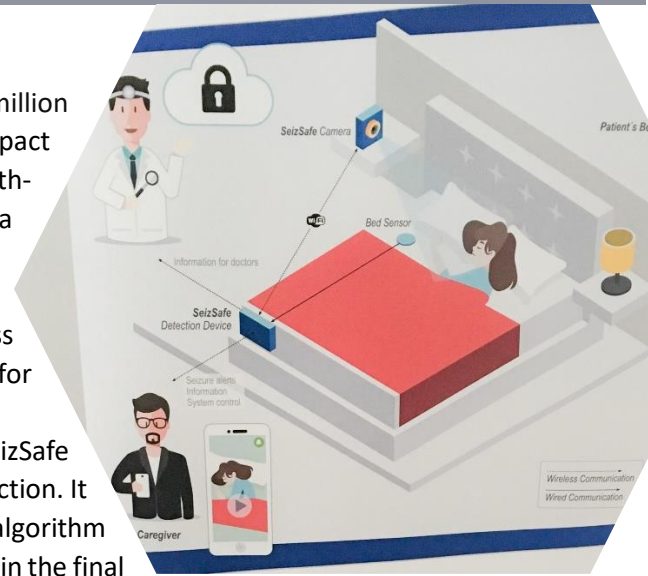


Nighttime Epileptic Seizure Detector Improves Care of Patients and Quality of Life for Caregivers

Challenge & Solutions

Epilepsy is a central nervous system disorder affecting approximately 50 million people worldwide and is characterized by recurrent seizures. Its economic impact in Europe is more than €13.8 billion annually in both direct and indirect health-care costs. These costs include treating patients who are injured or have a cardiac arrest during generalized convulsions. Caregivers, who often must sleep in the same room as patients, try to reduce this risk by being alert and applying techniques to mitigate the danger. Beyond the inconvenience of loss of privacy for both the patient and the caregiver, the effects of loss of sleep for the caregiver can add to the risk for patients.

To better monitor patients and lighten the burden on caregivers, the SeizSafe project built a nonintrusive, wireless motion-sensing system for seizure detection. It includes sensors placed on the bed to detect patient movements, and an algorithm that determines whether the patient is having a seizure. The system, which is in the final testing stage, also includes a camera that records patient movements for later evaluation by doctors. Once a seizure is detected, the caregiver is alerted via smartphone and seizure information is gathered in a cloud platform. The system's energy demands are low and it is minimally intrusive, which reduces patients' reluctance to use it.



EuroCPS Support

The EuroCPS technology portfolio includes STMicroelectronics' iNEMO™ inertial module system in package (SIP) with a wearable-sensor unit (WeSU) evaluation board. Using this technology, Encore Lab developed the processing and communication capacities of the WeSU, so that it efficiently runs the detection algorithm and communicates with the control unit. The WeSU evaluation board and iNEMO™ module include a 3D digital accelerometer and a 3D digital gyroscope. High robustness to mechanical shock makes the hardware suitable for SeizSafe. iNEMO™ software uses advanced algorithms to integrate outputs from multiple MEMS sensors independent of environmental conditions.

Digital Skills

Encore Lab: Sensors and data analysis.

Fraunhofer Institute for Integrated Systems and Device Technology: technical validation of the system.

Company

Encore Lab is a technology-based company whose main activity is the development of innovative solutions based on electronic and embedded systems to improve products and processes in different areas, mainly agriculture and health.(ES) - www.encore-lab.com



Since
2010

15 employees

Partners:
Fraunhofer IISB



Impact / What's next

By detecting seizures immediately and thus reducing their duration, SeizSafe improves quality of care for patients and improves their relatives and caregivers' quality of life, because it allows them to sleep in a different room than patients. It also provides doctors with a tool for monitoring patients, allowing for personalized diagnosis and drug prescriptions. In addition to improving care and quality of life for the 6 million epilepsy patients in Europe, SeizSafe helps reduce health-care costs by lowering hospitalization incidence and generating data that will improve patient diagnosis and tracking. Clinics will be able to use the information generated by the wireless system to increase the number of observations they perform at a reduced cost. The process also is far more patient friendly, because patients can avoid going to a clinic to be monitored with EEG. For pharmaceutical companies, anonymous data obtained from SeizSafe trials will help researchers predict the therapeutic potential of new drugs in early clinical proof-of-concept studies. SeizSafe recently was selected for the H2020 SME Instrument Phase 2 to bring the system to market.