



HemiStereo®

Application Showcase

Fall Detection for Elderly Care - Product PatronuSens®



The brand **PatronuSens®** is derived from the words „patronus“ (Harry Potters guarding spell) and „sensor“ (sensor technology). The associated product presented on www.patronusens.de focusses on safety needs in senior living - be it a care facility, an establishment of assisted living or the private domestic environment. Based on HemiStereo® 3d sensor technology a novel assistant system has been developed, that can detect falls as well as other emergencies of present people automatically and may call for help – immediately, independently and reliably.

Fall detection may be old hat, but have you ever seen a system in practice? Let me give you 5 reasons why this will change with HemiStereo® sensor technology.

1. One Room—One Sensor

Each device in the sensor network is an full 180° omnidirectional optical 3d sensor. Hence it is possible for the first time to monitor one complete room up to 100 m² by one single sensor device, see figure 1. With competitive solutions you need at least 3 times the amount of sensors, resulting in too much infrastructure and an unacceptable amount of investment. In

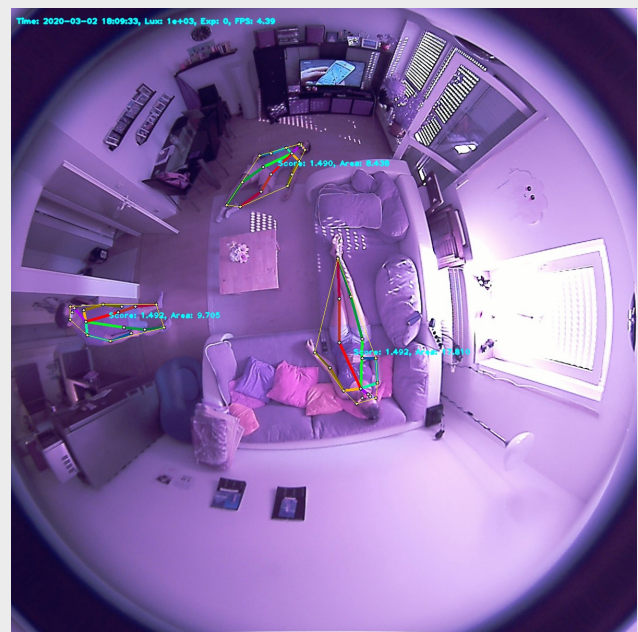


Figure 1 Omnidirectional view

intelligent spaces like the PatronuSens® usecase, HemiStereo® sensors are mounted on the ceiling. They take the best place to achieve a minimum of occlusion and a maximum of room coverage.

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depth sensing expanded

HemiStereo® is the world's first depth sensing technology able to capture hemispherical RGB-D data (color and depth information). It allows to measure depth for an extremely large volume with both large lateral resolution and high axial accuracy. The sensing device integrates AI supercomputer NVIDIA Jetson TX2 in order to allow real-time GPU-based inference using deep neural networks.

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2. Unmatched Data Quality and 24/7 Availability.

If a customer decides to believe the systems promises, the provider won't disappoint him. The vital basis of a reliable application based on optical sensors is high quality, real-time, multi-dimensional data fed into measure computer vision based algorithms. HemiStereo sensors are low-light sensitive for low-noise and therefore high quality image data even in environments with bad light conditions. An active IR-illumination preserves the data quality even when the vicinity is completely dark. More than this HemiStereo® generates high resolution (1 mega pixel) RGB-D data with frame rates up to 20 fps and an lateral accuracy of ~2.5cm@5m.

3. Buildin Intelligence

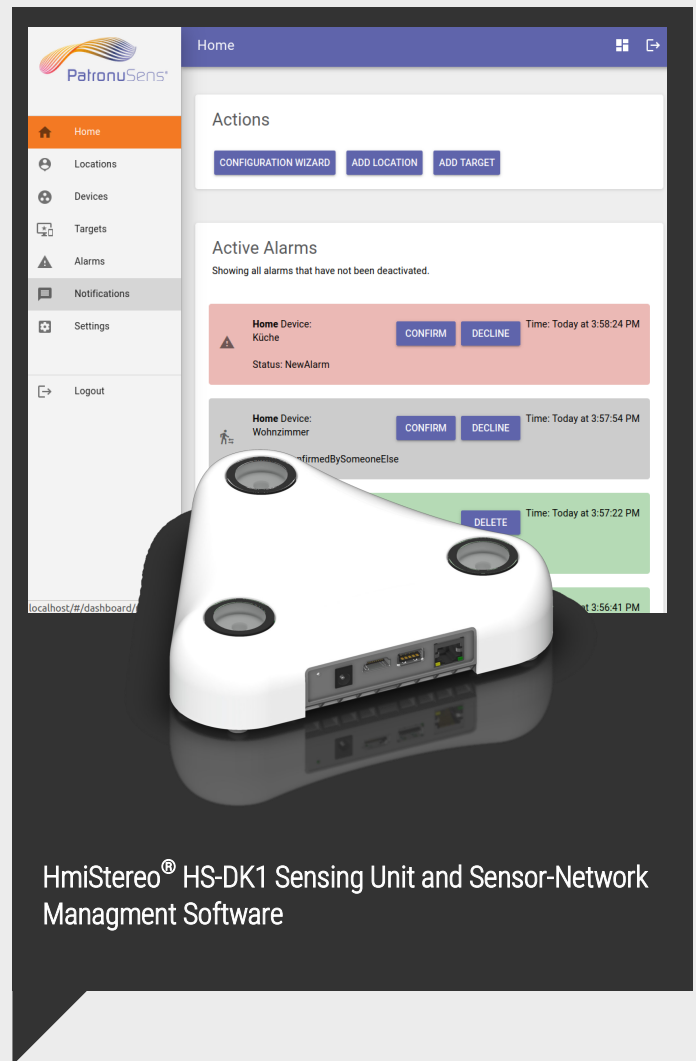
Build-in AI processing capability allows to run modern neural network based people detectors, see figure 1. This enables the sensor to concentrate on the peoples behaviour and not being fooled by other moving objects, big pets or changing light conditions. Falls may be detected easily by augmenting image detection results by 3d information.

4. Privacy—By—Design

An optical fall detector is a very private and critical thing. System providers have to make sure, that personal data remains solely in the sensor device. Customers on the other side don't want to be taken for a fool. The HemiStereo® sensor network architecture allows each sensor to operate independently as edge processing component and only meta information e.g. alert messages are transmitted via secure communication channel to relevant message receivers. We guarantee military standard encryption.

5. Low complex and flexible Infrastructure

HemiStereo® sensor devices are easy to be mounted and to start-up in the application environment. Each sensor calibrates automatically and integrates easily into the existing wifi-network via vision tag-based recognition. A central management software for sensor network administration may be deployed as desired in a cloud environment or on premise. The software allows for the PatronuSens® application to let the user parameterize and trigger different alarm targets like private mobil phones (with dedicated apps), E-Mail servers or even 3rd-party devices of home emergency call service providers. Additional sensors can be added on the fly as desired, providing a maximum scalability.



HmiStereo® HS-DK1 Sensing Unit and Sensor-Network Management Software



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