SMART COMPANION 2

Active AI Assistant for Emergency Care to Support Autonomous Living

A project funded under the 2020 call of the
"**ICT of the Future**" program

A conventional robot vacuum that doesn't just clean – it can save lives in emergencies: The research project "Smart Companion 2" demonstrates how modern sensor technology and artificial intelligence can be combined to help older adults live safely and independently at home for longer.

From Everyday Appliance to Lifesaver

Living independently in old age requires safety, yet classic emergency wristbands are often rejected or forgotten. "Smart Companion 2" solves this dilemma by technologically upgrading a standard robot vacuum cleaner. During vacuuming runs, the system analyses the environment using artificial intelligence directly on the device ("Ethics by Design"), without permanently sending data to a cloud.

If the neural network detects a lying person from the "floor-level perspective", the robot initiates a dialogue: "Do you need help?". Only when help is actively requested or there is no reaction does the system alert the emergency services (Arbeiter-Samariter-Bund). In this way, privacy is maintained, users retain control, and false alarms are minimized. Additionally, the robot proactively warns of fall hazards.

Figure 1: Schematic overview of system components and the decision flow in an emergency.

Successful Field Test

In a six-month field study in the private apartments of seniors (aged 60 – 84), the prototype proved its robustness: In over 4,300 operating hours, only a single false alarm occurred. Acceptance was high because the robot was primarily perceived as a useful household aid. Recordings from the robot's perspective show that its image recognition reliably distinguishes between a potential emergency and an everyday situation.

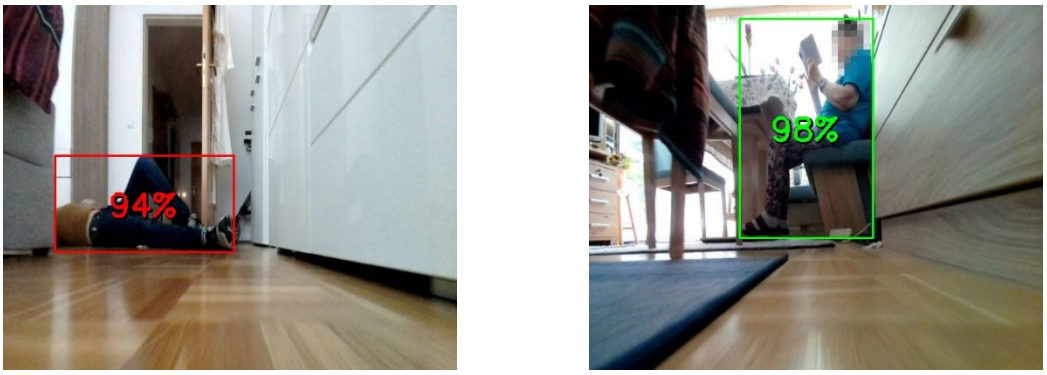

Figure 2: Robot's view: a lying person (left, marked red – triggers dialog) compared to a sitting person (right, marked green – everyday situation). The percentages represent probabilities.

The project provided the technological "Proof of Concept": Cost-effective consumer hardware can be transformed into a reliable safety net without stigmatization. The hurdle for market introduction is no longer the technology, but the societal establishment of such preventive systems as a natural part of modern living.

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https://research.ustp.at/projekte/smart-companion-2

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