Contextbot: Integration of smart home, robotics and smartwatches

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Purpose This presentation aims to analyze the current status and future prospects of technological support in residential environments, focusing on stationary systems, wearables, and smartwatches presenting the results of the Contexbot research project. The hypothesis is that integrating advanced technologies in homes can significantly enhance the quality of life and health outcomes, particularly for the elderly people. **Method** A review and analysis of current technological advancements and their applications in living spaces were conducted, examining stationary systems, smart homes, wearables, and smartwatches. The emphasis was on their role in health monitoring and support for independent living. Data have been collected from various studies, technological assessments, and case studies. Prototypical applications with smartwatches and robots were designed and partially realized with in the Contextbot project. **Results and Discussion** Technological integration in homes has shown significant potential in improving health and quality of life. Smart homes equipped with sensors and actuators can automate and optimize functions such as lighting, heating, and security, enhancing comfort and safety. Wearables and smartwatches offer continuous health monitoring capabilities, detecting vital parameters like heart rate, blood oxygen levels, and sleep patterns, providing early warnings for health issues. These devices are essential in health monitoring. They offer functionalities such as heart rate monitoring, sleep pattern analysis, detection of ADLs (activities of daily living, e.g., drinking), and EDLs (events of daily living, e.g., fall detection). They play a crucial role in preventing health issues through early detection and provide personalized health advice based on the collected data. In combination with care robots and in-house localization, these technologies allow elderly to live longer in their own homes and quickly receive help in emergencies. The **Contextbot Project** exemplifies the future of technological support in residential settings (Figure 1). By integrating service robots, wearables, and smart home technologies, Contextbot offers context-aware assistance, enhancing user-friendliness, efficiency, and quality of care. It aims to increase user safety and independence by identifying and responding to critical events like falls or abnormal vital signs. **Key Findings of Contextbot** 1. Smart Home Technologies: Provide automation and remote control capabilities using care robots and localization detection and communication with wearables. 2. Wearables and Smartwatches: Monitor health metrics and physical activities, detecting falls, monitoring heart rates, ADLs, and EDLs. 3. Overall advanced monitoring and assistance, particularly for elderly individuals, allow them to live independently while ensuring their safety and well-being.

References

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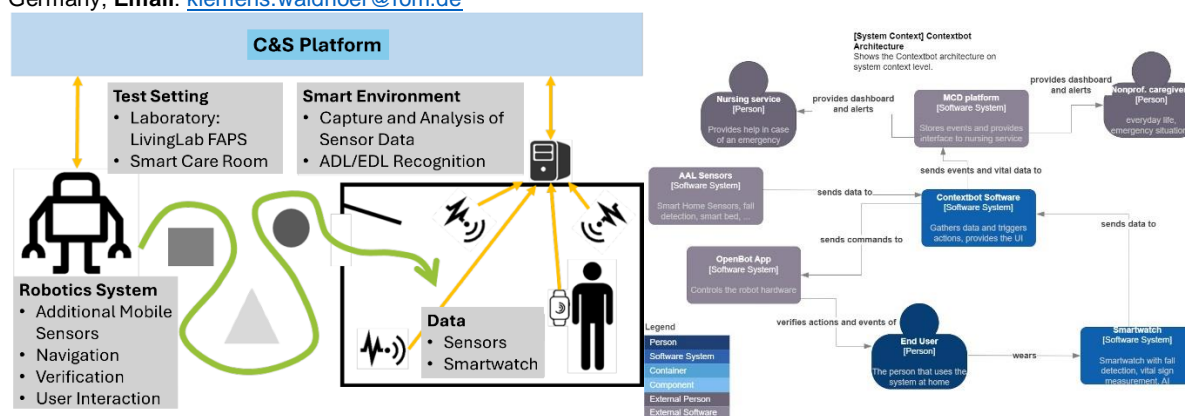

Figure 1: Interaction of the individual components in Contextbot: The service robot environment (left). System architecture of the project according to the C4 model (right).