Attitudes of older Turkish adults toward incorporating radar technologies into geriatric bathroom design

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Purpose Home bathrooms are among older Turkish adults' most common fall areas. Technology integration and geriatric bathroom adjustments are challenging, causing major user acceptance problems, construction costs, and burdening social facilities' architectural and engineering services. Although there is an increasing amount of research on geriatric bathrooms and fall-detection technologies, it should be noted that there are significant differences among simulated falls, design guidelines, bathroom standards, and real-world experiences of older adults. “Annually, around 424,000 deaths occur due to falls, 80% of which happen in medium and low-income countries” (Kimiafar et al., 2021, p.116). Compliance with accessibility standards does not guarantee a fall-free environment and a perception of quality for older adults. This study investigates older Turkish adults' attitudes toward using near-field radar technology to detect actual hazard situations. **Method** Fifty-nine interviews were conducted with older adults aged between 65 and 95. Participants’ problems with their home bathroom area were asked and their suggestions were collected. Photographs of their bathroom were taken. The study focused on the bathroom's bathing area in the form of a shower unit. The data were analyzed using thematic analysis. **Results and Discussion** Three themes emerged from the findings: Safety, privacy, and independence. The study highlighted the perceived importance of fall-detection technologies based on the participant’s performance in the bathroom. The real-time radar-based fall-detection system represents a cutting-edge technological solution designed to address the critical issue of these three themes on detecting and responding to falls. Figure 1 illustrates the overview of an exemplary real-time radar-based fall-detection system used in a related study by the authors (Olmez et al. 2024). One problem that exists with radar-based fall-detection modules is the existence of false positives. Thus, future studies could focus on the simulation of different emergency scenarios and the implementation of radar systems in bathrooms through machine/deep learning techniques to identify falls and differentiate them from other activities.

References

Jabiyev R., Özsoy, M. O., Aktürk, U. E., Oral, E. B., Ölmez, E., Ansen, B. (2023). RF/Microwave Safety Sensor System, Senior Project with Industrial Focus, Final Report, Bilkent University, Department of Electrical and Electronics Engineering

Kimiafar, K., Farrokhi, M., Manouchehri Monazah, F., Khadem-Rezaiyan, M., Sarbaz, M. (2021). Fall-related hospitalization of patients in Iran. Chinese Journal of Traumatology, 24(2), 115–119. https://doi.org/10.1016/j.cjtee.2021.01.001

Olmez, E. et al., Safety tracking system for bathroom shower environment, Proceedings of the IEEE 32nd Conference on Signal Processing and Communications Applications, in Turkish, 15–18 May 2024, Tarsus, Mersin, Türkiye

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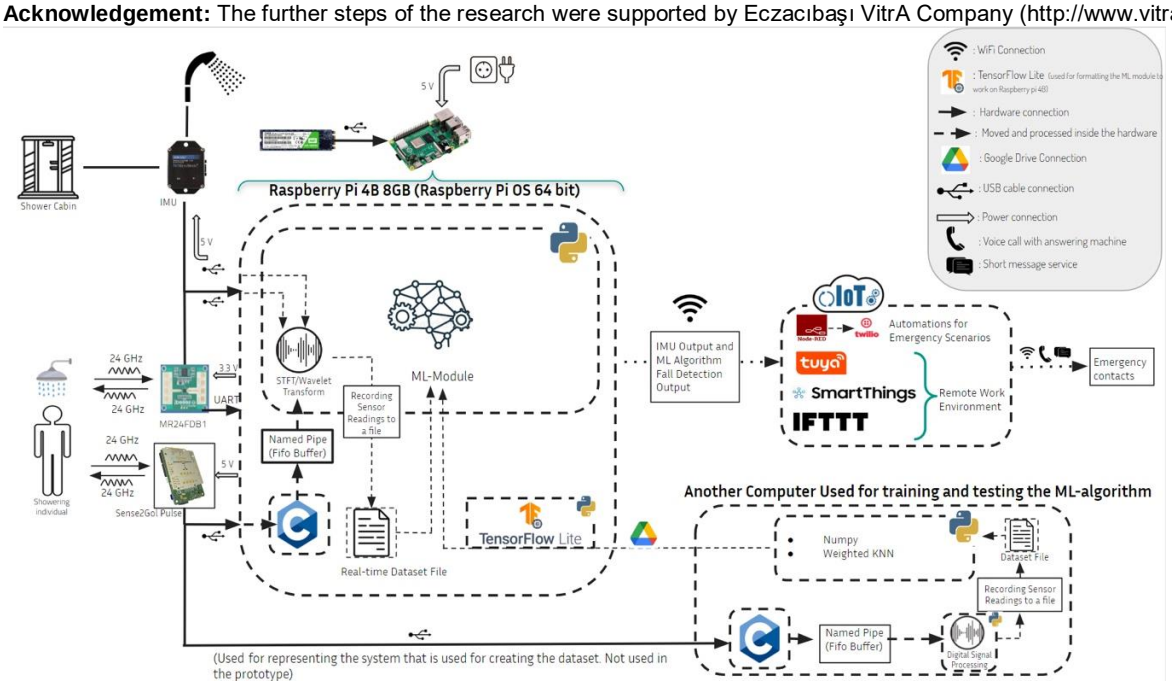

Figure 1. Overview of the fall detection system (Jabiyev et al. 2023)