Week 1: Refining a Problem Statement

Nate Bachmeier

TIM-7245:Directed Constructive Research

June 20, 2021

Northcentral University

# Problem Statement

## Central Issue

Senior citizens live longer than ever before and want to defer moving into nursing homes until later in life. Transitioning into elderly care comes as a double edge sword. On the one hand, nurses can provide 24-hour supervision. This assistance could mean the difference between life and death (e.g., during a fall). However, on the other hand, the medical services are prohibitively expensive, nearing $90,000 annually (Tan et al., 2020). Additionally, these medical facilities lack the personalization available within one’s home. Further, specific individuals with diseases like dementia and Alzheimer’s require even greater levels of attention.

## Present State

Traditionally, addressing the situation requires increasing human capital, such as more traveling nurses or family member oversight (Westergren et al., 2021). However, this solution increases health care costs and collects limited patient health samples. In addition, these infrequent visits might miss critical issues, especially with those most reluctant to relocate. Alternatively, researchers are exploring wearable IoT devices (Tun et al., 2021). These sensors provide mechanisms for requesting assistance and receiving continuous monitoring. Nevertheless, there are many limitations to wearable solutions. Most notably, the person must *remember* to wear them, which raises challenges for early-onset memory loss patients.

## Value Proposition

Modern solutions must bridge the differentiation between remaining in the home and still receiving the attentiveness typically found in assisted living facilities (Tan et al., 2020). When this gap narrows, it enables the patient to remain in familiar settings for more prolonged periods. That situation has numerous psychological benefits (e.g., higher morale) and economically (e.g., deferring private health care costs). For instance, patients with memory impairment might forget to empty the dishwasher, take medication, or bathe regularly. These scenarios are challenging to address through wearable devices. Medical facilities can address these challenges through real-time video monitoring services that analyze patients’ actions and recommend care. However, an in-home camera system transforms into a watchful eye that can spot those missing actions through computer vision. After detecting an issue, the system alerts the person using Text-to-Speech (TTS) services (e.g., Amazon Alexa or Google Home).

# References

Tan, K., Sekhar, K., Wong, J., Holdado, M., Ameer, M., & Vesonder, G. (2020). Alexa Eldercare Toolbox: A Smarthome Solution for the Elderly. *Annual Ubiquitous Computing* (pp. 806-812). Virtual: IEEE. doi:10.1109/UEMCON51285.2020.9298127

Tun, S., Madanian, S., & Mirza, F. (2021). Internet of things (IoT) applications for elderly care: a reflective review. *Aging Clinical & Experimental Research, 33*(4), 855-867. doi:10.1007/s40520-020-01545-9

Werergren, A., Ahlstrom, G., Persson, M., & Behm, L. (2021). Next of kin participation in the care of older persons in nursing homes. *PLoS ONE, 16*(1), 1-15. doi:10.1371/journal.pone.0244600