Submission of Interest

Workshop "Life in Transitions: The Role of Technology in Supporting Wellbeing in the Heart of Change"

Applicant: prof. Lucca Geurts, KU Leuven, Belgium

Prior Work

Over the past five years, we conducted a project focused on **promoting physical activity (PA) among older adults**. Our research explored how technology can be used to motivate older adults to stay active or even increase their activity levels, given its positive impact on their quality of life. The majority of this work was carried out by Dr. Dimitri Vargemidis as part of his PhD research, under the supervision of Prof. Kathrin Gerling (now at the Karlsruhe Institute of Technology). Prof. Vero Vanden Abeele and I served as co-supervisors. Dimitri is currently working as a postdoctoral researcher under my supervision, continuing his work in this area.

In the first study [1], a systematic review was carried out to explore the purpose, technological context, and target audience of wearable tracking systems, as well as design and evaluation processes with particular attention to the meaningful involvement of older adults. Our results show that most systems focus on supervising older adults in the context of disease and frailty management. Only few systems focus on supporting older adults by promoting rehabilitation and respecting agency of older adults via self-monitoring PA, or encouraging PA to maintain healthy levels of activity. Moreover, systems are often narrowly limited to walking, although older adults may enjoy a broader range of activities. Likewise, the involvement of older adults in design processes is scarce, and their experience with a given technology is rarely considered relevant for evaluation.

In the next study [2], we conducted a qualitative study with 24 older persons to explore their perspective on wearables and PA, through focus groups and co-design sessions. Through thematic analysis, we identified two main themes: (1) PA is personal in terms of preferred activities and reasons for PA, and (2) wearables are an emotional technology, causing negative emotions when resembling medical trackers or pressurizing to perform. We followed upon these results through a survey with 41 participants, which further highlighted individual differences in the perception of wearables. From this, we distilled questions to guide the design of wearables and reflect on their role to support PA in late life.

In the final study [3], we focused on the older adults' preferences regarding data visualizations of PA, which is of concern as many of the currently implemented visualizations strongly emphasize performance. We combined semi-structured interviews and an online survey to explore different approaches towards visualizing PA data for older adults. Through thematic analysis and statistical analysis, we highlight that visualizations' perceived usefulness and appeal is individual and mediated by the lived experiences of late life, and that the potential of performance and pleasure can be leveraged to be complementary. On this basis, we proposed design opportunities for visualizations of PA data specifically addressing the needs of older adults from the perspective of PA in late life.

References

[1] Dimitri Vargemidis, Kathrin Gerling, Katta Spiel, Vero Vanden Abeele, and Luc Geurts. 2020. Wearable Physical Activity Tracking Systems for Older Adults—A Systematic Review. ACM Trans. Comput. Healthcare 1, 4, Article 25 (September 2020), 37 pages. https://doi.org/10.1145/3402523

[2] Dimitri Vargemidis, Kathrin Gerling, Vero Vanden Abeele, Luc Geurts, and Katta Spiel. 2021. Irrelevant Gadgets or a Source of Worry: Exploring Wearable Activity Trackers with Older Adults. ACM Trans. Access. Comput. 14, 3, Article 16 (August 2021), 28 pages, DOI: https://doi.org/10.1145/3473463.

[3] Dimitri Vargemidis, Kathrin Gerling, Vero Vanden Abeele, and Luc Geurts. 2023. Performance and Pleasure: Exploring the Perceived Usefulness and Appeal of Physical Activity Data Visualizations with Older Adults. ACM Trans. Access. Comput. 16, 3, Article 21 (September 2023), 35 pages. https://doi.org/10.1145/3615664

Biography

Lucca Geurts is an Associate Professor at KU Leuven (Belgium), at the Faculty of Engineering Technology and the Department of Computer Science, division of Human-Computer Interaction. Currently, Lucca is also the Program Director of the Advanced Master in Innovative Health Technology and Director of the Leuven Centre for Affordable Health Technology. Lucca holds a master's degree in Electrical Engineering and obtained a PhD at KU Leuven on the topic of coding temporal information in signal processing for cochlear implants and hearing instruments for deaf people.

Lucca's research focuses on designing, implementing and evaluating interactive sensor-actuator systems with tangible components and playful elements. The application domains are Health, Learning, Arts and Entertainment, so collaborations are made with healthcare professionals and artists. We often work with vulnerable target groups such as children with developmental disabilities, people with chronic conditions, or patients in remote areas in developing countries.

Currently, Lucca is on sabbatical leave at KTH Stockholm, in the Media Technology and Interaction Design Department of the Human Centered Technology Department of the School of Electrical Engineering and Computer Science. The KTH faculty member acting as a host is Professor Madeline Balaam, who also works on interactive systems for health and wellness.

Keywords

wearable sensors, health data, vulnerable target groups, playful encouraging technologies