Proposal for a Special Session at IEEE RO-MAN 2024

Digital Health Applications of Social Robots

Aim and Scope of the Special Session

The distinctive intersection of Artificial Intelligence (AI), robotics, and healthcare is gaining prominence, particularly in the exploration of socially assistive robots (SARs) as digital therapeutics (DTx) tools aimed at improving patient care and engagement. This convergence is increasingly recognized as an innovative solution in the realm of healthcare delivery where AI-driven Digital Health (DH) systems are poised to play a critical role in the future of healthcare. In 2021, $57.2 billion was invested in DH systems around the world, recognizing the promise this concept holds for aiding in delivery and care management. DH systems traditionally include a blend of various technologies, AI, and physiological biomarkers and have shown a potential to provide support for individuals with various health conditions. DTx is a more specific set of technology-enabled interventions within the broader DH sphere intended to produce a measurable therapeutic effect. DTx tools can empower both patients and healthcare providers, informing the course of treatment through data-driven interventions while collecting data in real-time and potentially reducing the number of patient office visits needed.

In particular, SARs, as a DTx tool, can be a beneficial asset to DH systems since data gathered from sensors onboard the robot can help identify in-home behaviors, activity patterns, and health status of patients remotely. Furthermore, linking the robotic sensor data to other DH system components (e.g., mobile phones, wearables, smart home devices, virtual reality) and enabling SAR to function as part of an Internet of Things (IoT) ecosystem, can create a broader picture of patient health outcomes. The main challenge with DTx, and DH systems in general, is that the sheer volume and limited oversight of different DH systems and DTxs is hindering validation efforts (from technical, clinical, system, and privacy standpoints) and consequently slowing widespread adoption of these treatment tools.

Accepted papers will be encouraged to submit extended versions of the special session papers at the conference to a journal "special issue" that the organizers of the special session are putting together later this year.

Organizers
Čedomir Stanojević, PhD, CTRS
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Short Bio:
Dr. Čedomir Stanojević is an assistant professor at Clemson University's College of Behavioral Social and Health Sciences. He is committed to research and the development of evidence-based practices that can contribute to positive health outcomes for individuals with disabilities, specifically exploring the impact of emerging technologies on health outcomes. The core methodologies driving Dr. Stanojević's investigations involve the amalgamation of behavioral observations and physiological recordings while identifying sampling strategies to collect relevant information from the participants. He utilizes ecological momentary

assessment (EMA) philosophy as the guide in research design and tends to collect participant interaction data in real-time while characterizing variations in behaviors within a participant over time.

Dr. Stanojević's interdisciplinary approach relies on collaboration with a diverse team of subject matter experts. So far, in the past five years, a research team he is a part of has been continuously deploying different types of digital measuring instruments in participants' homes, including wrist-worn wearables capturing digital biomarkers, sensor suits on socially assistive robots recording interactions and environmental data, and mobile applications for real-time participant feedback. Through integrating these technologies, this research team developed machine-learning models featuring robust predictive algorithms, successfully identifying specific human-robot interactions based on sensor data.

Casey Bennett, PhD
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Short Bio:
Dr. Casey Bennett specializes in artificial intelligence and robotics in healthcare. He is currently an assistant professor and Chair of Health Informatics at DePaul University in Chicago IL, as well as a professor of data science at Hanyang University in Seoul Korea. He formerly served for over a decade as a senior data scientist at several of the largest healthcare organizations in the world: Cigna, CVS Health, and Centerstone Research Institute (CRI).

His current work includes utilizing robotic pets for therapeutic purposes with elderly patients, development of robotic IOT sensor systems for tracking in-home patient health, and studying social cognition & brain health through human-robot interaction to create more life-like AI devices. He received his PhD from the School of Informatics and Computing at Indiana University.

Tentative Speakers
1. Dr. Selma Šabanović
2. Dr. Chung Hyuk Park (George Washington)
3. Dr. Laurel Riek
4. Dr. Maja Mataric
5. Zachary Henkel