Research Statement

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Background

As a Human-Computer Interaction (HCI) researcher, I design, build, and evaluate technologies to make the physical and digital environment more accessible for people with disabilities. In my research, I conduct formative studies to understand challenges that impact individuals with disabilities. Combining and extending computational techniques like crowdsourcing and machine learning, I prototype, build, and deploy new technologies that address accessibility challenges. To communicate my work with my community, I evaluate them through qualitative and quantitative methods.

Research Areas

My recent projects include use of making videos accessible with web-based technologies and making ambulatory navigation accessible using robotics. The first research project addresses the limitations of current audio descriptions (ADs) for blind and low-vision (BLV) users by investigating the potential of customizable ADs. Through interviews with 15 BLV participants, the researchers identified desires for customizing various AD properties including length, emphasis, speed, voice, format, tone, and language, while also uncovering concerns about interruptions and increased interaction load. They developed and evaluated CustomAD, a prototype enabling AD customization, which demonstrated significant improvements in video understanding, immersion, and information navigation efficiency for BLV users, ultimately establishing the importance of personalized audio descriptions in enhancing video accessibility.

The second project tackles navigation challenges for blind and visually impaired (BVI) individuals through the development of RDog, an innovative quadruped robot guiding system. RDog combines advanced mapping and navigation capabilities with force feedback and preemptive voice feedback to support users in both indoor and outdoor environments. Experimental comparisons between RDog and traditional assistive tools (white cane and smart cane) revealed that the robotic system enabled faster and smoother navigation with fewer collisions, while also reducing users' cognitive load, demonstrating the potential of autonomous robotic guides in improving navigation assistance for BVI individuals. I plan to continue working on the same lines of work for the near future.

Selected Publications and Outputs

- Rosiana Natalie, Ruei-Che Chang, Smitha Sheshadri, Anhong Guo, and Kotaro Hara, "Audio Description Customization", Proceedings of ASSETS 2024
- Shaojun Cai, Ashwin Ram, Zhengtai Gou, Mohd Alqama Wasim Shaikh, Yu-An Chen, Yingjia Wan, Kotaro Hara, Shengdong Zhao, and David Hsu, "Navigating Real-World Challenges: A Quadruped Robot Guiding System for Visually Impaired People in Diverse Environments", Proceedings of CHI 2024. Honorable Mention Award