

It Could Literally Change My Life: Exploring the Potential of Conversational Interaction for Indoor Wayfinding Among People with Visual Impairments (PVI)

ACHI 2026

May 24, 2026 to May 28, 2026 - Venice, Italy

Segun Samuel, Mohammad Adnaan, Ahmed Farouk & Jeremy Cooperstock

Department of Electrical and Computer Engineering, McGill University

email: segun.samuel@mail.mcgill.ca



IARIA



McGill

Bio

Segun Samuel is a PhD student in Electrical and Computer Engineering at McGill University, where he is a member of the Shared Reality Lab and a MEDA Scholar. His research focuses on accessible multimodal AI systems, with particular emphasis on spatial cognition for persons with visual impairments.

His current work investigates how conversational AI and different instructional strategies can improve indoor wayfinding experience. Prior to McGill, he completed his M.Eng. in Electrical and Electronic Engineering at the University of Ibadan. He also brings industry experience from nearly a decade as a technical trainer.

Introduction

People often think wayfinding depends solely on vision.

- But think about your own apartment—you can move without seeing.
- What you're actually relying on is prior knowledge

For PVI, traveling to new indoor locations is challenging,

So, blind conduct some sorts of "research" (planning) before visiting new places.



Introduction- Existing systems and Gaps

Tactile maps

- Can convey limited information
- Not interactive

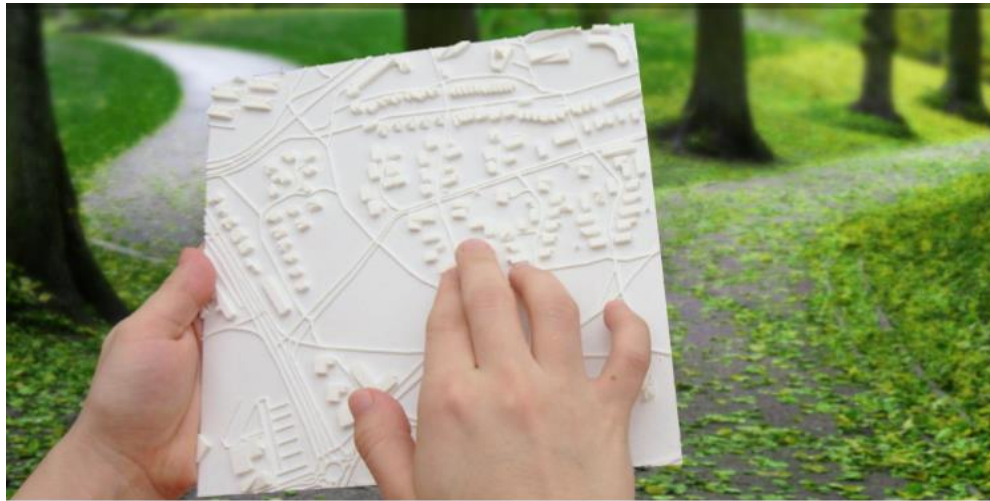
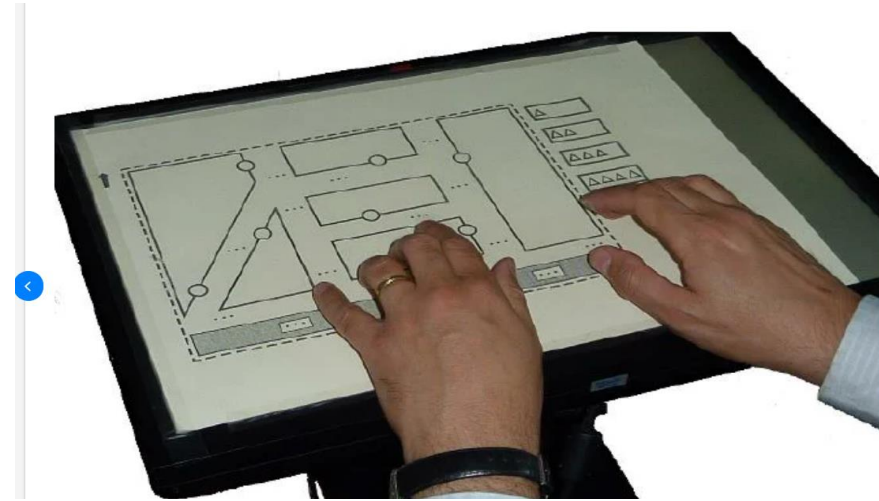


Image credit: touch-mapper.org

Audio-tactile maps

- Limited information
- Not mobile



Source: Brock & Jouffrais, 2015

Introduction- Existing systems

Audio-based virtual exploration

- Lack contextual delivery



Orientation and mobility

Specialists/Relations

- Availability



Image source: IResearchNet

Conversational Interactions (COI)

Current use of conversational interaction for indoor wayfinding

- Point of interest exploration, such as shopping malls

[Karmaker et al., 2025]; [Kaniwa et al., 2024]



Conversational Interactions (COI)

Current use of conversational interaction for indoor wayfinding

- In-situ navigation

[Rahimi et al., 2025]; [Cuayáhuitl et al., 2010]

But there is limited work targeting indoor route rehearsals



Explore how conversational interaction agents support planning for new indoor locations

RQ 1: What kind of spatial information do PVI expect from conversational interaction for indoor route learning?

RQ 2: How would PVI like to use conversational interaction for indoor route learning?

RQ 3: What challenges/reservations PVI might have with the use of conversational interaction for indoor wayfinding assistance?

Criteria for Conversational Interaction

Portability/Availability

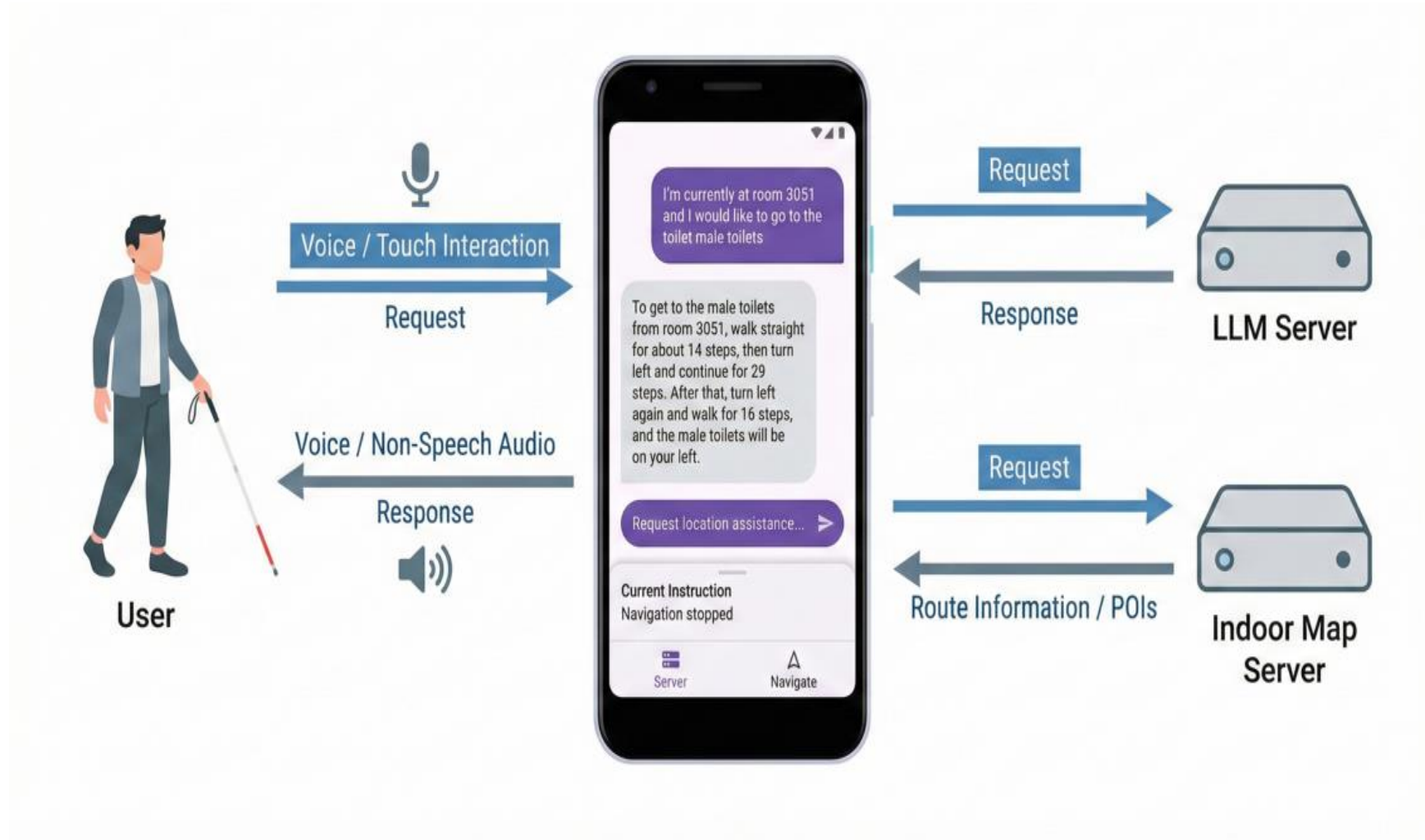
Cost effectiveness

Learnability

Interactivity



Conversational Workflow



Examples of user interaction

How do I get to the male restroom from here?

To get to the male toilets from room 3051, walk straight for about 14 steps, then turn left and continue for 29 steps. After that, turn left again and walk for 16 steps, and the male toilets will be on your left.

Is the route you provided me the shortest?

Yes, the route provided is the shortest path to the male toilets from room 3051, covering a total distance of about 63.9 steps. It efficiently guides you straight ahead, with just two left turns along the way. If you have any other questions or need further assistance, feel free to ask!

What landmarks would be along my route?

On your way to the male toilets, to your left, you'll find the study area and the Uprint station. On your right, there are pillars and some computer workstations. As you continue, you'll also see plastic bins and couches along the hallway. Just keep an eye out for these landmarks as you walk!

User Evaluation (60 mins)

7 Participants

- **1 complete blindness from birth**
- **6 participants had corrected-to-normal vision**



Tutorials & Interviews (15mins)

- Collect demographic information
 - Tutorials

System Use (30 mins)

- User requests

Semi-structured Interviews (15 mins)

- Reflect on the experience
- Capture post-user survey

Findings

RQ1: Information expected by PVI from conversational interaction for indoor route learning.

Landmark Identification and Sequential Ordering

Step count information

Obstacle Awareness and Safety Cues



Findings

RQ 2: How PVI like to use conversational interaction for indoor route learning

Journey Preplanning. *"It will help before one embarks on a journey, you can have an idea of the path, and how to get there."*-P002

Duality Modes, Active-Journey Error Correction and Integrated Navigation.

". . . it would just be like okay, it gives you an overview of the route first, and you start walking, and it kind of updates you as you work. So I think it would be very good."-P007

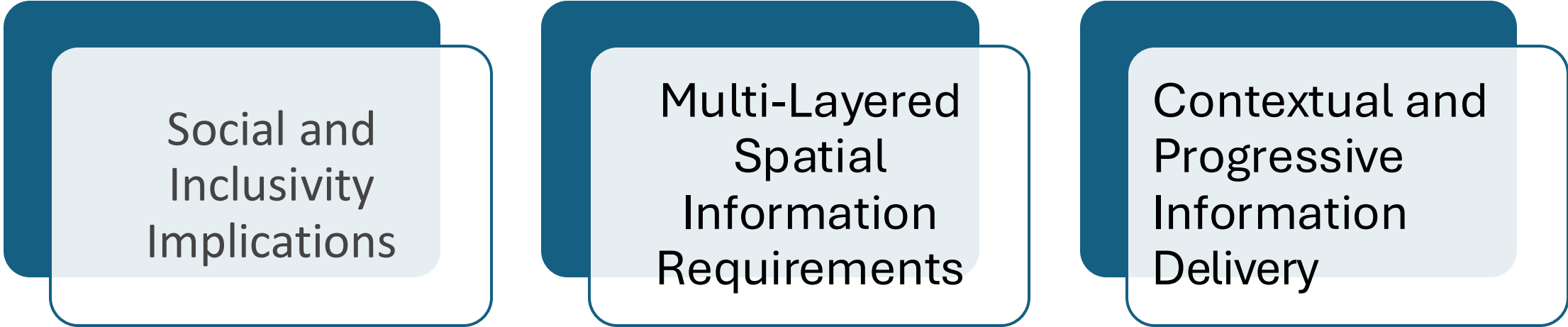
Findings

RQ 3: Challenges/reservations PVI might have with the use of conversational interaction for indoor wayfinding assistance?

Privacy and social concerns in indoor public spaces. *"They don't need to know I'm going to use a restroom"*- P007

Accent and speech recognition. *"...It's misplacing some words for other words, like, restroom for restaurants."*- (P005).

Key Insights



Social and
Inclusivity
Implications

Multi-Layered
Spatial
Information
Requirements

Contextual and
Progressive
Information
Delivery

Future Studies

Conduct

Conduct the studies with larger population

Compare

Compare preplanning intervention from conversational interaction with existing systems and evaluate performance in real world settings.

Thank You