

Guiding Robot Guides

Research at the University of Lincoln has shed light on the use of robotics in the public sector, the implications for the future of robots in museums, and how using these robots can benefit the general public by making collections more accessible.

University of Lincoln research has:

- Demonstrated that the use of robots in public cultural spaces, increases user engagement and accessibility by widening access for all people.
- Has identified the needs of the cultural sector in the use of technologies to guide future research.
- Fuelled further conversations on how AI and Robotics can support the cultural sector in a responsible way increasing user engagement and participation.



Robotics and Autonomous Interactive Technologies have the potential to transform accessibility and usability in the heritage and cultural sectors by facilitating the integration between the digital and physical space. Thus far, such applications, where attempted, have only been conducted in relatively limited contexts and have not considered the perspectives of the different stakeholders involved.

The Guiding Tour Guide project aims to enhance the engagement of local and national policymakers - i.e. the Lincolnshire County Council and the Arts Council England – with the University of Lincoln by formalizing experiences and expectations of using social robots in public cultural spaces, such as museums.

A robot, named Lindsey, has been deployed by the University of Lincoln in the Collection Museum since 2018, remaining operative to date and having provided more than 15,000 interactions with users in the museum so far. The outcomes from this deployment formed our starting-point case study to inform a co-design activity on guidelines for future applications in this area.

OUTCOMES OF THE WORKSHOP

The workshop's purpose was to bring together researchers from the University of Lincoln, the Lincolnshire County Council, and the Art Council England to determine and address any the impact of the robot's deployment, as well as any further suggestions to assist us improve the user experience and understand the needs of the cultural sector.

The necessity for additional training in using the robot to assist the museum tailor the tours that Lindsey can provide was emphasised, along with the importance of enabling the tours to be accessible more widely to different groups of users. One important aspect for future research is the improvement of Lindsey's conversational abilities, including voice synthesis and an adaptive vocabulary so that everyone can understand on their own terms the content being presented. Moreover, the use of VR/AR technology has been identified for making tours even more accessible for those who can't visit it in person.

At the moment, cultural venues are particularly interested in understanding how AI tools can safely enhance cultural experiences and exploring how technology can help managers better understand their audiences to adapt to their needs.

Lindsey's deployment started in 2018 at the Lincoln Museum, and it is still ongoing.

The robot started more than 15,000 interactions visitors so far.

It guided people around the museum, totalling more than 11,000 km of travel.

RESEARCH GENERATED

Real-time engagement detection enhances user experience and human-robot interaction. By recognising human cues such as human gaze the data gathered can be used to better understand the interaction between robot and human within a tour guided experience.

Tour Adaptation base on users' engagement which creates a more personalised, engaging, and effective museum visiting experiences. It promotes learning, inclusivity, and interactivity, leading to higher visitor satisfaction and a more memorable encounter with the museum exhibits

Co-creating with autistic people and/or with learning disabilities enriches the robotic tour guide's design, making it more accessible, accommodating, and engaging for all visitors. The process fosters inclusivity, empowers participants, and results in a robot that is truly designed for the diverse needs and preferences of its users.

IMPACT ON POLICY

Our activity has strengthened our links with stakeholder in the heritage arts sector and generated several outcomes in term of policy impact:

- Presented the results of our long-term deployment of "Lindsey the tour guide robot" to local and national public entities.
- Exchange of information of Roboticians at UoL with the LCC and ACE to understand the challenges and needs for the use of technologies in public cultural spaces.
- Fuelled discussion on opportunities for further research and impact in the topic leading to future external funding for collaborative projects.
- Led to the co-design of a workshop with users during the forthcoming Frequency Festival 2023 to present data of our case study and discover the public perspective on the use of AI and Robotics in public spaces.

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