

A Tactical Urbanist Approach to Facilitate Exploratory HRI Research in Public Spaces

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Abstract. Human-Robot Interaction (HRI) research in public spaces often encounters delays and restrictions due to the need for sophisticated technology, regulatory approvals, and public or community support. To remedy these concerns, we suggest HRI can apply the core philosophy of Tactical Urbanism, a concept from urban planning, to catalyze HRI in public spaces, gather community feedback and information on the feasibility of future implementations of robots in the public, and create social impact and forge connections with the community while spreading awareness about robots as a public resource. As a case study, we share tactics used, and strategies followed in conducting a pop-up style study of 'A robotic mailbox to raise awareness about homelessness.' We discuss benefits of the approach that could enable the social studies of HRI not only to match but to precede, the fast-paced technological advancement and deployment of robots in public spaces.

Introduction

Despite technical advances, supportive laws, and increased deployment in public spaces, the success of human-robot interaction (HRI) in public spaces has been limited and often disappointing: Bascelli (2018), due to lack of research in the public space and from the need for sophisticated technology to support dynamic public interactions. For public space studies, researchers often need to obtain additional approvals from the municipal government, whose bureaucracy can result

in long-lasting delays. Besides, a lack of participation from the general public and support from the target user communities is common due to their unfamiliarity with or disbelief towards the usefulness of novel robotic technologies. With such common impediments, how can we facilitate research in public spaces, find community participation, or test the feasibility of future robots for public and community use?

To overcome such hurdles, urban planners use Tactical or Pop-up Urbanism - an action-based approach to bringing urban change using budgeted, scoped, small-scale interventions, in a system curbed by outdated policies and voids in leadership: Lydon and Garcia (2015). The success of the approach lies in its public promotion and visibility of new solutions, which often leads to acceptance of novel ideas as best practices by the authorities. HRI research could follow a similar approach and use 'tactics' or short-term actions to test ideas in public by making use of available opportunities and finding creative solutions to policy and regulatory restrictions while staying within the 'strategies' or plans laid by law. We share our experience of conducting a pop-up HRI study 'deploying a 'robotic mailbox in public space to support the homeless.' We describe our use of the Tactical Urbanism-like approach to cope with challenges faced during the research ethics board approval process, lack of community support, and technical limitations. We discuss how using tactics, and following strategies facilitated our study, benefited us with research data, created social impact, and indicated the potential for future real-world implementation of our project.

Case Study - 'A robotic mailbox to raise awareness about homelessness'

We designed a stationary robotic mailbox, to address the lack of awareness about homelessness in the city by providing the public with information about homeless people and share their requests and stories, or receive advice and encouraging messages from the public for the homeless. The robot could detect passers-by, rotate its body seeming to look around, wave its 'red flag' to invite and greet, and move a sheet of paper/flyer back and forth to interact. The flyer contained stories and messages about homeless individuals and information on how passersby could support the homeless. To test the real-world effectiveness of our robotic mailbox, we aimed to install it in a few public spaces and have participation from a homeless shelter for recruiting homeless individuals who would provide us with their stories.

The community organizations we hoped to work with, however, were mostly uninterested in our approach, lacked time to participate, and did not believe in the potential for using robots to address issues relating to homelessness. Furthermore, reaching out to city officials for approvals for researching in a public space turned out to be a tedious and time-consuming process, as it involved several layers of bureaucratic oversight from officials in different departments and long response times to our queries. Besides, approvals from the homeless shelter and the city

were required to obtain institutional research board clearance. To counter these hurdles, that meant delays and non-participation, we changed our approach and followed a pop-up format, resonating with Tactical Urbanism principles, as described below.

Use of Tactics and Strategies in an HRI study

We followed tactics and strategies to speed up our approvals. For example, to address the issues of navigating several layers of bureaucracy for permissions to conduct a study in the public space, we used the blurred boundaries of public, semi-public, and private spaces to our benefit and researched spaces adjacent to the public spaces, open to all. To receive expedited institutional review board approval for our study, we ensured that specific departments or officials regulated our chosen semi-public spots, within a library or farmers market, thus had fewer layers of bureaucracy and were mostly open to the public. Finally, within the selected spaces, where possible, we used authorized public performance and street event spots to conduct our research, allowing us to follow established procedures for booking a spot and speeding up approvals.

Further, to address the lack of initial community participation, we carefully chose locations such as places where community events were held, or places with facilities attractive to a broad section of the public, used by a diverse group of people, from different socio-economic backgrounds and ages.

After we began our study, several times through the data collection, participant interviews indicated the need for design iterations to make our robotic mailbox more noticeable, inviting, and effective for public interaction. One way to achieve this could have been through significant technological changes, requiring considerable efforts, skills, and time such as by adding speech for the robot to attract and talk to passersby. Instead to avoid delays, we made use of a 'lighter, quicker, and cheaper' approach, akin to tactical urbanism, such as by posting stickers and signs to make the robotic mailbox more inviting and by Wizard-of-Oz'ing (WOZ) the robot to allow for quick control on the robot's behavior without requiring sophisticated technology.

Benefits of Tactical Urbanism Approach

Our study was reasonably successful in spreading awareness about the homeless in the city. Passersby mentioned that the robot made them aware of the sensitive issue of homelessness, without requiring awkward encounters with the homeless. In doing so, the robot exposed the public to the possible use of robotic technology for non-commercial, social purposes of delivering some social good.

The pop-up style research format also provided us demographic data from observation, and feedback from passers-by on the robot's features, sociality, appropriateness of interactions and purpose, suggestions on improvements and

alternative uses, and feasibility for future implementation of the project, through short interviews conducted in the public space.

Also, conducting research using a pop-up approach resulted in attracting people who did not generally attend traditional community engagement events for supporting the homeless. Passers-by mentioned that their interactions with the robot provided them with awareness beyond their preconceived ideas about the homeless community and thought that having a permanent robot in the city would encourage sharing of resources and communication with the homeless.

In sum, the robotic mailbox was successful in gaining attention from passers-by to convey the message about homelessness and pointed to the significance of studies in public space, especially for early stages of the research and robot design.

Conclusion

Following a pop-up format meant going a bit back from the initial involvement of homeless and the shelter authorities, limiting it to testing out the effectiveness of our robotic mailbox and understand if that was of interest to the community. We experienced several benefits of using the pop-up approach, for example, on design and interaction aspects of the robot, its purpose, and its effectiveness to raise awareness about homelessness. We got our initial feedback in context, rather than starting in the lab. Despite limitations from the dynamics of public space and research approval processes. We learned that the approach could provide necessary information on the true choke points in designing and developing useful robots for public spaces, and collecting user attitudes for public implementation of the project.

The pop-up robotics approach empowered our inter-disciplinary research team with limited technical capabilities and access to resources, to conduct valuable research using quick action, short-term, and scoped solutions. By placing equal value on 'strategies,' i.e., regulations and plans laid by critical legalities, and 'tactics' short-term actions to bring change, the pop-up approach encourages a human-centered solution to hurdles from regulatory approvals and limitations of technology by using creative resistance in research method.

References

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