Examining the Challenges of "Giving Voice" to Non-Human Animal Users

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Abstract

The Animal-Computer Interaction (ACI) community continues to develop new methodologies in order to include the end-users (i.e. the animals) in the design process, with many being borrowed and adapted from HCI. These new methodologies attempt to "give voice" to the animals participating in usability studies. This often requires input from human stakeholders (such as dog trainers and owners), either representing their own needs as co-users of the system, or 'translating' the needs and reactions of their dogs for researchers. However, relying on the human interpretation of dogs' responses makes it difficult to draw lines between the where the dog's needs and wants actually begin/end when they're not only completing tasks for humans, but also being interpreted by a human. To illustrate these issues, we present a case study of how we utilised such methodologies to explore the de-contextualised usability of buttons for dogs.

Author Keywords

Assistance Dog; Participatory Design; Animal-Computer Interaction; Assistive Technology; Disability

CCS Concepts

•**Human-centered computing** → **Human computer interaction (HCI)**; *Haptic devices;* User studies; Please use the 2012 Classifiers and see this link to embed them in the text:

Introduction

Animal-Computer Interaction (ACI) aims to develop a user-centered approach to designing technology for animals by including them as stakeholders throughout the design process [4]. Much work has focused on improving or designing novel interfaces for dogs to use, which has led to the emergence of Canine Computer Interaction (CCI), a subset of ACI focused on designing technological systems for both working and non-working domestic dogs. Technologies have been developed to support working dogs [12, 7, 8], pet dogs [11, 2], canine welfare [5, 3, 9], and their relationships with humans [10, 11]. Different canine input modalities have been leveraged, including some that have been co-designed with both canine users and their human caretakers. This has raised many challenges such as: how do we know what constitutes 'good' design for a dog? For dogs that are expected to do repetitive tasks (such as mobility assistance dogs), how might we improve their experience of the objects they interface with? When designing multi-species systems, what modalities would be most appropriate to allow the dog to playfully interact while simultaneously assisting their human? In order to answer these questions, new methodologies have been explored, to "give voice" to canine users in these contexts.

Participatory design in ACI

To address the issues that arise out of designing for and with other species, the ACI community continues to develop its own methodologies, with many of the design processes being borrowed and adapted from HCI. Within HCI, it is widely accepted that user input is imperative for good design, with effective communication (i.e. the understanding of oral and written language) playing a fundamental role in participatory and user-centered approaches to technolog-

ical design [1]. Similarly, ACI practitioners want to involve the end-user (animal) in the design process. This may involve relying on proxies for animal users to participate in traditional PD methods, standing in for the animal themselves, in early stages, and including the animal themselves in later but still early-as-possible stages of the design process. Practically, this often involves using rapid prototyping and/or design probes in early stages to allow animal users to communicate through their *responses* to such designs. However, such responses still have to be interpreted within some sort of protocol or framework, given that the users are non-verbal. Thus, the nature of this involvement by the animal users in the design process varies depending on the type of research, and often raises a number of questions regarding the notion of "giving voice", such as: How do we involve canines in the design process? How do we empower non-human stakeholders in design when they do not have the language or craft skills integral to many design methods? To what extent can these HCI methods and principles be applied to ACI, and to what extent might they require adaptation or reinvention?

Case Study: Exploring Usability of Buttons for Dogs

Assistance dogs regularly use buttons to conduct various tasks for their human owners such as opening doors and using light switches. However, it is not fully understood how dogs view these interactions or what ergonomics (including potential affordances) or feedback they require to ensure good usability of buttons that were usually designed for human, not dog, use. We worked with pet dog (non-assistance dog) participants and their owners to explore the de-contextualised usability of buttons for dogs, using various off-the-shelf buttons as design probes [6]. In a series of co-design sessions, eight pet dogs were presented with seven different types of buttons (varying in size, mate-

Figure 1: The off-the-shelf accessibility buttons used as design probes in the study

rial, and types of tactile or audio feedback provided), with owners requesting to their dogs that they press the various buttons and observing/interpreting their experiences activating the buttons (Fig. 1). We also interviewed human participants on their pre-existing training relationship with their dogs.

This work served as a pilot for further work that uncovered some design implications moving forward to improve button design for canine use. However, importantly, it served as a pilot methodology to leverage a combination of human stakeholder interviewing, canine and human co-design sessions via design probes, and using well-trained pet dogs (rather than highly trained assistance dogs, which can be harder to access for long-term studies and frequent design sessions). It raised questions as to how, as researchers, can we draw lines between the needs, wants, and preferences of the humans as both caretakers and interpreters for canine users, but also as users themselves. Much of the technology created through the ACI/CCI framework features input from the human stakeholders (such as dog trainers and owners), either representing their own needs as co-users of the system, or 'translating' the needs and reactions of their dogs for researchers. Therefore, by conducting usability studies with the dogs as participants, we then are inherently also allowing their owners to influence their "voice" as we rely on the human interpretation of the

dogs' responses. In this case study, when examining the dogs' reactions to the buttons, we also ultimately ended up relying on interpretation of these behaviours by the other stakeholder (i.e. the human).

Conclusion

By reflecting on a pilot methodology study and preliminary button usability work with canine users, we have looked at one instance of giving "voice" to dog users - that is, testing out design preferences and ergonomic requirements through co-design with non-human animals. However, this raises a broader issue of, what is meant by giving voice to dog users. In this instance, we are giving voice to how dogs understand certain types of physical affordances in a design, and how they may interpret feedback, so as to better understand if they have accomplished a task or not (i.e. activating a button). However, there is a broader agenda of giving voice to non-human animal users: that is, defining their own wants and needs, independent of human influence (i.e. not to accomplish tasks on behalf of humans, but on their own (e.g. designing interactive enrichment devices or systems for wildlife in captivity)).

Therefore, this raises the question of where the dog's needs and wants actually begin and end when they're not only completing tasks for humans, but also being interpreted by a human. Furthermore, when we observe canine participants interacting with buttons as design probes, we are interpreting their responses and behaviour within a specific context. That is, we are only "giving voice" to these participants in the context of pushing buttons to complete tasks for humans, and not as an individual or a species. Thus, taking this study as an example, CCI research may leverage novel methodologies to understand the usability dimensions of a particular interaction modality, allowing us to improve such interfaces, hence "giving voice" to

user preferences. While there are clear issues with the current methodologies used in CCI, there may be alternative approaches which more accurately "give voice" to animal users that seek to further capture animal users' motivations, habits, and needs as a user group beyond those of completing tasks on behalf of humans.

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