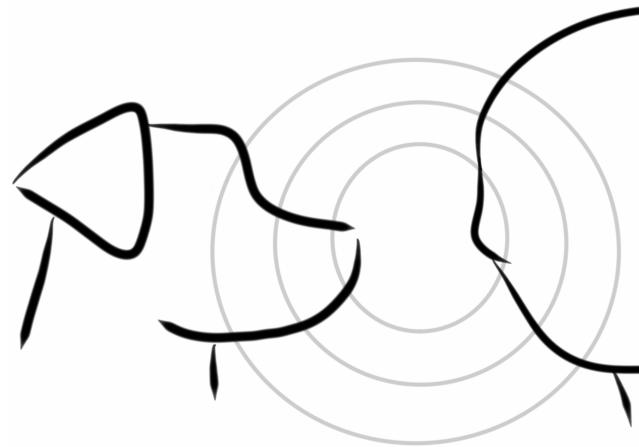

From HCI to ACI: User-centered and Participatory design in Canine ACI

Giancarlo Valentin
Georgia Tech
Atlanta, GA 30332 USA
giancarlo@gatech.edu



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Abstract

As is the case with new scientific disciplines, Animal-Computer Interaction (ACI) has motivated the re-examination of solved and unsolved issues in the philosophy of science. Using canine-human interaction as an example, these challenges are traced back to their roots in existing disciplines. We argue that, as long as research adheres to minimal standards, it should be considered ACI regardless of its stance on these debates.

Author Keywords

Animal-computer Interaction, Ethics

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

Introduction

To the extent that a research effort is not considered a new scientific discipline, its practitioners can adopt the philosophical tenets of the parent disciplines with or without active consideration. Before the establishment of ACI, early researchers employed the value system of Human-Computer Interaction (HCI) and related disciplines in the social sciences. The HCI values were then shifted away from the perceived anthropocentrism by the pioneering efforts of Resner [6]. Researchers who

followed his philosophy stated that only work that shared the same ontological commitments should form part of this new discipline.

Background

To defend ACI from the assertion that animal interaction with technology is intrinsically anthropocentric, and to compensate for approaches ignoring animal needs, pioneers proposed only including research not deemed anthropocentric. They stated that apparent anthropocentric research would be better considered 'animal technology' or 'folk animal psychology'[5, 8], rather than ACI. Two broad directives for ACI research have emerged from this position.

Species-appropriateness & Anthropomorphism

The first directive instructs designers to take into account current understanding of the evolutionary history of a species when designing new interfaces (species appropriateness). Resner proposed this framework under the auspices of user-centered design [6]. Although these can be commendable principles, they could have unintended consequences. For example, had this metric been applied to early classics of HCI work such as Douglas Engelbart's oN-Line System (NLS) it might have been rendered as 'human technology' rather than HCI. Engelbart seemingly failed to fully consider the species-appropriateness of "learn[ing] cryptic mnemonic codes" to use the system [2]. Indeed, as new HCI frameworks emerge over time, pioneering work in the field would be similarly in danger of no longer deserving the name. We propose that early (or alternative) attempts at computer-mediated animal interaction, regardless of whether they adhere to the current philosophies, should be considered ACI. Resner himself, understood that "the successful identification of a human task can compensate

for a poorly designed interface".

We warn against assuming user needs from a static view of its species' evolutionary history. A cautionary analogy can be drawn with humans. Analyzing the evolutionary history of *homo-sapiens* before the agricultural revolution, would be unlikely to forecast the advent of manned space-flight or wireless telecommunication.

Human understanding of the evolutionary history of different species is itself evolving. With canines, current attempts to use it in design have relied on notions of wolf instincts and pack leadership. Nevertheless, lupomorphic approaches to canine cognition have increasingly come into as much questioning as anthropomorphism itself. While "dogs and wolves share a common ancestor, this does not mean that dogs are descended from wolves" [1]. To interpret "dog behavior through the lens of wolf behavior is even worse than anthropomorphizing: it's a human anthropomorphizing wolf behavior and using that flawed impression as an analogy for dog behavior" [1].

Similarly, animal behaviorists interested in language view the 'red flag' of anthropomorphism as raised every time an attempt is made to study areas previously considered reserved for humans. Dr. Con Slobodchikoff has opposed this view by framing the principle of *evolutionary continuity* as a rhetorical question: "If animals share common vital systems such as breathing, vision, and hearing why must we view humans as discretely different from them?". He recognizes language as a fundamental vital system such as breathing and sleeping, which we already accept as sharing with other animals.

As an example, we have observed cases where dogs learn to interact with non-physical elements such as proximity sensors (Figure 1) and touch-screens (Figure 2) in a

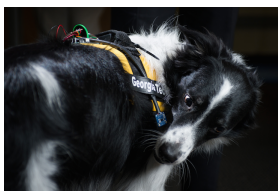


Figure 1: Activation of proximity-based sensor [3].

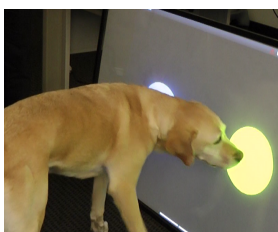


Figure 2: An example of a touch-based interface [9].

matter of seconds despite what a designer could construe as a lack of evolutionary history to support such interactions. These experiments should not be construed as ignoring the dog's needs and capabilities, precisely because their goal is to *determine* what these needs and capabilities are, rather than assuming them beforehand.

Researchers, such as Alexandra Weilenmann, propose avoiding “deciding on suitable levels of animal abilities a priori to empirical studies or design” [7]. She acknowledges that “already when conceptualizing something such as human-animal interaction, we infer a form of anthropomorphism [because] in order to interact with us, they and we must in some sense have some shared abilities and orientations”. The debate on the appropriate degree to which systems should adapt to users or vice-versa should not dictate whether research falls under ACI anymore so than it does HCI.

Participatory Design and Consent

The second ACI directive strives to address the issue of consent. The issue is older than its appearance in ACI. The care of pet dogs involves regular washing, nail-cutting and ear-cleaning occurring without their apparent consent. Even when assistance dogs “leap with excitement” when their harness is presented, it is unclear if this behavior is a result of their training or intrinsic free will (an equally problematic concept in humans).

The canine-human relationship is often compared to that of a parent and child. The parent is viewed as having a role to care for the child, even if this role involves administering vaccines without their consent. The use (or invention) of pediatric vaccines should not be viewed as a disregard of participatory design. The ethical challenges with these practices are legitimate, but we must

acknowledge their roots in older debates.

Participation as Consent

Resner believed animals could not be considered research participants due to their inability to express consent through verbal expression. Since then, non-verbal participation has been proposed as a form of consent ([4, 6] as referenced in [5]). In the absence of other alternatives, we believe this one is acceptable, while recognizing that participation does not intrinsically imply consent. Humans are known to participate in activities for which they see no other alternative (e.g. forced labor). It is possible that to the extent that animals are unaware of their alternatives, consent or the length of time for which it would hold, cannot be fully inferred.

In extreme cases, such as the research of canine-human interaction during hunting [7], a third of the species involved are non-consenting participants. The authors propose “bracket[ing] such concerns” in favor of an apolitical approach.

Apolitical Approach and Ethical Standards

Weilenmann calls for “interaction and practical accomplishments rather than pushing particular anthropomorphical agendas” [7]. Although we believe this objective is a step in the right direction, whether it is possible or desirable to purge “political agendas” is itself a matter of debate. Secondly, the issue of animal-rights is cited by Weilenmann as one example of “political agendas” in describing Lee et al [4]; but a lack of a stance on the issue could lead to the sanctioning of activities such as animal cruelty by the community to whom the work is presented.

Finally, there are examples of research in areas of general interest that can overlap with politics. Mancini motivates

one of the needs for ACI as a tool of sustainability by explaining its potential benefits in addressing the issue of global warming [5]. Unlike Weilenmann, we consider these goals as acceptable and commendable.

To reconcile these positions, we can rely on the approach employed by other disciplines. There are (adequate or inadequate) minimum standards that guide animal and human research. To the extent that disagreements arise on what the standard should be, they should be addressed as such (e.g. lobbying the institutions who sanction research with animals). Beyond that, we can follow Weilemann's advice to avoid "deciding on suitable levels of animal abilities a priori to empirical studies".

Conclusions

The philosophy established by the emerging field of ACI is commendable. It lays the foundation for a scientific discipline, and successfully makes a case for it beyond a niche interest [5].

Beginning with the rationale for its existence, ACI renews and creates debates: in ethics and canine-cognition, in addition to other fields. We must recognize that these dilemmas are not all new to ACI, but have a long history in other disciplines. To the extent they are similar to existing ones, these disciplines can be relied on for guidance. To the extent that problems are unique, they must be addressed with new methods to be determined by investigation rather than *before* it.

We should not ask that researchers presume to know the answers to new questions before they have a chance to explore them. As long as work adheres to minimal ethical standards, even if "it diminishes the relevance of the area" [7], it should be considered within the scope of ACI. This view will allow the field to be as inclusive of practitioners

as it intends to be of our fellow species.

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