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The Ethics of How to Work with Dogs in Animal Computer Interaction

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Abstract

When designing technology for dogs, ethics need to be considered. The technological approach with dogs has changed with a progressive viewpoint of where a dog is situated within a computer system and how the researcher reacts and treats the dog. This work presents a list of currently used ethical protocols within Dog Computer Interaction (DCI) composed by the Animal Computer Interaction Design (ACID) group to ensure the best animal welfare and the usage of appropriate data collection methods. This list is extended into a discussion on how these principals were formed through a literature review of ACID studies. This paper suggests that the researcher is situated in the tension between human and dog centered design. The extent to which the researcher views the animals will directly affect the results and methods created. It is through the researchers stating how they conceptualise dogs, and being aware where the dog-human relationship place can be situated that more depth is given to the findings.

Introduction

Animal Computer Interaction (ACI) is a stream of research around animals being involved in technology. This research involves the design of interaction modalities and the building of methodological frameworks. Off-shooting theories encompass these challenges with interpretations and outcomes. Throughout and within the background of these factors, the ethical story of the relationships between humans, machines and non-human animals is being played out. This narration not only concerns the manipulation and usage of applications for the ethics involved, but the implications for the participants and more widely for the growing field of ACI. While primarily ACI research focuses on the building and implementation of systems, the ethics of the researcher's relationships with the other entities often is not implicitly discussed despite the results often emerging through the intra-actions of this relationship [3]. This agential realism stance to ACI is shaped into an animal centered design standpoint relationship between animal and human: but to what benefit? This relationship-dance that we have with our pets [10], and more recently the added partner of machines is not a singular interactive lone process. Through an ethical analysis of these complex connections, interpretations can go deeper.

This paper aims to situate the authors' ethics of working with dogs and machines which informs their animal centered design stance. This stance will then be presented with a discussion around the tension between non-human animal, machines and data gathering. Evidence of this discussion in practice and findings are then reflected upon and evaluated. This is then summarized into a belief statement on how to work with dogs in the ACI field.

Ethics of Working with Dogs and Machines

When designing technology for dogs, consideration has to be taken of the ethical practice of the study(s). This consideration of the application is not only for the dogs' welfare, particularly as they cannot explicitly give consent, but also to ensure as precise results as possible. This statement is particularly relevant when gathering dogs' opinions and emotions which could both be influenced through trained behavior. Notwithstanding, animal rights have set boundaries for ethical protocols. This has directly influenced ACI in disbanding speciesism in an argument that ACI inherently includes Human Computer Interaction (HCI) and providing a bases of non-harm towards the non-human animal involved [13]. The ethics of the environmental influence have been acknowledged in ACI within works which aim to shape playful environments through labelling parameters [14] and questioning the dog-machine relationship bond [20] to see how they influence the results. The most notable work is by Vaataji [21] who looks at ACI through the 'three Rs' of cost benefit approach (replacement, reduction and refinement)

followed by a literature review of identified ethical guidelines. Her work however is situated in the design of the study and in the reporting of methods used.

Even though the most common form of ACI is with dogs, Dog-Computer-Interaction (DCI), [8; 11; 16] there has yet to be a set of guidelines about conducting studies specifically with pet dogs. Research in DCI covers a number of different topics, such as dog-monitor communication [12; 8], dog-tablet communication [24; 16], dog-unidentified object (UMO) [20], dog tracking [23], aiding human and/or animal communication [14], welfare, and gaming [15]. While the technology used, and motivations behind this use are diverse, they are all within the same species. Despite this DCI creators will often choose ad-hoc or pre-existing Human Computer Interaction (HCI) methods based upon a number of different principals. These principals range from what is available, what is ethical and where the researcher feels situated in their research. However, this approach does not allow for a community to learn from the gathered knowledge. In order to enrich this field and hopefully start building up a set of universal guidelines in DCI, we present below a list of currently followed guidelines by the Animal Computer Interaction Design (ACID) group at the University of Central Lancashire. The ACID group is a research group looking at designing DCI. These guidelines here are presented to not only benefit the DIC community but also benefit those working with dogs in general HCI.

Whilst these guidelines have been used in previous studies by the ACID group, they have not been implicitly laid out. Researchers, however, such as Vaataji [21], have touched upon these in a generic ACI sense: such as adequate housing (related to guideline 3) and forming consent (guideline 1). These guidelines, nonetheless, have mostly been formed through a merger of the researchers own work within ACI, the researchers own opinions on animal-human-computer relationship, and the current guidelines of working with animals.

Whilst the guidelines below are presented as being specific towards dogs, these can, and should where possible, be applied to other researcher in ACI. For example, providing a safe place variants between animal species and should be accordingly adjusted. In a similar route though, animals which are not able to work away through being immobile should be empowered through an alternative route to still enable a form of consent. In this sense the guidelines should provide just that: a guide. Each individual study will need its own set of guidelines but by looking at the customary instances below, this could help open up questions and responses

Similarly to the application of these guidelines to multi-species, guidelines specifically for children (Child Computer Interaction (CCI)) have been developed in HCI [5]. These can often be mapped to animals due to the similar challenges of children and animals face with technology of being none or limited verbally especially with abstract concepts and actions [6]. An instance of this is by giving children better control and trust [9] through familiarising them with the lab, which guideline 1 & 2 (below) aims to circumvent with animals.

ACID Group Guidelines for DCI

1. Enable Consent: Walking away. The dog used in any study must be able to walk away from the study as a low-level form of consent and freedom. This not only empowers the dog but also gives more insight into the technology as the dog is not forced to use it.

2. Providing a Safe Place. This can take the form of a dog bed or a blanket which the dog is familiar with if working outside of the home. This is to enable the dog to not only walk away but to have somewhere they feel comfortable to go to. This helps to minimalize any stress felt upon the dog.

3. Work Where Possible Within the Dog's Own Home. This method allows for dogs to both feel comfortable and display normal behaviors as they are familiar with the setting.

4. Have the Owner or Carer Observing. While there is no doubting the benefit of a trained professional in dog-behavior to spot any potential long or short term emotional trauma, the holder of the dog often knows habitual behaviors and will be able to quickly spot and identify any adverse effects. This also has the benefit of enabling the dog to seek comfort if it feels the need to. This enables the dog to be more within the center of the design process through helping the dog's behavioral reactions to shape the research process.

5. When Using Audio or Video Never Show Familiar or Distressing Footage or Sound. In DCI researchers should avoid creating confusion and distress to the dog by showing them audio/visual representations of people or non-human animals they know. This is to prevent disembodiment causing confusion from the lack of understanding around technology on the dogs' behalf. Within this area, the researcher should also not show anything which can cause distress to the dog as this goes against their welfare.

6. Dogs Should Have No Emotional Behavioral Problems. Unless the aim of the study is to improve the emotional behavioral response, generally no dog with behavioral problems along the emotional spectrum should be included. The reason for this is twofold: firstly, the chance of a possible negative effect upon the dog is greater due to an instability of behavior and secondly, there would be some distortion of the results with abnormal behavioral responses.

7. Dogs Should Not Be Trained To Use a System. When working with technology systems it is possible to train the dog to use the system. This however gets the dog to use a system in a trained method and does not collect ordinary results. By allowing the dog to use the system naturalistically the dog will present normal behavior. This, in turn, enables commonplace data collection. The methods and theories then drawn from the gathered data can then be more focused around the center of the dogs' true needs as the results are truer to the dogs ordinary behaviour. This guideline however is not always suitable towards creating systems within working dogs who are relied upon to behave in a certain manner as part of their work.

While these are general principles that ACID researchers follow, and these ideals have been spoken about in various previous studies [11; 21] and ACI conference topics (Bad design ACI@BHCI), the implications behind these decisions have yet to be debated. Even with these things in place does the dog ever really have a choice behind the activities it participates in? Do these principals help a dog choose what it does? Dogs have been shown to follow human choices, gaze [20] and recognize emotions [2], and befriend UMOs [1] and aid each other [18]. This is bringing forward increasing evidence that the interconnected relationships held within and throughout the technology and the environment, influence the study findings. This is why it is so important to record more base statistics of an experimental set-up, as suggest by Vaataja [21], to fully scope the relationships' influences not only on animal-nonhuman animal behavior but also the other agencies involved. Following this, by making the dog as comfortable as possible it both places value on its welfare whilst supporting higher quality research. The ethics of a researcher is always an integral part to the data that is collected with their views and themselves forming part of the research findings [3].

Animal, Machine and Human Relationship

The social attitude behind what a dog is, has evolved drastically, impacting upon the ethics of studies done with dogs. This attitude change has been formed from the knowledge we have gained in relation to the cognitive abilities of dogs, from aiding us in sports and entertainment, to providing companionship, security and physical wellbeing [7]. As a consequence, the abilities of dogs have been demonstrated resulting in dogs being reclassified in 2014/15 as sentient beings rather than as property, having the same legal protection as children under the law in France, Quebec and New Zealand. This change has been backed up by comparative neuroscience which has found that many of the same things that activate the human caudate also activate the dog's caudate leading to functional homology [4]. While biologists such as Darwin long suspected that all animals have emotions on some scale, this view has only recently been taken seriously as advancements in neurobiology and chemistry have added data. The notion that dogs can experience emotions, like love and attachment, puts dogs on a similar sentience to that of children. This directly impacts on how DCI researchers work with dogs. This reclassification has been acknowledged in some ACI work, such as in the creation of a Doggy Ladder of Participation to design with the dog rather than for the dog; thus appreciating the dog's cognitive aptitude [11].

This reclassification highlights the issues facing researchers working with animals: the problems between gathering data and the ethical morality of working with animals. This is especially true in ACI where for the best part the studies are for animal welfare. If there were no ethics behind working with animal researchers could undoubtedly collect more data, but the accuracy of this data would not be as dependable due to interfering factors

(tiredness, motivation etc.). Unlike typical animal experimentation within DCI there should not be a typical cost benefit of harm vs. benefit analysis done as it is not morally acceptable to harm a sentinel being. This is the atypical view HCI researchers hold for children. This is because even with the above mentioned precautions in place a dog can never fully consent to taking part within a study. Due to this, responsibility of welfare between the person and the dog lies with the researcher's country's legislation and more importantly the researcher's point of view on animal welfare and moralities. This no-harm approach, however, is idealistic as not all risks can be foreseen. In order to advance ACI/DCI studies have to be done that can potentially put the animal at risk but will in the long term aid animal welfare. It is, therefore, up to the researcher to find a mid-point which reduces the possibility of risk, insuring the correct welfare of the animal whilst still having usable data. This can be done by placing the animal in the center of the research through a triangulation of knowledge and involvement from the animal's owner(s), animal behaviourist(s) and the researcher(s). This ensures that the animal's welfare is observed from varying perspectives guaranteeing the most amount of gathered knowledge.

Study Reflection

Giving further insight into this, below is a summary of the ethical approach taken within the ACID studies, and the findings that helped informed future ethics from these studies.

Dog Species Appropriate Visual/Audio Stimuli. [10]

This initially investigated the content a dog pays attention to visually and formed the foundation of ACID ethics. Here it was noted that the dog would follow the visual cues of the human owner and thus the owner was instructed not to watch the visual stimuli. Data here was also collected within the dog's own home due to more normalised behavior being displayed by the dog vs in a lab where the dog was more prone to show exploratory behavior (guideline 3). Due to this, the dogs involved often walked away from the media, but this only showed disinterest within the stimuli so was not seen as null data. Within this study, the owner was also involved to ensure the welfare of the dog(s), especially when diverse forms of media were used which could possibly have had a negative effect (guideline 4). It was decided early on that dogs should not be shown media that would be distressing, which it was noted happened with media (sound/images) of known animals (guideline 5). This was further avoided by making sure that no dog involved within the study had behavioural problems to ensure that both the results were normalised and the animals own welfare (guideline 6).

Dog Head Tracker [9]

This study created a head tracker to monitor within three sections (left/right/center) where a dog was looking visually on a screen. The key ethical issues within were twofold: firstly, whether or not to train the dog to sit still to allow for eye tracking and secondly, failing this, to attach a device to the dog's head. There is tension in eye tracking as the most accurate results are at the pixel level which requires more in-depth methods (eye to gaze to face to body) which puts more restraints on the dog thus affecting normal behavior (guideline 7). Whilst Somppi [19] chose to train the dog to look at the screen to collect pixel-level tracking, the dog was not allowed to look away from the screen (trained to position head on a headrest) causing data collection even when the dog was not visually interested. Alternatively, researchers in Lincoln [22] took a different approach that allowed the dog to have freedom over movement but strapped a device onto their face. Even though positive reinforcement was used to get the dog used to wearing the apparatus, this training would have had an impact upon the visual patterns of the dog. This highlighted the tension between accuracy vs. normality and resulted in ACID researchers deciding for a contact-free approach to allow for normal behavior but having the effect of reducing data collection. This approach has since been duplicated in ACI with cats [17] relying on a computer system to analyse the position of the face/body to give approximation. As this study was the first to take place within a lab (due to the technological requirement) it was at this point that the need for a safe place was highlighted to enable the dog to retreat away from the study (watching media) (guideline 1 & 2). This did result in null data being collected (dog going to bed) but this ensured the dogs welfare.

Concluding Statement

When designing technology for dogs there are numerous factors to consider and with an evolving landscape of what it means to be a dog, the ethics of how to work with dogs plays a vital role in DCI. The undertone of DCI ethical considerations, is the jurisdiction that people aim to empower the dog through and with technology. This animal centered design approach, however, has to initially start with the researcher and is based around their opinions of what a dog is to both them and their research. This placement upon the scaler line of people vs. dogs interaction world view homogony goes beyond the interaction into the results shaping the data and shaping the found knowledge. In order to situate research, the authors here present ACI researchers with a challenge to state within the research conducted what their position is between the animal-researcher and how the researcher sees the animal. This would shape the parameters around the relationship and thus the intra-action taking place. Lastly, DCI guidelines have been coined to ensure the empowerment of ethical working with dogs within ACI. This will hopefully be built upon to become standard practice within DCI.

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