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Power, Participation, and the Dog Internet

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Have you ever wondered how technology could help you to better understand your dog's feelings? Or wished for a gadget that could translate your cat's thoughts into words? If so, you are not alone, as recent years have seen a proliferation of startups offering apps, Web services, and digital devices that promise to enhance our understanding of, and relationships with, our animal companions. For instance, Whistle and Fitbark offer digitally enhanced collars that measure physical activity and track location, while Flipaw automatically texts you cheeky messages from your dog, complete with personalized levels of sarcasm. Meanwhile, attaching a TailTalk sensor to your pet promises to translate tail motion into emotional feedback that you can access on your smartphone.

As HCI researchers who have collaborated extensively with animal behavior scientists, we are cautious about this rush to capitalize on computing for pets. In particular, we are concerned about the potential for negative impacts on animal welfare, since innovation appears to be driven largely by technology rather than the needs of the animals. It seems that in most cases the science upon which these gadgets rely to make their decisions and recommendations simply does not exist. In work presented at CHI 2015 [1], we identified and explained the latent problematic nature of these technologies based on participatory research we did with pet owners and animal behavior scientists. We exposed a considerable disparity between pet owners' understanding of the technology and the reaction of animal behavior experts. Owners were quick to trust the ability of technology to judge their pets' health, and many indicated they would trust the technology more than a qualified veterinarian. We argued that these gadgets have the potential to disrupt the relationship between human and animal. They can reinforce unrealistic ideas about animal behavior and foment distrust between owners and veterinary practitioners, creating a potentially harmful environment that can negatively affect animal welfare.

We question whether the design of these new devices and technologies for domestic pets is for the benefit of the animal or for the amusement of the owner. If the real users of these technologies are the owners, then what role do the animals play? We might consider the animal users of these technologies as what Eric Baumer labels *usees,* because technology is imposed upon them, and "the system (does) things with the individual's data to which s/he did not knowingly consent" [2]. In our own work we have shown that this lack of consideration for animals can have potentially profound and far-reaching problematic implications for human-animal relationships.

Moreover, we also argue that animal-computer interfaces are all too frequently created to serve human needs and to do things *to* animals, not with them. They are very rarely designed to support animals in doing things to humans. In the majority of work within the nascent research field of animal-computer interaction (ACI), this implicit power structure is recognized, and every effort is made to prioritize animal welfare in this relationship. For example, recent research has studied technology developed for working animals in agricultural contexts, for assistance dogs, and for animal-supported therapy. Though in these contexts the animal is still a usee, these projects typically feature collaboration with animal welfare experts to minimize risk to animals in those specific, well-defined roles and environments. This process is rarely observed in the design of technologies aimed for home use by non-expert owners of domestic companion animals.

Given the importance of considering animal welfare, we suggest that design processes for ACI technology must at least regard animals as stakeholders, and potentially even include them within design activities. However, the process of co-designing technology with animal collaborators raises some strange and potentially intractable ontological issues. In the rest of this article, we highlight the many conceptual problems inherent in carrying out cross-species co-design. In order to illustrate the strangeness of cross-species co-design, we present a number of speculative designs for genuinely animal-centered technology focusing on an exploration of the Dog Internet.

My Users and Other Animals

A major challenge facing ACI researchers lies in understanding to what extent a design process can reflect the needs of animals as *users* rather than *usees*. If a design process is to be considered participatory, it should be genuinely capable of reflecting and representing the values and concerns of all stakeholders equally, and not prejudicing or devaluing the contribution of any one group. It requires a sharing of *power* between designers, users, and communities; none of the stakeholders should be excluded from the decision-making process, nor should any stakeholders be excluded from initiating ideas or raising new concerns. A clear and constructive dialogue must be established between all stakeholders. Even the most advanced and inclusive cross-species design processes fall short on fulfilling the majority of these objectives.

There are challenges to a productive sharing of power in the design process. In particular, the cross-species gap in language abilities impairs our ability to collaborate productively with animals. The most remarkable species-specific skill of humans is language, which allows us to do many things that other animals cannot. We use our language abilities not just to communicate, but also to reason, interpret,

and speculate. Indeed, these are exactly the types of contributions that we solicit from collaborators in participatory design studies. The fact that animals cannot participate in these activities on an even footing with humans inherently prejudices the process against them.

All animals can learn lessons from the consequences of their own actions, but humans are uniquely skilled and efficient in learning from the experiences of others, through stories, analogies, and rules. However, while language is incredibly useful for humans, it also undermines our ability to understand animals, who, lacking analogical reasoning skills, experience the world in a very different way. Indeed, humans have a strong tendency to project human characteristics, such as complex cognition and emotionality, onto animals that objectively do not have those abilities. For example, it is very tempting to infer from watching an animal interact with a device that they "like" it, or "want" it, or that they are "curious," all based on our perspectives as humans. More likely, the animal is behaving in a manner that they have previously learned is likely to produce attention, food, and approval from the humans present. It is important that such observations should not be mistaken for the genuine thoughts or feelings of the animal. As counterintuitive as it sounds to all animal lovers, we simply have no evidence that these thoughts and feelings exist, or, if they do, that we can interpret them reliably and accurately. Observing an animal may give *us* new ideas, but we can't say that the designed outcomes are a manifestation of the animal's own idea. Thus, the cross-species gap in language abilities, and tendency for humans to anthropomorphize animal behavior, significantly undermines our ability to build a constructive and empathic dialogue with animal users.

Of course, a design process can focus a designer's attention on the needs of users without necessarily soliciting productive contributions from those users. For example, some processes focus on establishing a user preference between a pre-defined set of solutions. Existing studies of animal preference toward technology often utilize a similar approach. However, when applied to humans, these types of processes have been criticized as functioning mainly as a marketing tactic, since the participants have very little say in the design. In other words, designers have already decided that a product or service will be created; they just need help making it acceptable to users [3]. This veil of "consultation" allows UX designers to appear as if they have transferred responsibility for decisions to stakeholders, when in reality the power that is shared is minimal. Moreover, engaging in this facade of participation can render those stakeholders complicit in, and less able to resist, any regressive or anti-social outcomes of the process, as they metaphorically chose the color of their own shackles. This is particularly concerning in the case of animals, who have little or no power to resist technological exploitation.

We argue, therefore, that due to diverging species-specific abilities, human-led co-design processes will necessarily be discriminatory toward animals, since, appropriating Wittgenstein, even if a cat could design, we could not understand it. It follows that genuinely animal-centric technology may be inscrutable and impossible to understand from a human perspective, since the interactions would be composed primarily of signals that are meaningful only to animals. Indeed, during heated discussions on animal-centric technology, we have frequently found ourselves engaged in thought experiments, such as "What would a truly Dog-Centered Internet actually look like?" and "If it were designed by and for dogs, what would it be used for?" In the next section, we illustrate this dilemma through a series of speculations on the form and function of genuinely dog-centric technology.

Speculating on the Dog Internet

Here, we identify some specific cognitive and communicative abilities of animals and speculate as to what technology designed by animals with those abilities might look like and be used for. The intention is to explore how technology may support the agency of the animal, so that they can genuinely be considered users, rather than usees.

Futures and fictions. Somewhat surprisingly, we are not alone in pondering these questions. When he was recently asked if dogs should have access to the Internet, Julian Assange stated matter-of-factly that they will get it "whether they want it or not" [4]. In popular fiction, humans have occasionally speculated on what networked systems designed by animals might look like. For instance, it is easy to recognize the analogy between the Internet and Dodie Smith's notion of the twilight barking in *The 101 Dalmatians*:

"Busy town dogs bark less than country dogs, but all dogs know all about the Twilight Barking. It is their way of keeping in touch with distant friends, passing on important news, enjoying a good gossip."

In another example, the satirical BBC television program *Look Around You* [5] presents a feature on a racehorse, Championess, who has created a computer capable of predicting the winners of races. The computer is made "from stuff she found lying around her stable," and we witness the horse operating her computer by stamping on an array of horseshoes, connected to a mess of wires, wood, and batteries held together by her own manure. We see that a flickering light bulb communicates—something—to the horse, but the nature of the feedback is inscrutable to the human viewer. Nevertheless, it is claimed that the horse is making around $100,000 a year from successful bets.

Could dogs follow Championess's lead and repurpose technology for their own gain? Animal behavior scientist Marian Dawkins has asked what animals want. If parapsychologist Rupert Sheldrake is to be believed [6], then one of the things that *dogs want* is to know when their owners are about to come home. Quite why they want to know this, other than to perhaps tidy the house and delete their Dog-Internet browsing history, is perhaps a mystery. However, we suggest that it is relatively straightforward for dogs to repurpose human technology (much like Championess) in order to easily give themselves this ability without resorting to interspecies telepathy or morphic fields. Dogs might simply use the GPS on their owner's phone (e.g., by craftily setting up "Find my Friends") or by surreptitiously fixing an iBeacon to the owner's car that triggers an alert somewhere along the owner's route home. How might this alert be delivered, though? A high-frequency whistle inaudible to humans? A dimming of the houselights using Dog-IoT actuators? Certainly it seems unlikely that even the most adventurous of hounds would decide to repurpose electric shock collars for this task, regardless of their popularity among owners.

Figure 1. Dog Internet-of-Things solution to enable dogs to know when their owners are coming home.

Everyone knows you are a dog. The old adage goes, "On the Internet, nobody knows you're a dog." However, a dog faces numerous barriers in getting any value out of the Internet as devised by humans. Indeed, in Steiner's original *New Yorker* cartoon, the Internet-using dog is obliged to balance on a chair shaped for a human's backside, with one faltering paw resting on a keyboard designed for sticky human fingers. Increasing effort is being invested in developing interfaces that are possible for dogs to use. These include levers that can be grasped by the mouth or nudged by the nose or paw. These interfaces are typically redesigns of human interfaces that have been simplified for animal use.

We have often speculated whether it might be possible to rethink this whole approach. For instance, can interfaces be built that dogs could *possibly* use, but that are also comfortable and elegant, where interaction is based on skills at which dogs excel? The capabilities of dogs' noses, for instance, are well documented, and an interface in which interaction relies on production and identification of odors may work intuitively well for dogs. Such an interface would support dogs in terms of ease of use and would in addition confer power and privacy to the dog. Unlike with lever-based interfaces, we essentially cannot know what information the dog has understood, or transmitted.

The above idea is perhaps not as far-fetched as it seems. Dog olfaction-based interfaces are already used to contribute to purely human needs. For example, research has demonstrated that their powers can be harnessed to detect cancer cells in human urine. We note that speculative designer Soomi Park has explored similar ideas in her *Republic of Privacy* work suggesting that dogs might be built into ATMs in order to use scent as a user-authentication mechanism. We are struck by similarities between this and the harnessing of so-called *cognitive surplus*, whereby humans are used to do tasks that machines are incapable of doing. It would certainly be a dark, dystopian future if we became comfortable with harnessing and exploiting the olfactory capabilities of dogs on a grand scale (e.g., to select the best-smelling cheese) and ended up building the Dog Matrix instead of the Dog Internet.

Commented [DC1]: such olfaction-based systems ?? or
such canine talents might be replicated into ATM interfaces in order…

Commented [02]: this is speculative design, so I think she means actual dogs, correct?

In order to be truly free of human interference, any dog-centered communication technology must have appropriate security protocols. We suggest that dogs' olfactory capabilities might be used to prevent access to sensitive areas of the Dog Internet, similar to how captchas are used to prevent machines (specifically bots) gaining unauthorized access to human resources.

Figure 2. Olfaction-based Completely Automated Public Turing test to tell Dogs and Humans Apart (CAPTDHA).

SUMMARY

Just as lightweight, reliable, affordable computing devices have enabled wearable technology for humans, we are beginning to see similar devices developed for companion animals. But how do we implement design processes that are respectful of the needs and values of all users, when some of these users are not human? The human ability to use language to share complex ideas and opinions makes for ideal partners in a user-centered design process in a way that is problematic with animals. Those human strengths can actively undermine this process, since anthropomorphism can lead us to consider our users on unsuitable human terms.

As such, we argue that most technology currently being designed for use by pets is exploitative and entangled in human-centric values. To illustrate and explore the implications of this deeply unintuitive problem, we suggest using tools like speculative design to attempt to understand what an animal-centric technology might actually look like. Our examples highlight issues around agency and security as it relates to technology for animals, especially in contrast to similar technologies designed for people. We argue that designers working in this area must engage openly and honestly with our lack of understanding of the subjective experience of our animal collaborators.

Endnotes

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Insights

- Maintaining animal welfare as a key responsibility in designing interactive technology for animals.

- Conceptual problems in cross-species co-design include focusing on human language and anthropomorphism as obstacles to understanding.

- We illustrate these issues through speculative designs for dog-centered technology, based on the concept of the Dog Internet.