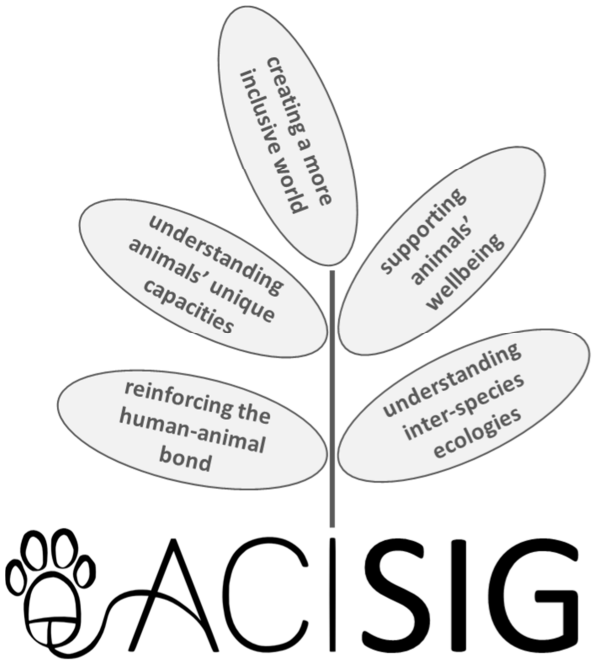
ACI SIG at CHI'12: meeting report

Clara Mancini, The Open University
Chadwick Wingrave, University of Central Florida
Janet van der Linden, The Open University
Shaun Lawson, University of Lincoln
Frank Noz, FrankNoz.com

CHI'12 hosted the first meeting of the Special Interest Group on Animal-Computer Interaction, which took place on the 10th of May at the Atlanta Convention Centre, Texas, and was attended by a lively crowd who enthusiastically contributed to an interesting discussion. The meeting opened with a brief presentation about ACI and its aims, including: 1) understanding the interaction and relation between animals and computing technology within their habitual contexts; 2) designing computing technology that can make life better for animals, support animals in their tasks, or foster intra- and interspecies relationships; 3) informing user-centred approaches and methodologies to developing technology for animals. The presentation also illustrated possible areas of ACI application with examples from pet entertainment, animal behavioural research, conservation studies, and farming practices. Following the presentation, participants were invited to share their motivations for attending, before contributing to the discussion of three topics, namely regarding methodological issues, research competencies and future steps. The different phases of the event are summarised below.

Participants' interest in the meeting

Two dozen participants attended the meeting, even though this research area is still emerging and occupies a very marginal position in the CHI community, and even though the event took place during the last session of the last day of the conference, just before the closing plenary. A few participants reported attending because they were curious to find out more about ACI or because ACI sounded like one of the craziest trends currently developing in interaction design. However, most of them reported being motivated to attend by specific research and personal interests. The motivations of both organisers and participants can be summarised as follows:



- Wishing to expand the boundaries of interaction design and computing research, informing less anthropocentric and more inclusive approaches and methodologies to the development of computing technology.
- Wishing to support the wellbeing of animals (e.g. improving conditions for farm animals, relieving anxiety in pets, enriching the lives of captive wild animals) through the development of technology appropriate for them.
- Wishing to understand how animals can do things which humans cannot do (e.g. predicting epileptic seizures) and how to make companion technology that behaves as animals do (e.g., animal-like robots).
- Wishing to make human technology accessible also to companion animals, in order to share the fun, enhance their intelligence, and reinforce the bond between humans and companion species.
- Wishing to use technology as a channel to better understand human and animal behaviour and cognition, as well as human-animal communication, and to attain a better grasp of interspecies ecologies.

Methodological issues

The first discussion topic focussed on methodological issues arising when doing research with and developing technology for animals, in particular when trying to elicit user requirements, involving users in the design process and doing prototype evaluations with users, the users being of course animals. The main objective of the discussion was to identify HCI methodologies and approaches that could be adapted to and used in ACI research.

The issue of ethics and ethics approval when doing research with animals emerged almost immediately. HCI researchers are used to doing research with humans and know how such work is ethically regulated; but doing research with animals is a very different story. Animal research is a highly sensitive subject, partly because animals cannot consent to their involvement and partly because of the controversial way in which they are often used in bioscience; hence in many countries doing research on animals is strongly regulated. Consistently with its aims, ACI is not about doing research 'on' animals but about working 'with' animals in order to benefit them without harming the individuals involved in the process. However, at present there are no ethics frameworks that cover what is effectively a grey area of animal participation in research. Therefore, this is an issue that the ACI community needs to address as a matter of urgency (e.g., The Open University is currently working on an ACI research ethics protocol, but this is likely to take several months and its progress is not without difficulty, mainly due to the novelty of the research approach).

There seemed to be consensus on the idea that technology should engage with animals, or allow animals to engage with it, in a way that is natural to them, and that designers should make every effort to take as much as possible the 'point of view' of the animal. To this effect, it was suggested that rather than trying to explicitly elicit animals' requirements for new technology, researchers could use the equivalent of cultural probes sometimes used in HCI research, thus providing opportunities for spontaneous and possibly unexpected interactions through which the animals' point of view could be better understood. Iteration through different designs and prototypes, with the involvement of the animals throughout, emerged as an essential part of this process.

Direct observation emerged as an important method to gather data and gain insights into animals' needs, aptitudes and interactions, but knowing how long to observe for, what to look at and how to interpret one's observations appeared to be critical issues. It was suggested that integrating human guardians' testimonials into ethnographic observation of animals (e.g., pets or zoo animals) was important and could provide useful interpretational keys, due to the rich history of interaction between the animals and their humans. However, it was also noted that guardians (e.g., pet owners) may misinterpret the behaviour of their animals by projecting their own meaning onto those behaviours. Therefore it was proposed that involving animal experts (e.g., behavioural researchers or practitioners) in ACI research would be almost inevitable.

Evaluating technology designed for animal users presents similar challenges to those encountered when trying to understand what their needs or inclinations might be in the first place. Observing animals' behavioural or physiological reactions to technological interventions was suggested as a sensible approach. It was noted that, similarly to HCI research, when evaluating specific usability or experience aspects, ACI researchers could take the experimental approach typical of animal behavioural research by allowing animals to express preferences, for example, between different technological interfaces (e.g., as done by Lee et al. when evaluating their mobile pet wearable computer and mixed reality system for human-poultry interaction through the internet); or by employing non-invasive, unobtrusive sensor technology to monitor the animals' physiological and affective reactions (e.g., similarly to a developing approach in animal welfare research). However, consistently with HCI protocols, a more ethnographic or ethological approach could be taken when evaluating more complex aspects of a technological intervention, for example, the interferences between social dynamics and technology use (e.g., how bovine social dynamics affect the way in which different individual cows use voluntary robotic milking systems); or when assessing how a technological intervention affects an animal's behaviour 'in the wild', for example, by inducing new, perhaps even unusual or unexpected, behaviour. In this respect, cognitive ethology and multispecies

ethnography have a lot to offer HCI researchers; the work of anthrozoologists and ethologists provides many insights into how researchers can negotiate the methodological issues deriving from the fact that they are attempting to understand interactions relations that involve members of other species.

Composition of ACI teams

The second discussion topic focussed on the competencies needed to carry out ACI research. HCI researchers are generally well versed in disciplines that study the human mind and body (e.g., ergonomics, psychology), but when it comes to animals they may lack the corresponding necessary background.

Consistently with the position that experts are needed to interpret animal behaviour correctly, it was suggested that animal behavioural researchers or practitioners should be an essential component of ACI teams, contributing decades of relevant research which cannot be compensated for by simply perusing the literature they produce. Not only can animal behavioural researchers and practitioners help ACI researchers develop better technology for animals; more importantly they can prevent them from effecting technological interventions that make animals' lives worse (e.g., by increasing their level of anxiety). It was highlighted how experts' involvement would be particularly important when working with animals who are not ordinary family members: ACI researchers might be sufficiently equipped to design technology for human families and their nonhuman members, but they are unlikely to have the necessary skills to design technology, for example, for wild animals. However, it was also noted that animal behavioural researchers often disagree in their scientific approaches to the study and in their interpretations of animal behaviour. So much is still unexplained about human and animal consciousness, emotion and cognition, and their behavioural manifestations, that taking any particular stance in this regard remains largely a matter of belief. This seems particularly problematic when it comes to developing a user-centric design approach for nonhuman users, whose responses to any technological interventions are interpreted by humans, even though these human interpreters may be experts.

In the experience of the organisers, one of the main challenges in this scenario was identifying the right experts to work with on a particular project and then obtaining their collaboration. Since ACI is not an established discipline, researchers interested in carrying out this kind of work find themselves having to use personal connections (e.g., through volunteering for animal shelters or other non-governmental organisations) in order to gain access to the relevant experts. Gradually building a shared repository including information on animal researchers and practitioners around the world could therefore provide the ACI community with a valuable resource. As mentioned above, just like in other disciplines, the theoretical perspective and practical approach taken by individual animal researchers and practitioners to understanding and interacting with animals may differ from that of their peers. Hence, it was deemed important that ACI researchers ponder with care their choice of research partners and, once they have made their choice, stick with their partners' perspective and approach until the end of a project for the sake of rigour, consistency and practicality.

Once identified, enticing animal behavioural researchers or practitioners to collaborate with can be a challenge, partly because these experts will have their own agendas, to the pursuit of which ACI research may be irrelevant, and partly because of communication barriers between disciplines. It was suggested that prototypes have an important role to play here, potentially providing concrete albeit rudimentary demonstrations of a project's aims, which could help overcome ontological and linguistic differences between parties. It was also suggested that developing technology for animals could be presented as an opportunity for animal researchers and practitioners to access new funding sources to advance their research interests; in this respect, it would be important to identify synergies between ACI and animal experts (e.g., how technology could improve cognitive scientists' insights into animal cognition), for which purpose the abovementioned repository would also be valuable. Finally, it was suggested that animal experts would be more likely to engage if they perceived that ACI researchers have a genuine interest in the animals they want to work with and not just in pursuing their own technological ambitions. Attendees reported that these communities (e.g., zoo managers and keepers)

may have ideas about technology they would like to have for the animals they care for, but lack the expertise necessary to turn their ideas into reality. Such communities are likely to been keen on establishing partnerships with ACI researchers, so they should be explicitly targeted.

Developing the ACI community

The third discussion topic aimed at identifying opportunities to develop the emerging research community through actions that could easily be taken following the SIG meeting. Firstly, it was suggested that the organisers should start developing a categorised list of useful references, including references about animal behavioural research, which ACI researchers could use as a resource. This seemed particularly appropriate since it was noted that often ACI-related papers fail to reference relevant animal behavioural work, even though demonstrating awareness of, and building on, such work was recognised as critical if ACI research is to be taken seriously by the animal research community.

Secondly, it was proposed that researchers from this emerging community could organise an ACI workshop. The SIG organisers had already submitted a workshop proposal to CHI'12, which was rejected on the grounds that the programme was too ambitious and that the event wouldn't attract enough interest. So it was suggested that other venues might be more receptive and it was noted that the biannual conference on Affective Computing and Intelligent Interaction (ACII) might be an interesting possibility. It was also suggested that ACI researchers could more boldly venture into an animal behavioural research venue as a way of engaging a highly relevant community.

Thirdly, regarding the issue of engagement, it was suggested that ACI researchers should develop connections with other communities where they might more easily find opportunities and financial support for collaboration (e.g., the agricultural or conservation industries). This was consistent with the previously discussed point that developing an understanding of other communities' needs might help ACI researchers think of work that might be mutually beneficial and therefore more likely to receive attention and support from outside the HCI or ACI communities.

Finally, difficulties in classifying ACI work when submitting papers to CHI were highlighted, since the available descriptors don't apply to this new kind of research. This is a problem experienced by authors of ACI-related work in general, which is indicative of the fact that ACI research is still off the CHI community's radar. So the need was pointed out to open a dialogue with CHI's technical chairs in order to persuade them to broaden their paper descriptors to also account for ACI work, and more generally to convince them to make room for ACI-related contributions in the conference's programme. In this regard, it was noted how important it is that researchers endeavour to produce and submit high quality ACI work to gain recognition that this is research worthy of a place at CHI and other computing conferences.

Conclusions

Organisers and attendees agreed that ACI research is a natural progression for both HCI and animal behavioural research, since animals increasingly find themselves sharing our artificial, technologized and digitised environments. Indeed, popular media such as YouTube provide evidence of a growing culture in which people endeavour to augment the lives of, and their relationships with, their animals through technology. The fact that ACI research is still so underdeveloped seems a significant and almost inexplicable oversight in the relentless process of technological expansion. Nevertheless, the challenge remains for ACI researchers to demonstrate that they are a legitimate community capable of producing work which is credible and valuable to both the animal behavioural research community and the computing research community. While building credibility based on evidence of positive influence is already problematic when doing research with humans, let alone when doing research with animals, it seems clear that ACI has an important contribution to make to both science and society, and that the time has come to acknowledge, and make room for, 'the elephant in the room'.