Design and Evaluation of Interactive Technology for Human-Animal Encounters at the Zoo

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ABSTRACT
Zoos are making increasing use of digital technology for visitor interpretations and for animal enrichment and research. Modern zoos place considerable emphasis on animal welfare, on constructing positive human-animal interactions as a foundation for education, and shaping public attitudes towards wildlife and conservation. These objectives have much in common with the stated goals of ACI. To date, only limited ACI research has been conducted in the context of the zoo. Through my research, I aim to provide a foundation for ACI to contribute to the evolution of the zoo as a site of education, conservation and animal welfare best practice.

INTRODUCTION
Zoos have considerable social and cultural significance as sites where human-animal interactions routinely take place and where relations are constructed between human and non-human worlds. The modern zoo conceptualises itself primarily as a conservation organisation, with a focus on protecting threatened wildlife, public education, and animal welfare [21]. Research into zoo institutions and visitors has established the value of engaging animal experiences as a strategy for education and influencing public attitudes [5]. For example, visitors’ attitudes to animals and wildlife can be positively influenced by experiencing a sense of connection with wildlife [4] or a "profound experience" with an animal [19]. Accordingly, zoos seek to design exhibits in which animal visibility and behaviours support visitor entertainment and education [10], while balancing these objectives with the aim of meeting welfare needs and avoiding adverse impacts on animals resulting from visitor presence [17].

A number of HCI studies have explored interactive technologies for zoo visitor education and conservation messaging, including the social dimensions of learning about zoo animals [12], and guides’ use of information systems [7].

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Research indicates that digital interpretations have a greater impact than static signage [15], and are attractive to young people [13,18]. The challenge of designing systems which do not detract from the visitor's visual connection with the animals has led to some interest in smartphone-based augmented reality systems for the zoo [8,9,16].

Figure 1: Apps for Apes iPad enrichment at Melbourne Zoo

Zoos are increasingly turning to interactive technologies as a means of providing animals, predominantly primates, with novel forms of cognitively stimulating enrichment. A few researchers have explored the potential of interactive technologies for animal enrichment [1,2] and playful connections between humans and animals [20]. Studies suggest that attitudes to technology at the zoo are broadly positive amongst zoo personnel [3] and visitors [14].

Despite this, there has been relatively little research into the impact of technology on areas of central concern in the zoo context: animal welfare [6], visitor interpretations and the human-animal encounter. These core interests of the zoo overlap considerably with the goals of animal-computer interaction [11]; it is thus important that ACI should be able to engage with and respond to the zoo context. For this, ACI requires approaches for conceptualising and investigating animal-human-computer interaction appropriate to this context.
RESEARCH TOPIC
Prior research indicates the potential for interactive technology at the zoo to contribute to animal well-being, and to enhance the visitor’s experience and corresponding educational and conservation outcomes. In my research I will address the question of how we can design and evaluate interactive technology for human-animal encounters at the zoo. As part of this, I will explore the impact of technology on human-animal encounters at the zoo; related opportunities and constraints; and the extension of ACI / HCI methods through adaptation and integration of animal science methods and tools.

RESEARCH METHODS
My research is being conducted as part of a partnership between the Microsoft Research Centre for Social NUIs at Melbourne University and Melbourne Zoo (MZ). This initiative is currently exploring digital interactive enrichment for orang-utans.

Study 1: Interactive Technology at the Zoo
Through a case study of five interactive systems deployed by MZ, I examine the impact of existing technologies on human-animal encounters in the zoo context. The study investigates systems used by visitors (Digital Signs and the Zoopermarket), zoo personnel with visitors (Educator Screens and Volunteer iPads), and zoo personnel with animals (Apps for Apes). My research includes interviews with MZ personnel (interpretations, keepers, educators and volunteers), observations of systems in use in the field, and review of relevant corporate documents.

This study shows how digital systems are being used to extend human-animal encounters temporally and spatially, reveals considerations for integrating digital systems within naturalistic zoo exhibits, and explores how competing perspectives and objectives within the institution of the zoo bear on the design and use of technology. This reveals that in this context it is fruitful for ACI to adopt a broad view of the encounter between animals and humans.

Study 2: Technology for Human-Animal Encounters
To explore how technology might enrich human-animal encounters in a way that supports both animal enrichment and the visitor experience, we have developed an interactive floor to be used by orang-utans and humans for collaborative games and shared digital experiences. Drawing on the impacts and considerations identified in Study 1, as well as established methods from HCI, ACI and animal sciences (including welfare assessment techniques), I will plan and conduct an evaluation of a system pilot (Sept-Oct 2015) with orang-utans and zoo personnel. From this I will define methods for design and evaluation of the system implementation (2016).

Study 3
Study 3 will investigate interesting findings or respond to areas of concern identified in Study 2 (2016-17).

ANTICIPATED CONTRIBUTIONS
My research will investigate opportunities and challenges relating to design of interactive digital technologies for the zoo, and deliver guidelines or methods for design and evaluation in this context. Through this I aim to provide a foundation for ACI to play a role in the development of novel interactive technologies that enhance the wellbeing of captive animals, permit new forms of animal experiences for the public, and support zoos in their conservation goals.

REFERENCES


