Don't Cut to the Chase: Hunting Experiences for Zoo Animals and Visitors

Fiona French

School of Computing, London Metropolitan University, UK
f.french@londonmet.ac.uk

Mark Kingston-Jones

The Shape of Enrichment and Team Building, with BITE, UK
mkjones@enrichment.org

David T. Schaller

Eduweb, St. Paul, Minnesota, USA
david@eduweb.com

Sarah Ellen Webber

Microsoft Research Centre for Social Natural User Interfaces, The University of Melbourne, Australia.
s.webber@unimelb.edu.au

Heli Väätäjä

Dept. of Pervasive Computing Tampere Univ. of Technology, Finland
heli.vaataja@tut.fi

Mark Campbell

School of Computing, London Metropolitan University, UK
mark.campbell_home@btopenworld.com

Abstract

This workshop explores different ways to use technology to facilitate hunting behaviour enrichment for zoo-housed animals and parallel gaming experiences for zoo visitors.

Author Keywords

Environmental enrichment; ACI; games; physical computing.

ACM Classification Keywords

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

Introduction

Enabling captive animals to experience their natural predatory and avoidance behaviours is an interesting challenge for zoos. Many zoos worldwide are searching for different novel ways to enrich the lives of captive animals to ensure their physical and psychological welfare. Although the keeping of wild animals in captivity can raise a debate on its justification, zoos do have an important role in preserving many species that are already going extinct or being in the risk of going extinct. Furthermore, zoos have an important role in educating the public about wild species and their behaviour, and those responsible for conservation

Figures 1-3: Prototypes of Lion Rover, a remote controlled enrichment device for stimulating hunting behaviour in large felids [11], images courtesy MKJ

efforts. In addition, they provide an opportunity for researching species to help their preservation, restoring their natural habitats and related ecosystems.

Motivation

Enabling animals to perform highly motivated behaviours, including foraging and hunting, is widely understood to be an important measure in ensuring animal welfare [1]. While a variety of enrichment has been introduced to predatory species in order to encourage them to exhibit their natural behaviour patterns, aspects of the hunt are difficult to emulate without a live prey. Bashaw et al [2] found that when felids were introduced to live prey in the form of fish, their range of hunting techniques expanded. This has particular significance for pack animals such as wild canids and felids, for whom hunting together may be an important social activity as well as providing exercise, cognitive stimulation and ultimately food.

However, predators in zoos are not generally fed live prey (such as other mammals), because this is detrimental to the welfare of the hunted animal and generally considered by zoos to be a cause for public ethical concern. Indeed, in many countries, it is illegal. As a consequence, a number of zoos have installed mechanical devices to deliver food in a manner which promotes hunting behaviours [3]. Other approaches include acoustic interventions which mimic the sounds of prey species [4]. Digital technology has the potential to extend the welfare impact of such environmental enrichment, by allowing greater complexity and unpredictability, and responding to animals' evolving needs to avoid habituation [5]. In addition, Mancini et al. highlight the opportunity to create adaptive, personalised experiences [6].

Despite the negative welfare impact of prolonged stress, there is potentially an associated opportunity to offer complementary enrichment experiences for social prey species, whose herd behaviour is stimulated by external threats [7].

It might be that zoo visitors already provide a steady supply of stress-inducing events – for example, zoo-housed meerkats typically exhibit their normal lookout behaviour, although research at Melbourne Zoo suggests that visitor presence has little impact (perhaps because meerkats are adapted to watch for aerial predators) [8].

As part of a parallel investigation, this workshop will consider how to offer zoo visitors gaming experiences that map conceptually to the enrichment experiences offered to the animals, albeit with an alternative interface. The purpose of this is to further the zoo mission to educate the public about the animals in their care, inspire visitor's respect for animals, as well as stimulating interest in the exhibits and increasing public awareness, an opportunity highlighted by Carter et al. [9]. An example of this approach is provided by Schaller [10] whose firm Eduweb worked with the Minnesota Zoo to develop "WolfQuest" as both a game and an educational resource, aimed at a youthful demographic who respond well to interactive experiences.

With the increasing popularity of the Internet of Things and associated technology, it has become possible to monitor animals' interactions "in the field" in real time without the presence of keepers or researchers, who might inadvertently modify behaviour patterns. This is another example of how technology may be able to

Example Design Prototypes
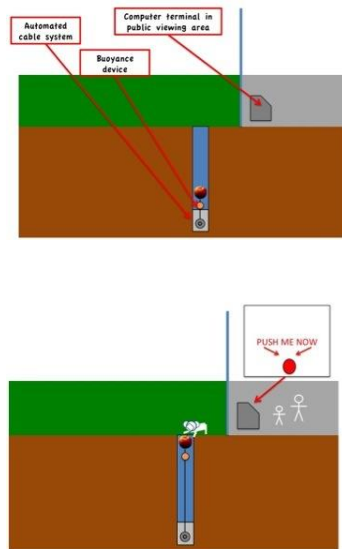
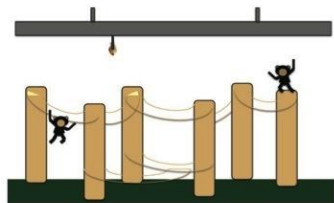Figures 4-5: Polar bear lie and wait ambush simulation with public interaction

Figure 6: Chimp Chess hunting simulator, images courtesy MKJ

support research into enrichment and also provide material for developing simulations.

Aims and Activities

The workshop's aims include:

- Facilitate networking between different communities.
- Identify and resolve challenges to cooperative working practices between zoos and ACI developers.
- Identify clear enrichment goals for a range of species.
- Investigate how to involve zoo visitors in experiences that contribute towards their understanding of different species.
- Produce draft design specifications for a selection of novel environmental enrichment experiences, emphasising the following key goals, adapted from recent participatory design sessions in ACI [12]: (i) enrichment, (ii) playfulness (iii) usability, (iv) robustness/fitness for purpose, (v) technical competence, (vi) educational impact.

We plan to undertake the following activities during the event:

- Introductions and slideshow of participants' work.
- Structured workshop activities enabling people from different backgrounds to meet and discuss challenges in the field of animal enrichment and how technology might be able to facilitate development and evaluation. Participants will brainstorm and work together to find common themes.
- Small teams brainstorming further specific themes that have emerged from the workshop, undertaking

collaborative design briefs and creating early phase concepts presented as storyboards or similar communicative means.

- Presentations - feedback to group, followed by a discussion session that builds on the concepts and points to some ways forward.

We plan to share the outcomes of the workshop in a repository of ideas and support future collaborations by keeping a record of participants' skills and interests. There will be a website dedicated to the workshop and we will publicise it via our mailing lists and personal contacts. A paper will be written to CHI in alt.chi or Late-breaking work track based on the workshop activity.

Biographies

Fiona French is a senior lecturer in the School of Computing at London Metropolitan University. She is course leader for BSc Computer Games Programming and has organised several gamejams and other play-related public events. Her research interests include Animal Computer Interaction, physical computing and toy and game design and development. Fiona is currently investigating the design of playful interactive systems for elephants, as part of a PhD in the Animal Computer Interaction Lab at The Open University.

Mark Kingston-Jones is a Workshop Coordinator and Level 1 Instructor for The Shape of Enrichment, having been involved in 46 workshops, in the UK, Indonesia, South Africa, Uganda, Romania, Russia, Lithuania, Vietnam, Armenia, India and Croatia. Previous to becoming self-employed in 2014, he worked at Howletts and Port Lympne Wild Animal Parks, as 'Head

of Education and Research'. In addition to organizing talks, workshops and conferences, he has run over 70 team building enrichment workshops for corporate and university groups, as well as working with keepers to design and implement enrichment ideas. Mark is the SHAPE-UK & Ireland Events Co-Coordinator, an Honorary Research Fellow at the University of Kent, an external advisor for the PASA captive Care Group and a Trustee for Lakeview Monkey Sanctuary.

Mark Campbell is a senior lecturer in Computer Science, and course leader for MSc Systems Development in the School of Computing at London Metropolitan University. He has a vast wealth of experience in both academia and industry and currently specialises in IoT technology, robotics and systems building, network and cloud security, and mobile distributed application development. Mark is also a STEMNet Ambassador who regularly visits schools to demonstrate new technology.

Sarah Webber is a PhD candidate at the Microsoft Research Centre for Social Natural User Interfaces at the University of Melbourne. Her PhD research examines the use, design and evaluation of digital technology for animal-human encounters at the zoo. She has a professional and academic background in interaction design, user research and user-oriented technology evaluation.

Heli Väätäjä is a post-doctoral researcher in the Department of Pervasive Computing at Tampere University of Technology, Finland. She is the responsible teacher for M.Sc. level courses on experience design and evaluation, user interface design, and user-centered product development. As a

hobby, she teaches as part of her dog training classes about dog's psychological needs and natural behaviors, and enrichment of eating and hunting behaviors. Her research interests include serious gaming, IoT and big data, and in ACI specifically animal welfare and enrichment with technology, and design methodologies for animals.

David T Schaller is the Principal of Eduweb, an award-winning developer of learning games and simulations, based in Minnesota, USA. Dave has over twenty-five years of experience in natural history and social science interpretation, working in print, exhibit, and digital media. Since 1996, he has developed over 200 digital games and interactives about science, art, and history. As a Principal Investigator on the WolfQuest project, he worked with biologists, zoo curators, and educators to design a scientifically-accurate game about wolf ecology. He holds a B.A. in Humanities from Macalester College and an M.A. in Geography and Museum Studies from the University of Minnesota.

Call for Participation

This workshop aims to bring together expertise from different disciplines and enable participants to network and move towards designing and developing exciting new enrichment experiences for zoo animals and their visitors.   In particular, we will focus on individual and pack hunting behaviours, such as ambushing, stalking and chasing; how to stimulate their expression in animals and how to enhance the experience of zoo visitors through the provision of a parallel simulation or game.

We invite participants from a wide range of communities, including but not limited to game design,

computer science, engineering, education, HCI and ACI, zoo personnel, animal behaviour and environmental enrichment. This is an opportunity for developers with an interest in ACI to share ideas with animal experts and explore the potential for future synergy. The workshop will have a practical focus, with an emphasis on collaborative design.

We would like prospective participants to submit either: (i) a short proposal, describing their relevant expertise and how this might contribute to the topics under discussion; or (ii) a short presentation of a recent and relevant artifact, system or concept they have been working on. In addition, we would like participants to provide one slide that we will incorporate into a slideshow that showcases everyone's work.

References
1. Fraser, D. Understanding Animal Welfare: The Science in its Cultural Context. John Wiley & Sons, 2008. 184.

2. Bashaw, MJ., Bloomsmith, MA., Marr, MJ., Maple, TL. 2003. To hunt or not to hunt? A feeding enrichment experiment with captive large felids. Zoo Biology Vol.22 Issue 2. Wiley Subscription Services, Inc. http://dx.doi.org/10.1002/zoo.10065

3. Young, R.J. The importance of food presentation for animal welfare and conservation. Proceedings of the Nutrition Society 56, 3 (1997), 1095–1104

4. Markowitz, H., Aday, C., and Gavazzi, A. Effectiveness of acoustic "prey": Environmental enrichment for a captive African leopard (Panthera pardus). *Zoo Biology 14*, 4 (1995), 371–379

5. Rault, J.-L., Webber, S., and Carter, M. Cross-disciplinary Perspectives on Animal Welfare Science and Animal-computer Interaction. *Proceedings of the 12th International Conference on Advances in Computer Entertainment Technology*, ACM (2015), 56:1–56:5

6. Mancini, C., van der Linden, J., Kortuem, G., Dewsbury, G., Mills, D. and Boyden, P. (2014). UbiComp for animal welfare: envisioning smart environments for kenneled dogs. In Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '14). ACM, New York, NY, USA, 117-128. http://dx.doi.org/10.1145/2632048.2632073

7. Kelling, A.S., Allard, S.M., Kelling, N.J., Sandhaus, E.A., and Maple, T.L. Lion, Ungulate, and Visitor Reactions to Playbacks of Lion Roars at Zoo Atlanta. *Journal of Applied Animal Welfare Science 15*, 4 (2012), 313–328.

8. Sherwen, S.L., Magrath, M.J.L., Butler, K.L., Phillips, C.J.C., and Hemsworth, P.H. A multi-enclosure study investigating the behavioural response of meerkats to zoo visitors. *Applied Animal Behaviour Science 156*, (2014), 70–77

9. Carter, M., Webber, S., and Sherwen, S. Naturalism and ACI: Augmenting Zoo Enclosures with Digital Technology. *Proceedings of The Second International Congress on Animal Computer Interaction, In Press.*, ACM (2015).]

10. Schaller, D. et al., Learning In The Wild: What Wolfquest Taught Developers and Game Players. In J. Trant and D. Bearman (eds). Museums and the Web 2009: Proceedings. Toronto: Archives & Museum Informatics. Published March 31, 2009. Consulted July 7, 2016. http://www.archimuse.com/mw2009/papers/schaller/schaller.html

11. Kingston-Jones, M., Buchanan-Smith, H., Marno, R. 2005. Novel Feeding and Hunting Enrichment for Large Captive Felids. Proceedings of the 7th Annual Symposium on Zoo Research 2005

12. French, F., Mancini, C., Sharp, H. Playful UX for elephants. Proceedings of Measuring Behavior