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Poster applied innovative commercial NACCQ CAPSTONE PROJECTS

Virtual Antfarm

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Otago Polytechnic Bachelor of Information Technology has had a long collaborative relationship with Otago Museum (Mann and Smith 2006). While these projects may fall outside traditional development arenas we find that the particular challenges of museum projects are well suited for capstone projects. These challenges include the focus on visitor experience (cf usability), content and narrative, metaphor and fidelity. These developments have in common an interactive basis. All are driven by computing that is non-trivial. In the finished form none involve a traditional screen-keyboard-mouse arrangement yet there is a requirement that the systems, both software and hardware are bullet proof – they can demand zero maintenance. We find a different role for functional requirements, differing measures of success, a complex role of interactivity that is closely intertwined with narrative and educational parameters. Perhaps the most important aspect is that of reality, not in terms of virtual reality but in terms of the integration of real and not real in the forms of interface, story and engine. This element of faked aspects of development is perhaps unique to this area.

In 2009 Otago Museum has redeveloped its nature gallery to become more interactive and engaging. This created a dilemma similar to those which lead to *Fish'n'clicks* and *Metamorphamatic* (Mann and Smith 2006): visitors need to interact with an animal that must not know it is being interacted with. In this case the solution was to create a virtual ant farm on an interactive surface for the Otago Museum. Antfarm has been deployed in the rebuilt Nature Gallery.

Antfarm is seen by the visitor as an ant colony on the floor. Antfarm has successfully managed to give the impression of a real ant colony. In two days of live testing at a Careers Expo, the most frequently observed response was "are they real?", many people assumed Antfarm was a movie. When the visitor puts their hand out or stands on the surface, nearby ants will come and investigate.

The group followed the Agile Development Framework (see development blog http://bitweb.tekotago.ac.nz/wiki/index.php?title=Ant_Blog). Antfarm was developed as a finite state machine in Flash actionscript, projected from the ceiling onto the gallery floor. Fifty ants are individually either hungry, eating, returning to the nest, or interested in an object. Ants who find food stay to "eat" it then return to the nest leaving a pheromone trail to direct other ants to the food supply. A camera above the surface detects visitor movement and creates a point of interest which ants will investigate. If the visitor remains very still (or leaves), the ants will eventually lose interest and disperse.

A particular challenge of this project has been to remove all traces of perceived artificiality. Antfarm behaves as a system – emergent properties are quite unpredictable but can be quite distracting and break the suspension of disbelief. For example, when ants lost interest in an object, they all broke at once, creating a flash and wave effect that did not look natural. This was fixed by varying a persistence value for each ant.

Antfarm is providing ongoing research questions. Many visitors do not realise that they can play with ants. One option considered is erecting a sign saying what visitors can do with the attraction but we believe this would detract from the discovery inherent in the museum: you don't see playgrounds with signs on this apparatus is for sitting on and sliding down! Some visitors might miss out on playing with the ants... the bigger risk is that we might inhibit their discovery by specifying how they should engage with the exhibit. We hope the response to movement is obvious enough that sufficient people will discover what they can do.

Mann, S. and L. G. Smith (2006). "Exhibiting reality: collaboration in practice." New Zealand Journal of Applied Computing and Information Technology: 46-56.