The Reflective Practitioner: In Creation of PEGASYS

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ABSTRACT
This paper discusses the framework of a presence-generating art system (PEGASYS) in development as part of practice-based research. The interactive audio-visual panoramic computer-based system provides engagement with a natural terrain, incorporating site-specific performance and augmented characters made possible through the design, production and implementation of a tetradecagon (14 sided) camera plate. A gaze-based interface facilitates a biotechnological interaction that utilizes our ability to see in a human-computer orientation. The co-joining of eye-gaze technology with human strengths produces an outcome that facilitates engagements that can be deeply rewarding, embedding participants in new relationships with remote natural habitats.

Categories and Subject Descriptors
H.5 Information Interfaces and Presentation, H.5.1 Multimedia Information Systems J.4 Social and Behavioural Sciences J.5 Arts and Humanities J.7 Computers in other Systems.

General Terms
Documentation, Design, Experimentation, Human Factors.

Keywords
Presence, interactive art systems, eye-gaze interface, video-on-demand (VOD), head-mounted display (HMD)

1. INTRODUCTION
The aims of this research assist in determining best practice and technologies for creating and exhibiting a presence-based computer mediated experience through a real-time video networked system for public exhibition. It integrates multimedia technologies, computer-human interaction (CHI) and digital networked systems drawing from research into digital immersive environments, augmented reality and aspects of cybertherapy. The research is extending knowledge about the development of a system that utilises eye-gaze technology for alternate interface navigation within an entertainment device. The hands-free approach is primarily to assist in generating deep presence engagement but incidentally provides a creative navigational alternative for people with severe physical disabilities. The presence generating art system (PEGASYS) in development provides an opportunity for both the able and disabled person to traverse a natural landscape by moving their eyes only in an eye-gaze based interface. This paper first examines the methodology and practice supporting the new work positioning it contextually within the conferences themes outlining its significance, related theory and technical history. System requirements and design considerations are followed by summaries of work concluded and further research.

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2. METHODOLOGY AND PRACTICE
The motivation driving this research is to facilitate the construction of a mobile entertainment device that will evolve through the secure network structures provided by Creativity and Cognition Studios (CCS) at UTS. Here we are creating an immersive interactive apparatus that can be exhibited as a digital art experience in science and technology museums, taking the Australian landscape to foreign grounds and to people who are either unfamiliar with natural environments or who cannot locate themselves physically (wheelchair bound). During engagement with the art system, which is booked into Beta_space [1] at the Powerhouse Museum Sydney in late 2009, willing participants will undergo a series of documented evaluation processes. CCS extends its principal methodology of practice–based research (PBR) [2] offering assistance with data generation and collection. Principally these include face-to-face interview with observation of video recall and questionnaire.

The Studio as Laboratory [3] extends itself here to include the natural environment for landscape portraiture. *PEGASYS* provides the community with a system that enables individual participants to physically, yet remotely, engage in a new location; providing them with any number of possibilities for exploration. The experiment aims to produce repeatable experiences for individual participants in order that analysis of the results of these experimental events will assist in drawing conclusions about creating a presence-generating system. This work is situated around concepts that explore man and nature, man and technology and finally technology and nature. Unlike a game this system facilitates rest and relaxation, a repose from the manic as the system delivers a recording of natural events as they unfold. Diagetic sounds juxtaposed with Baroque music inform the participant of events occurring outside the immediate view of the screen. Eye-gaze technology enables participants to then travel through the location using video-on-demand (VOD) by moving left to right and vice versa. Three participatory levels were developed in order to test the presence aspects of the system with the participant. These levels of interactivity are embedded within the system design facilitating a variety of engagements each of which is comparable through evaluation of the one participants experience. These levels include: *Stage One* in which the natural environment is presented in real time. Audio was captured separately using a

binaural sound capture device and is therefore contained in individual clips that run in-sync with the video clips. The cameras were calibrated for varying levels of sun exposure and captured uninterrupted for 12 minutes before the plate was rotated and the process repeated (see Figure 1).

Figure 1. Stage One of PEGASYS

Figure 2. Stage Two of PEGASYS

Figure 3. Stage Three of PEGASYS

In *Stage Two* the same environment includes the presence of an actor who engages with the camera system as if it were a person in situ, moving from one camera frame into another as she traverses the landscape (see Figure 2) and finally *Stage Three* which includes the presence of 13 artists embedded throughout the landscape each artist performing a routine choreographed to enhance the locations aesthetics, promote memory of place and extend upon the metaphor of human life (see Figure 3).

The configuration of any number of possible scenarios may be widely exploited as participants move through the landscape. Information generated through observation of user experience produces scientific data that will validate the systems ability to perform its aims. As stated above, the testing process is carried out within the safe environment of Beta_space at the Powerhouse Museum.

In searching for the essence of nature or *the thing itself [4] PEGASYS* facilitates a digitised experience of a natural environment without the constant reminder of human effort. In the context of habitat the chosen landscape for audio-video surveillance is buried deep within the Royal National Park, located 29 km south of Sydney, Australia. *Crystal Pool* is a naturally formed ecosystem with cascading waterfalls and abundant wildlife. In the late 19th century 'pleasure gardens' such as *Crystal Pool* were understood to provide ideal places for rest and relaxation. Within the park the aura of mystery and romance provides an ideal escape from general city life. (http://www.environment.nsw.gov.au/nationalparks.htm).

2. SIGNIFICANCE

The desire to experience other places through visual means has long been of interest to human beings and as technology has advanced so too has the formalisation of systems for exploring time, space and location based engagements. The ability to simultaneously share a moment of awe and magic with others through a screen-based activity is now firmly embedded within our culture and our relationship with the screen becomes ever more co-dependent as technologies advance. *PEGASYS* provides a contemporary experience for explorative play within a panoramic digital environment. The eye-gaze based interface facilitates instant exposure to audio and VOD snugly embedded within a head-mounted display (HMD). The system has been designed in order to generate presence engagement for participants using 'real-time video' rather than a virtual-reality system. At present, the author is unaware of any other multimedia systems in development with the same aims.

2. 1 Presence-based Engagement

Interactive art transforms the spectator into a participant [5] who physically engages with and becomes a part of the computer-based art system [6] thereby facilitating the creation of their own experience; interacting with the computer-based components to orchestrate their own engagement. In order to generate a presence engagement a key concept requirement is that the participant engross themselves in the application, devoting themselves to the experience and acknowledging that the system is designed to take them on a *'being there'* [7] experience if they are willing. The psychological challenge for each participant is to allow this system to operate as it is designed, thereby responding to an experience that has the potential to become a source of pleasurable entertainment. It is anticipated that whilst enjoying the various elements of the work participants will conclude their engagement with a sense of having undergone a physical and mental relaxation process; a restful repose having been gained through exposure to the digitised natural environment and the orchestration of other key functions embedded within the system.

This panoramic video system is designed in order to allow for the generation of new knowledge about presence engagement following research into presence through; photo-realistic predictive displays, knowledge based systems for creativity, augmented and mixed realities, time place and space theories, wearable technologies and healing media.

2.2 A Brief Overview of Panoramic Devices

In 1787 Scottish visual artist Robert Barker was granted a patent for his process in producing the first known 360 degree panoramic representation. Barker called his invention *'La nature a coup d' oeil'*. Produced using 6 hand coloured prints each 425mm x 540mm the panorama had an overall length of 3250mm. It was exhibited on the curved surface of a part circular room [8].

Figure 3. Barker's Gigantic Panorama of Edinburgh. 1792

This author, having created a taxonomy of panoramic representations, concludes that following Barker's work came *The Cyclorama* (1791), *The Diorama* (1795), *The Myriorama* (1850's) or moving panorama and *The Technirama* (1930's). Fred Waller's *Vitarama* was produced in the 1930's culminating in the *Cinerama* (1952). This wide screen panorama used 4 projection booths, 3 of which screened picture only, the sound coming from the regular projection booth. Paramount Studios produced 7 films made over a single decade with *The Cinerama* before it was deemed to be too cumbersome and expensive for general usage. By this stage purpose built cinemas flooded the USA and Britain using 3 camera-recording systems and 3 projectors for screening the film (Cinemascope, Superscope, TODD-AO, Ultra Panavision etc) or 2 projectors locked together to synchronize the image on the screen as in Albert Reynolds *Thrillorama* (1956). Following *The Vistarama* (1959) Ivan Sutherland built and exhibited *The Sensorama* (1960) an immersive computer-based system that engaged the participant in the sight, sound and smells of a location-based environment. More recently computer-based systems like *iCinema* and *iDome* at the College of Fine Arts (COFA) at the University of New South Wales demonstrate technological

assists in producing a state-of-the-art interactive system. The location-based shoot was victorious in terms of its professional outcomes providing the project with an abundance of usable data for further experimentation. This exploratory research is grounded in work in creativity and interaction design. By facilitating opportunities for explorative creative play the device aims to provide users with new experiences, new memories and vitally, a sense of a newly discovered place within the world. Sharing location-based art systems enables all participants to engage in a dialogue with themselves and then with others facilitating the possibility for explorative play and reposeful relaxation amidst the beauty of a natural habit as yet untouched by civilized man. In developing the wearable recreational entertainment device documentation of practice-based research [2, 10] is tracing the production of the art system, one that aims to produce new knowledge about presence-based engagement for participants. Evaluation of voluntary participants' experiences through video-cued recall, questionnaire and feedback processes of the system design and aims will provide data illustrating the research aims in terms of contribution to new knowledge for presence-based engagement and CHI.

6. FURTHER RESEARCH

In the evaluation process the user testers will provide the querent with information about the experiments various modes of experience building techniques. Empirical questions have been raised and require answers. For example, which comes first the relaxation mode or the active component of the engagement? Does it matter? How does a participant's idea of what is 'relaxation' affect their engagement? How does this affect the presence generating experience? Is there enough interaction for the participant to feel located as an active element of the process or do they still feel like a bystander spectator? To allow for testing these types of inquiries the system has been designed in order to facilitate an infinite number of repeatable experiments. Information generated through observation of experience, questionnaire and video recall produces scientific data that will validate the systems ability to perform its functions. Early participants of the system (user testers) will assist in the contribution of generating new knowledge as tests conducted are refined, modified or rejected in an elimination process that embraces useful parts for the computer-based presence-generating art system. Production phase-two of the research (including applying the Eye-gaze software and building the HMD) will be conducted when results of production phase-one (creating and coding the data clips) have been generated and evaluated at Creativity and Cognition Studios (CCS) in January 2009.

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5. DISCUSSION

Current CVE platforms are not optimised for building a shared, distributed studio. For example new users of Second Life are immediately presented with tools for customising their avatar's appearance, but no private space. Land is available for sale through a comparatively complex system requiring some hours of cultural immersion in the system to understand. To set up land access controls is another learning experience. At the other extreme experimental CVEs tend to be entirely private, disconnected from a social milieu beyond the experimenters themselves. In both commercial and experimental CVEs mixed-reality systems are the exception rather than the rule. In these isolated Virtual Realities intended as complete simulacra [2], only in-world tasks are meaningful, and the only tools visible and available are those instantiated in the virtual world. In order to support real-world creative work designers must adopt a theoretical framework, to help make meaningful judgements between competing considerations. The principles set out in this paper are a first attempt to enunciate that framework. When building a CVE they may now serve as partially tested rules of thumb; for those with interest in pursuing this line of enquiry further they are a foundation for further testing and research.

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