

## Place and Time: Creating Contextualised Presence for Virtual Heritage

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**Abstract.** A place is more than just a space. A place is redolent with meaning. A place is a contextualized space. Three dimensional computer graphics is routinely used to model spaces in fields as diverse as architecture, games and virtual heritage. Presence, ‘the feeling of being there’ is widely reported by users of virtual environments (VEs). Presence is subjective and individual user characteristics are a major factor. The challenge for virtual heritage is to create places, as opposed to spaces. The Sydney Virtual Rocks project will model the evolution of place over time and explore creating contextualized presence for the diverse users of virtual heritage.

**Keywords:** Place, Space, Presence, Contextualised Presence, Virtual Heritage, User Characteristics, User Factors

### 1 Introduction

‘A place is particular, unique, dynamic and memorably related to other places, peoples and events.’ [1]

A place is more than a location. A place is a location that is meaningful in some way. There is a large and growing body of work on place from a range of disciplines including architecture, geography and philosophy [2-9]. Relph identifies physical setting, activity and meaning as fundamental to place [3]. Casey focuses on meaning, memory and feeling [5]. And for the humanist geographer Yi-Fu Tuan, place is about the physical, social, personal and cultural relationship between a person and a location [4].

‘Space is the opportunity; place the understood reality’ or more succinctly, ‘Place = space + meaning’ [8]. Heritage is intimately concerned with place. One of the challenges for virtual heritage is to re-create places and not just spaces.

## 2 Background

### 2.1 Virtual Environments

A virtual environment (VE) is an interactive three dimensional computer generated space. Users are able to explore the space and interact with objects within it. VEs are used in an increasingly wide range of applications including flight simulators, games, medicine and engineering [10].

The application of virtual technology to heritage has some obvious advantages and has given rise to the relatively new, but rapidly expanding, field of virtual heritage. Virtual Heritage (<http://www.virtualheritage.net>) was established in 1997 and since 1998 the International Society on Virtual Systems and Multimedia (<http://vsmm.org>) have been holding Special Sessions on Virtual Heritage at their annual conference. An ever-increasing number of ancient sites have been, or are in the process of being modeled. These include the Kinja Kuji Temple [11], the Inner City of Beijing [12], the Fatih Madrassa [13] and the Santa Maria Maggiore Basilica [14] which is part of the Rome Reborn Project (<http://www.romereborn.virginia.edu>).

### 2.2 Presence

Presence, most commonly described as ‘the feeling of being there’ has been reported in a wide variety of media [10, 15, 16]. The phenomenon of presence is of great interest to researchers and there is a growing body of work on the topic. The MIT journal, Presence: Tele-operators and Virtual Environments, was founded in 1992 and The International Society for Presence Research (<http://www.temple.edu/ispr/>) was set up in 2002. But as Lombard and Ditton noted in their seminal survey of the field in 1997, ‘The work that has been done is fragmentary and unsystematic, in part because the people interested in presence come from many different academic fields (including communication, psychology, cognitive science, computer science, engineering, philosophy, and the arts)’ [10]. As a result there is a plethora of terms that describe presence and the factors that affect presence.

### 2.3 Shades of Presence

Researchers distinguish between different types of presence. Telepresence, also known as remote presence, is the feeling of ‘being there’ where ‘there’ is real, though

remote, location. Social presence, also known as co-presence, is the feeling of 'being there' with someone else [16]. Social presence may be experienced during a telephone conversation or in a virtual environment that supports multiple users. Contextualized or cultural presence is the feeling of being in a place rather than a location [1, 10, 16, 17]. Other distinctions include embodied presence [18], physical presence, spatial presence and hyperpresence [19], tangible presence and imaginary presence [20].

## **2.4 Theories of Presence**

Various theories of presence have been proposed [15, 17, 20-30]. Several researchers have equated presence with sensory fidelity. Other researchers have argued that presence is more than mere immersion and is a multi-dimensional construct arising from the interaction of the mind with the environment [17, 24, 26, 28].

## **2.5 Factors of Presence**

Research to date has identified a large number of factors affecting presence but the breakdown of factors has varied from researcher to researcher (For details see [10, 26, 31-35]). These factors can be grouped into the three main categories of realism, social interaction and user factors.

**Realism** – The more realistically the VE looks, sounds and behaves the more presence will be reported. A bigger display is better than a smaller one [36]. Directional sound is better than unidirectional sound [37]. Sound and vision is better than just vision [38]. Sometimes more realism can undermine presence. Too much irrelevant information is distracting and presence is diminished.

**Social Interaction** – The power of social interaction alone to evoke presence is demonstrated by the fact that presence is widely reported in the sensory poor media of telephones and text-based on-line interactions [10, 15, 16].

**User characteristics/factors** – A faithful simulacra of reality will not in and of itself evoke presence [24]. The importance of individual user factors is revealed by the fact that 'differences among individual users often account for more variability in performance than system design factors' [39]. Researchers agree that presence appears to be inextricably linked to attention [17, 23, 29, 31, 32, 40]. Little research into user factors has been carried out. An exception is Howe and Sharkey's paper on identifying suitable users for a VE [41] and Jurnet et al's paper investigating the effect of individual differences on the sense of presence [42]. User factors known to affect presence include spatial intelligence, personality type and prior knowledge [42, 43]. The subjective nature of the experience of presence underlines the importance of individual user characteristics [20, 28, 41].

### 3 Creating Contextualised Presence in Virtual Heritage

Combining all the known data (text, images, sounds, site surveys, etc) about an historical site in a cross-referenced database that is linked to a three dimensional model of the site would create an extremely powerful research and educational resource [44-46]. Kim et al have coined the term Virtual Site Museum to describe such a resource [45]. Users of a VSM could range from museum staff such as curators, collection managers and educators, to scholars, teachers, students and museum visitors [47].

A VSM is an ideal platform to explore creating contextualised presence as it combines three dimensional modeling data with associated cultural data. Among the many issues to be considered in a VSM are issues of completeness, authenticity and usability. A place is a space with meaning [8]. To re-create a place you need to re-create the space in use. But the historical record is always incomplete. If a reconstruction is limited to only that which is known to be true then much will be omitted. If hypothesised data is used to fill out the model then, no matter how plausible, issues of historical authenticity inevitably arise. In any reconstructed historical environment there will be a tension between authenticity and completeness. Place-making for virtual heritage can never be definitive. At best, we can hope to evoke a might-have-been place.

Museums, as places that seek to inform and educate the public [48], have a long history of using displays and tableaux to bring to life historical settings and events. The rising use of VEs for educative purposes by museums offers major advantages in that a number of different might-have-beens can be easily displayed, either in parallel or in sequence. The museum visitor is then presented with a number of plausible alternatives rather than one definitive version.

Another key issue is the usability of the resource by a wide range of users who will have quite differing needs, learning styles, prior knowledge and familiarity and ease of use of the VSM. One solution could be to design one VSM for each of the identified user groups. However this involves a costly duplication of effort in both building and maintaining the resulting resources. An alternative approach would be to design an interface to a single VSM that catered for the various users. While this is a non-trivial design task the field of HCI/Interaction Design has a great deal of literature relevant to the problem of supporting the user experience while not undermining it by offering too much information [49].

Cameron and Robinson have outlined some of the problems facing the post-modern museum [50]. On one hand museums want to empower users to find their own paths through the data but on the other hand, 'Many users do not want to take full responsibility for the interpretive process and continue to look to the museum to provide trustworthy, authoritative, and meaningful scholarly information' [50].

The popularity and success of immersive three dimensional computer games has led a number of researchers to investigate using similar approaches in virtual heritage [1, 51]. While the immersive presence felt by players of first-person shooter style computer games is of some relevance to creating presence in an historical VE there are some major caveats. Computer games tend to support procedural learning, not prescriptive learning [1] so this may not be the most appropriate strategy for engaging and educating someone interested in virtual heritage.

Turner et al argue that a sense of place develops over time. It is '*an emergent property* of interaction between an individual and the environment, and while there are some shared elements, the experience of place is fundamentally unique to each of us' [6]. The challenge for virtual heritage is to create contextualised virtual spaces that a wide variety of people will want to spend time in and thereby develop a sense of place.

"The past is a foreign country; they do things differently there."  
Leslie Poles Hartley (English Writer, 1895-1972)

Visitors to a foreign country can explore it in a number of different ways. Many people prepare in advance for their visit by learning the language or reading about the history and culture of the place they plan to visit. Some people go for short trips and some stay for months. Some stay in hotels while others with local families. Some people like to wander serendipitously; other people prefer to go on guided tours. Someone familiar with the country and its history may seek out particular places to go. This provides a solution to the problem of catering for a wide range of users of a VSM. Offering the user a range of alternative exploration paradigms including going on a guided tour, wandering freely or playing some sort of game will allow the user to explore the data in the way that suits them best.

#### **4 Sydney Virtual Rocks Project**

The oldest part of the city of Sydney, Australia is known as the Rocks. Prior to European Settlement the land was inhabited by Aboriginals from the Cadigal band and evidence of human settlement in the area has been found dating back over 30,000 years. On the 26<sup>th</sup> January 1788 the First Fleet arrived at Port Jackson and anchored in what became known as Farm Cove and the transformation of the area from wooded countryside to cityscape began. In 1994, over a twenty week period known as The Big Dig, an extensive site where 42 buildings had stood was excavated and over three quarters of a million artifacts were discovered [52].

I am currently using some of this data to construct a Virtual Site Museum of this part of the Rocks from settlement in 1788 to the present day. The Virtual Rocks will consist of an interactive three dimensional environment populated with computer controlled avatars and The Virtual Rocks Guidebook, a hyperlinked database of relevant information (text, images and sound). The Virtual Rocks will be implemented in VirtoolsTM, (<http://www.virttools.com/>) a games development kit, to

take advantage of the powerful render engine and existing library of behaviours. This will support an iterative design cycle of prototyping, testing, analyzing, and refining the Virtual Rocks. The use of atmospherics to enhance place via lighting and weather will be explored.

The interface will consist of two screens. One will show a first person view of the Virtual Rocks while the other screen will show the Virtual Rocks Guidebook. Users will be able to explore the site at different dates and via a number of different paradigms. These will initially include a guided tour, wandering at will and a detective style game. (It is hoped in later versions to include the option of playing a role such as convict, soldier or settler.) Users will be able to visit the Virtual Rocks in 1788, 1809, 1823, 1835, 1890 and 1915, and experience the evolution of place over time.

I will be using the Virtual Rocks to evaluate place-making for a wide variety of users of virtual heritage and, in particular, the interaction of user characteristics such as prior knowledge and personal learning styles with different exploration paradigms.

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