The Irreducible Ensemble: Place-Hampi

Sarah Kenderdine

Special Projects, Museum Victoria, Carlton Gardens, Melbourne, Australia 3053
skenderdine@museum.vic.gov.au

Abstract. This discussion examines several philosophical considerations (*phenomenology*, *embodiment*, *corpothetics* and *mediation*) which form powerful interlocking arguments, whose qualities are prerequisites for building *presence* and *place* in virtual heritage landscapes. The discourse draws upon Interpretive Archaeology and Interpretive Archaeological Systems theory and it is in Symmetrical Archaeology theory that we find a basis for complex emergent narratives in immersive virtual environments. Firmly rooted in praxis, the argument explores these issues through research associated with applications from the Place-Hampi project. Place-Hampi is an embodied theatre of participation in the drama of Hindu mythology focused at the most significant archaeological, historical and sacred locations of the World Heritage site Vijayanagara (Hampi), South India. Through the Advanced Visualization Interactive Environment a translation of spatial potential is enacted in Place-Hampi where participants are able to transform myths into the drama of a co-evolutionary narrative by their actions within the virtual landscape and through the creation of a virtual heritage embodiment of a real world dynamic. Place-Hampi restores *symmetry* to the autonomy of interactions within virtual heritage and allows machine and human entities to make narrative sense of each other's actions (as an *entanglement of people-things* cf Bruno Latour).

Keywords: co-evolutionary narrative; omnistereoscopic panoramas; virtual heritage; autonomous agency; Hampi; Indian mythology; Symmetrical Archaeology.

It is about conditions of possibility, the immanent relation between theory and practice . . . and a resolute belief . . . in the concrete potential of transdisciplinary…[1]

1 Introduction

Interpretive virtual heritage has emerged from a period of increasingly sophisticated digital model making and creation of navigable landscapes of pictorially rendered objects—to begin critical examination into the meaning of representations of space

[1] Organized Networks: Media Theory, Creative Labour, New Institutions by Ned Rossiter, reviewed by Geoff Cox <http://www.leonardo.info/reviews/jun2007/organ_cox.html> NAi, Rotterdam (2006).

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and place, in its endeavors to facilitate dynamic inter-actor participation and cultural learning (e.g. various authors [6], [13], [15], [32], [14]). Practitioners must resolve a complex mix of HCI issues to generate for participants the hermeneutic, symbolic and epistemological meanings found in readings of real archaeological and cultural landscapes. As the discussion below will demonstrate, the malleable real-time nature of virtual environments and their associated visual, sonic and algorithmic technologies offer powerful tools for mediating tangible, intangible and abstract aspects of heritage landscapes—offering the opportunity for both embodied experiences and, new narrative engagement.

Fig. 1. Place-Hampi: augmented stereoscopic panoramic exhibition, Lille3000, France © Kenderdine and Shaw, 2006

The purpose of this paper is to articulate the relationship between the theoretical positions in Interpretive (e.g. [41], [42]) and Symmetrical Archaeology [46], [47], [48], [50], [51] collectively encompassing phenomenology, embodiment, corpothetics and mediation and, the interactive augmented stereographic panoramic exhibits from the Place-Hampi project. Place-Hampi is an embodied theatre of participation in the drama of Hindu mythology focused at the most significant archaeological, historical and sacred locations of the World Heritage site Vijayanagara (Hampi), South India. Stage one of the research (Demonstrator One, see Fig. 1.) premiered at the Opera House in Lille, France in October 2006 as part of a three-month arts and cultural festival celebrating France-India year[2]. For a full description of this work refer to prior publications [20], [21], [30].

[2] The work is now on tour in Europe and Asia/Pacific 2006-2008 including: *Lille3000*, Opera House; *Berliner Festspiele, Vom Funken zum Pixel*, Martin-Gropius-Bau; *Panorama Festival*, ZKM, Center for Art and Media Karlsruhe; *New Light on Hampi*, Museum Victoria.

In stage two of the research (Demonstrator Two) described below, the principal technical innovations are in the use of a unique multi user omnistereographic immersive environment (the Advanced Visualization Interactive Environment (AVIE) at iCinema Centre, UNSW [1]), and in real-time *co-evolving* narrative formulation. This discussion explores the affordances of the immersive technologies for both Demonstrator One and Two that find appropriate counterparts in the theoretical discourse observed in aforementioned positions in archaeological philosophy.

Periodically virtual heritage practitioners call to our attention the divergence between praxis in the discipline and the theoretical basis of New Museology, New Archaeology, Interpretive Archaeology and heritage discourse in general [6], [9] [14], [35]. These observations offer a counterpoint to the technological determinism prevalent in the discipline observed by Monod and Klein in analysis of the European Union Digicult Report 2002 [26], [27], where an increasing number of tools solve scientific problems for tangible heritage but are found to be inadequate for addressing the needs of interpretation of intangible and abstract aspects, indeed the phenomenological encounter between object/place/space—for a larger audience[3]. Fundamental dysfunction in the discipline itself is noted by Joseph Reeves who states "archaeological theory and scientific methodology have often been seen as the two sides of an archaeological coin. Rarely do the two disciplines meet…." [31]. Further "…attempts to marry archaeology theory and scientific practice in any useful sense are often clumsy affairs, usually consisting of a "theory bit" and an unrelated "science bit"" [31]. The inability of virtual heritage to address the wider conceptual arguments leads Neil Silberman to suggest "…we should (therefore) resist overstating the potential contribution of Digital Heritage to the wider social processes of re-creating and the understanding the past" [35].

In a longer-term vision statement Silberman concludes:

> *…the Future of Heritage requires forms and modalities of recording, analysis, interpretation, and public dissemination that go far beyond those already available. The watchwords are place, network, memory, identity, and communication. Obviously technology can and will provide the context and tools for these new approaches to heritage. From a strictly Cultural Heritage perspective, the big changes to be anticipated in the next ten years or so are unlikely to be about automation but rather about systemic changes in the way our heritage is categorized, protected, and interpreted* [36: 20].

Interpreted is a keyword for the following discussion which will examine both Interpretive Archeology as a basis for immersive environment design, and Symmetrical Archaeology, in which *interpretation* is re-formulated as *meditation* allowing for the co-evolution of a narrative between people and things.

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[3] In the European Union the bias observed in ICT CH may have been a direct result of the structure of funding—as acutely observed by the latest EPOCH Research Framework Report, David Arnold, Guntram Geser, D 2.11 Research Agenda, 17th January (2007). EPOCH proposed the Use-inspired Basic Research – "Pasteur's Quadrant" in the latest finding of their report to help redirect some of the research funding strategies to address the complex and inter-disciplinary nature of CH work that spans from basic research in computer science through to the applied work in cultural heritage organizations and by archaeological scientists.

2 Interpretive Archaeology (and Systems)

Within archaeology, Interpretive Archaeology is a trend well defined by Christopher Tilley [41], [42] and Julian Thomas [38], [39], [40] among others over the last fifteen years. In relation to this are the principles of hermeneutics, phenomenology, re-enactment, and embodiment. This framework has the particular archaeological aim of understanding the past through providing learning experiences and interpretation in a never-ending process of making sense. Interpretation is always in flux, and never final because more can always be said or learned. Interpretation is always historically situated and therefore changes through time (refer also to the hermeneutic spiral)[4] [2].

Drawing together theory from Interpretive Archaeology and from Interpretive Information Systems, Monod and Klein [26], [27] proposed a research framework for the interpretation of archaeological landscapes that could be considered useful for emerging design practice in virtual and augmented reality environments of these spaces/places. The core of their framework for building virtual heritage applications encompassed Re-enactment; Embodiment; Context; Self Projection; Possibilities of Being; Historical Self; Inquiring Being; Universality of Uniqueness. This framework was a seminal attempt to integrate both the theoretical and practical aspects of e-heritage research which appears to have been largely ignored by the virtual heritage community. My purpose here is to re-examine more closely some of the key philosophical principles that underlie the aforementioned criteria for interpretation as defined by Interpretive Archaeology (and Systems), and then to extend these to include the defining principles found in Symmetrical Archaeology.

3 Phenomenology and Archaeology

In archaeology, phenomenological discourse provides a philosophy that emphasizes the interpretation of the human experience [41], [42]. Merleau Ponty, whose

[4] Contemporary hermeneutics was given a new basis through phenomenology by Heidegger, who saw understanding as constitutive of human existence, and thus a phenomenology of human existence is a phenomenology of understanding. Hermeneutics considers that to understanding is not something as given but is always subject to pre-judgment. If this prejudice is modified in an interpretive encounter, it forms a new basis of the next engagement, and so on: this is the hermeneutic spiral. Appreciating hermeneutics as a living tradition is fundamentally a matter of perceiving a moving horizon, engaging a strand of dialogue that is an on-going re-articulation of the dynamically historical nature of all human thought. Refer also, Hodder, I.: The Archaeological Process. An Introduction, Oxford, (1999). Thomas, J.: The Great Dark Book. Archaeology, Experience, and Interpretation, In J. Bintliff (ed.) A Companion To Archaeology, Oxford, (2004): 21-36. Don Ihde promotes a material hermeneutics as a hermeneutics which "gives things voices where there had been silence, and brings to sight that which was invisible." Such a hermeneutics in natural science can best be illustrated by its imaging practices. The objects of this visual hermeneutics were not texts nor linguistic phenomena, but things which came into vision through instrumental magnifications, allowing perception to go where it had not gone before. One could also say that a visual hermeneutics is a perceptual hermeneutics with a perception which while including texts, goes beyond texts. Extracted from <http://humanitieslab.stanford.edu/Symmetry/746> last accessed 3 August 2007.

pioneering work on embodiment was constitutive of the existential philosophy, tells us that the meaning of experience is found in the synthesis of the subjective and objective aspects. Phenomenology simultaneously analyzes and describes consciousness, while also searching for understandings of 'space', 'time' and the world in non-cognitive terms, or as they are lived through embodiment. Phenomenological 'influence' recognized in conjunction with the study of landscape and other 'lived spaces'.

Tilley demonstrates the manner in which a phenomenological perspective, in which the past is understood and interpreted from a sensuous human scale, as opposed to an abstract analytical gaze, can provide a radically different way of thinking through the past in the present, and shed new light on old monuments. Tilley maintains that the body is continually improvising its relationship towards things because it not a closed mechanical system, constantly opening itself out to the world as it moves through it [41: 10]. From a phenomenological point of view the analytical approach in archaeology is rejected. "…the qualities of a thing, in fact, may tell us far more about it than any measurement of its geometrical properties. Descriptive accounts are fundamentally ambiguous and open-ended" [41: 10].

> *The body carries time into the experience of place and landscape. Any moment of lived experience is thus orientated by and towards the past, a fusion of the two. Past and present fold upon each other. The past influences the present and the present rearticulates that past.* [41: 12]

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> *The historical sense involves a perception, not only of the pastness of the past but of its presence*[5]

Tilley incorporates a discussion of synaethesia and the "fusion of the senses" in a bodily relationship with place and landscape. "In the actual practice as opposed to the representation, of a person's encounter with landscape and place, the senses are always involved in a dynamic intertwining" [41: 16]. Merleau Ponty articulates the veracity of perception—that our vision 'goes to the things themselves' [25: 15] through the process of inhabiting the world as lived bodies. In the active sensorial participation or interplay with ones surroundings objects are attributed with anthropomorphic or animistic qualities. Natural objects, trees, stones, mountains and artifacts are regarded as being alive or having a soul and reciprocate in each others existence. Merleau Ponty's philosophy is effectively a modern Western exposition of animistic and totemic thought in which essences of persons and things are intertwined through embodied mind in which perception in a worldly event governed by participation rather than a disembodied mental image [41: 10-12].

The notion of the importance of the sensory and phenomenological engagement in an irreducible ensemble with the world has been a nexus of interest for many inter-disciplinary researchers including not only archaeology (see also Shanks, 1992 [33];

[5] Eliot, T.: Tradition and the individual talent. In F. Kernode (ed) Selected Prose of T.S. Eliot. London, Faber and Faber (1975).

Pearson and Shanks 2001 [28]) but anthropology (e.g. Howes, 2005 [16]) cultural geography (in the exploration of space and place (e.g. Tuan [43], [44], [45] Casey [7], [8]); architecture (e.g. Bruno 2002 [5] and film (e.g. Schoback 2005 [35]) among many others.

Suffice to say here that there ample discourse to situate the body at the forefront of immersive virtual heritage research as a space of phenomenological encounter. Further more, if in fact embodiment is the experience of the world through all the senses of the body, then narrative strategies privileging one sense over the other, or emphasizing certain aspects over others, prove to be unequal to the task of embodied representation. Embodiment explodes narrative and other traditional modes of representation [3].

5 Symmetrical Archaeology

> *Until meaning is left entangled within a mixture encompassing the material it remains asymmetrical. In other words, meaning must be reconfigured within heterogeneous networks comprised of collectivities of humans, materials, media and other companion species—only then will it acquire symmetry* [23].

For Witmore, Webmoor, and others [46], [47], [48], [50], [51] the embrace of the Interpretive Archaeology framework is *asymmetrical*[6]. Interpretive Archaeology, they emphasize, weighs in favor of interpersonal functionality, at the expense of saying anything about the things of the past. For example, Julian Thomas recently concluded that "interpretation is a circle that we cannot escape (Gadamer 1975: 235)" [38]. This over-emphasis of the processes of making sense means we are simply left with increasing numbers of interpretations and as a result distance ourselves from material objects and materiality. Archaeology is after all the "discipline of things" (cf Olsen 2003) [51].

In the reformulation of post-processural archaeology then, Symmetrical Archaeology reconfigures a host of basic dualisms – such as past/present, subject/object, meaning/referent, representation/represented. Witmore asks "what if we were to treat things and people symmetrically?" [51: 10]. Furthermore, the current form of archaeological transformation, inscription and interpretation will "…never encompass locality, materiality, multiplicity or experience" [48]. In Symmetrical Archaeology rather than nature and society poised across from each other on a horizontal axis, nature-society is seen as a complex *entanglement of people-things* (cf Latour) [46]. Human beings are not "detached and singular intentional agents, but rather always are implicated in complex socio-technical assemblages" [46]. It is in this discourse that we find constructs that support co-evolutionary narrative between machine agents and human participants—a core research component in the Place-Hampi project.

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[6] Christopher Witmore, while hoping to address the multiplicity of embodied experience from an archaeological standpoint, points out that the term *embodiment* itself implies a modernist duality of the Cartesian mind-body dichotomy. Phenomenology also is often subject to the same critique for its asymmetrical embrace of subjectivity (cf Latour 1993) Witmore, C.L.: Four Archaeological Engagements with Place: Mediating Bodily Experience through Peripatetic Video. The Visual Anthropology Review 20(2) (2004): 69.

5.1 Meditation

Whereas vision is a distancing sense, hearing is one of Alliance [49: 282]

Witmore suggests that *mediation* of the archaeological source "…as doing something fundamentally different from the semiotically-limited notion of representation in conventional scholarly forms of documentation and inscription"[7]. Mediation, for archaeology, occurs across a series of transformations between material presence and media. Mediation allows one to contemplate ways of transforming aspects of the material past while at the same time bringing forth something of the locality, multiplicity, and materiality left behind with conventional processes of documentation and inscription. Mediation is a process that allows us to attain richer and fuller translations of bodily experience and materiality that are "located, multi-textured, reflexive, sensory, and polysemous" [51].

Typically in archaeology, the sensory prosthesis tends to be entirely visual. The destructive process of transformation from the archaeological source relies on a host of technologies (e.g. theodolites, tapes, GPS, cameras, scanners etc) to produce maps, plans, diagrams, illustrations, catalogues and text. This (visual) perspective has allowed for a high degree of consistency and standardization to the discipline. However this record has great paucity and it has been acknowledged for example that auditory importance of landscape needs to be represented. This has only recently been the focus of archaeological investigation and documentation. *Sound* is itself highly transient much more so than the visual record [50: 272]. As Wolfgang Welsch comments "…the mode of being of the visible and audible is fundamentally different. The visible persist in time, the audible, however vanishes in time. Vision is concerned with the constant enduring being, audition, on the other hand, with the fleeting, transient, the event-like" [50: 272]. As Witmore points out however, while sound is transient it is also *re-current*[8]. Furthermore, "while the past does percolate through its material traces and memory, it can also do so through the liveness of performance and physical re-enactment" [50: 272]. It is the performative encounter with audible and visual landscape in a narrative exchange with and between people—that directs the research in Place-Hampi.

5.2 Co-action and Narrative

As previously argued [20] concepts of digital narrative applied in new media remain predominantly uni-modal while virtual heritage researchers continue to understand virtual heritage narrative as a derivative of conventional notions of virtual reality and cultural memory, lacking an understanding of the complex multi-dimensional quality of digital and cultural processes. Modelled on mimetic theory, they theorize narrative in spatial terms as simulation [4] and recovery [37]. These uni-modal formulations

[7] With each step in the archaeological process, from excavating a trench profile, drawing building phase sections, taking photographs, sampling, measuring, narrating, etc. we lose "locality, particularity, materiality, multiplicity, and continuity"—aspects of the material world—yet we gain "compatibility, standardization, text, calculation, circulation, and relative universality"—qualities of documentation (Latour 1999:47, in Witmore, 2004).

[8] Witmore, 2004, in summation of theorists Kaye, 2000; Lopex y Royo, 2005; Pearson and Shanks, 2001.

flatten narrative into a one dimensional ready-made object ignoring the multi-dimensional dynamics involved in a narrative generated through the interchange between ontologically divergent human and machine entities. Mediation on the other hand is a mode of engagement, which takes us beyond narrative, for scholarly narrative obfuscates the multiplicity of material presence. Critically, mediation calls attention to the co-action of what are conventionally split apart - subject and object - in accounts of representation. In this regard, mediation symmetrically shifts the 'burden of knowing', of knowledge claims in archaeology, away from a subject(archaeologists)-society pole representing inert reality out there [48]. "Mediation (re)balances claims to know the world by excavating beneath representation as conventionally understood, and provides both an ontology of the co-creation of people-things and an epistemology not encumbered by the subject-world gap…"[47].

6 Place-Hampi

Through the affordances of new technologies in AVIE, Place Hampi is able to transcend the common interpretive frameworks to become a site of mediation, an entanglement of people-things from the past and present occupation of the site. Place-Hampi is comprised of high resolution augmented stereoscopic panoramas (captured with the analog Seitz stereo Roundshot camera; imaged based modeling is used to derive geometry of the scenes) and surrounded by a rich aural field (derived from on-site ambisonic recordings and selected compositions by Dr L. Subramanian), and permits an unprecedented level of viewer co-presence in a narrative-discovery of a cultural landscape[9]. The research addresses the sensorium through a combination of immersive kinesthetic, and visual and sonic strategies. The discussion below embraces both the embodied corporeal aesthetics of place and its transformation through an assemblage of technologies (algorithmic software, immersive omnistereo environment architecture, and real-time animations).

6.1 Technologies of AVIE Architecture

The AVIE screen is a 10m diameter cylinder, 3.6m high and with an 80cm doorway (Fig 2a). The dimensions provide a vertical field of view of 40º for a centrally located viewer. 12 SXGA+ projectors with 1:1 throw are mounted in pairs so as to illuminate the entire cylinder, resulting in a total circumferential resolution of ~ 8000 pixels. A cluster of six dual Xeon Windows PC's is used to drive the 12 projectors. The system includes 24 high-quality loud speakers, distributed evenly around the top and bottom screen, provide real-time spatial audio [24].

Twelve infra-red cameras, distributed at various locations overhead, provide coverage of the entire AVIE arena. Twenty infra-red flood lights provide illumination.

[9] A large interdisciplinary team of professionals including south Indian art historical and archaeological scholars, Indian classical Carnatic composers and Indian artists and animators, classical Indian dancers, computer engineers, and museum and media arts specialists, contributed to Place-Hampi.

From this data the systems tracks individuals proximity to the screen, distribution in space, when people come in to contact with one another and estimated head position. Hand gesture information can also be tracked (Fig 2b) [24].

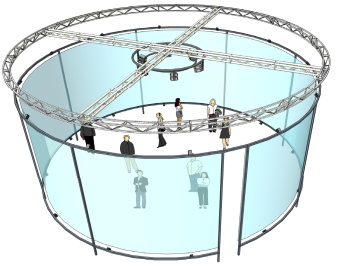

Fig. 2a. AVIE © iCinema Centre 2007

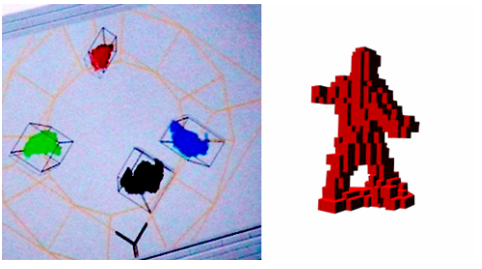

Fig. 2b. Voxel models built from tracking software in AVIE © iCinema Centre 2007

Stereoscopy is a powerful means of enhancing immersion. Conventional stereo projection demands that a viewer's position and orientation accurately match the position and orientation from which the imagery was rendered or captured (achieved through tracking users head position in real time). On the other hand omnistereo, assumes a view point at the centre of the cylinder and a view direction perpendicular to the screen surface. This method produces perceptually correct stereoscopic depth over the full 360º viewing circle and provides all viewers a valid stereo image.[10]

In Place-Hampi a translation of the spatial potential is enacted whereby participants in AVIE are able to transform the myths of place into the drama of a co-evolving narrative by their actions within the virtual landscape and through the creation of a virtual heritage embodiment of the real world dynamic. The transactional performance schemata are based on the types of narratives that are commonplace in Indian mythology and to phenomenon in the contemporary landscape. This conversation (envisaged by pilgrims to the site) between mythological characters and devotional site is integrated into the system design and well demonstrated in Demonstrator One of the project. The following section will briefly re-state the basis for corpothetic resonance however the reader is referred to the larger discussion for a full understanding [21].

6.2 Seeing and Being Seen

Hampi today continues to be an active pilgrim site, not simply an historic place. Information derived from the examination of diverse scopic regimes in historical and contemporary Indian iconography has been used to guide the aesthetic decisions of

[10] Omnistereo only produces correct imagery for viewers located at the centre. However, inside the AVIE theatre the omnistereo images can be viewed comfortably from any position. This is the principal advantage of a cylindrical screen were any image distortion is continuous and therefore far less perceptible. This observation is based on the experiences of the many hundreds of visitors AVIE has already received. In McGinity, M. et al.: AVIE: A Versatile Multi-User Stereo 360° Interactive VR Theatre. EDT, ACM (2007). In press.

the Place-Hampi project, and in combination with symbolic logic and high level cognitive programming of computer graphic characters—co-evolve the narrative engagement between intangible heritage of 'place' and participants. The history of predominantly chromolithography validates the use of 'magical realism' as a formal aesthetic of choice for the CG characters that best represents the intangible aspects of 'place' and the religious experiences active in the landscape of Vijayanagara in contemporary times.

Hindi religious practice also emphasizes the concept of *darshan*, of 'seeing and being seen' by a deity. Its role is central to Indian scopic regimes. The act of darshan mobilizes and activates the human sensorium, and is a physically transformative contact with the deity [29]. For pilgrims to Vijayanagara the most important aspect of the site is the association with various myths and legends. Pilgrims experience the landscape through ritualized movements enforced by the spatial configuration of the districts around the temples and inside the temples themselves.

The promotion of dialogues of engagement in Place-Hampi is significant. The dialogues embedded in the imagery and aural architecture of a cultural landscape is used to activate the knowledge contained there. It has been demonstrated that cultural practices can treat images as compressed performances. Thus the culturally determined experience of an image affects both its power and meaning. Christopher Pinney extrapolates this cultural response to imagery to the Indian context using the concept of darshan and argues for the notion of *corpothetics*–embodied, corporeal aesthetics–as opposed to disassociated representation. "The relevant question then becomes not how images 'look' but what they can do" [29: 8].

The significance of images is expressed by rural Indian community not through an efflorescence of words around an object, but a bodily praxis, a poetry of the body, that helps give the images what they want [29: 21]. Consumers demanded that these images fundamentally addressed their presence and invoked a new corpothetics. "…In these images the beholder is a worshipper, drinking in the eyes of the deity that gazes directly back at him…" [17: 22]. Such a bodily relationship with images has been described by various authors including Adorno in the term "somatic solidarity". These definitions are pertinent to the discussion of physical responses to images (and sound) often heightened in large scale stereoscopic and immersive environments. The image figure is: "relatively free of the demands of meaning, indeed it is not the arena of the production of meaning but a space where 'intensities are felt'" [17: 23].

It is with these understanding that Place-Hampi has been approached utilizing technologies of immersion (the sensorium) to become an embodying mechanism, of cultural space. Place-Hampi seeks to recognize the authority of both the origin and the representational scheme, and thereby to provide an environment where the sensorial is active to respond to the representational scheme the images emerge from. The implications for cross-cultural participation in Place-Hampi, has been argued in previous publications [21].

6.3 Presence in AVIE

Presence research is an established body of inquiry fundamental to the way in which Place-Hampi is constructed. Presence thrives in a panoramic space of high fidelity visual stereo material and spatialized aural fields [19], [22]. These enclosures are free for both

circumambulation (the bodily movement through space) and for circumambience (landscape as perceived, Casey [7]). Such a strategy of immersion frees the body from the discomfort and bodily alienation of haptic technologies and head mounted displays common in virtual reality experiments. AVIE also accommodates up to 30 people free to interact and collaborate in human-human relations, additional to those possible with the virtual landscape and characters—while typical VR technologies such as the CAVE are restricted to few viewers and a single operator.

6.4 Co-evolutionary Narrative

Presence flourishes within immersive environments in which the behavior of virtual characters can evolve or "co-evolve" interactively by making intelligent reference to the actions of viewing participants in real time [20]. When co-evolving systems of interaction are applied to the relationships between viewers and computer generated (CG) characters unique interactive relationships are formed in dramatic and culturally distinctive ways. Place-Hampi endeavors to facilitate dynamic inter-actor participation and cultural learning and, the creation of presence, in virtual heritage and is being developed using symbolic logic and high level cognitive programming of CG characters in conjunction with intelligent immersive virtual reality of AVIE.

In many interpretations of the Ramayana, Hampi is considered *Kishkinda* – the kingdom of the monkeys. The mythological inhabitants have counterparts in the real world and at Hampi today the monkeys are prevalent revered by the faithful, but often delinquent in their behaviour towards permanent inhabitants and tourists. In the research Place-Hampi will create a tribe of synthetic Computer Generated (CG) monkeys who will operate as autonomous agents within one of the stereo panoramic scenes shot at Hampi (Hemakuta Hill). Their behaviour shall operate in a co-evolutionary relationship to that of the behaviours of the real visitors within AVIE. The evolving time-based development of behavioural interaction between real people and virtual agents will be achieved by script based actions of CG animation and/or motion capture sequences, linked to interpretive software techniques (artificial intelligence; AI)[11]. The latter allows the machine agents to act, observe the consequences of their actions in the real world and then formulate new actions according to certain goals that have been imprinted in their identities. For example, a mother monkey may prioritise the protection of her young, and will take appropriate action to protect her territory from the proximity of humans. Others will be given various drives towards socialisation with the human visitors, e.g. hunger for food, interest in bodily antics, or merely curiosity. Different temperaments can be defined, such as fearless, jittery, protective, paranoid, etc. Registration of the human actions is largely focused on group and individual spatial disposition and changing proximity to the screen (and thus the space occupied by the monkeys) and the nature of their

[11] It should be noted that the proposed development in autonomous virtual agents operates a significantly different paradigm to massive online game play in which avatars are often seem to have significant artificial intelligence capacity. These avatars are operated by other humans and not independent of human actions. Krisher, S.: Game designers test the limits of artificial intelligence. The Boston Globe <http://www.boston.com/business/personaltech/articles/2007/06/17/game_designers_test_the_limits_of_artificial_intelligence/> last accessed 3 August 2007.

movement that can be interpreted in the range of threatening (if abrupt) to inviting (if measured). An interpretive matrix provides the mapping of various articulations of human behaviours to the scripted and improvisational range of monkey behaviours that are time sensitive to enable a 'narrative' development (evolution). In addition, Hanuman (a God of great significance at Hampi) will be present in the virtual world. His improvised responses to participants' behaviour will provide key insights into the tenets of Ramayana, and the importance of Kishkinda to the mythology (Figs 3a & 3b).

Figs 3a & 3b. Scenario visualization, Place-Hampi in AVIE © iCinema Centre, 2006

The framework advanced in the research addresses a need articulated by virtual heritage scholars to treat the heritage object as an evolving experience, a symmetrical experience [51] (addressing aforementioned arguments in hermeneutics for example) in which the story told is not pre-rehearsed but emerging as an interactive dialogue between viewers and agents. Following Deleuze and De Landa it is theorized that narrative is as a reciprocal process in which meaning is co-generated by intelligent agents and viewers as the result of a modest narrative of exploration. Narrative is a process that interweaves viewers and cinematic images in the production of new multi-layered events that simultaneously incorporate the past and present [20], [10], [11], [12]. Providing autonomy to machine agents balances the interactive initiative between virtual characters and viewers within virtual heritage. This equalizing of agent and participant transforms the encounter into an exciting and unpredictable drama in which events are co-produced by machine and human. In this way the research incorporates philosophical underpinning of Symmetrical Archaeology. It is the independence of the avatars that is crucial in the Place-Hampi Demonstrator Two.

7 Conclusion

The project is a preliminary experiment in creating co-evolutionary narrative experiences in virtual heritage environments underwritten by the potentiality of phenomenology and embodiment of place. As noted above, Demonstrator Two utilize transactional performance schemata based on the types of narratives that are commonplace in Indian mythology and pilgrimage. As the machine agents and participants learn to stimulate these scenarios through their actions, they co-evolve

unique narrative experiences. In this way Place-Hampi instigates a digital reformulation of the notions of corpothetics and somatic solidarity. This reformulation is both convergent with and facilitated by the new technologies of immersion, presence and hybrid interaction. What Place-Hampi provides is a landscape for narrative co-evolution (in machine and participant) and a place of somatic solidarity for the expression of cultural space. As described in Demonstrator Two the tracking systems in Place-Hampi (a contemporary digital sensorium) enables a situation of corporeal registration of visitors' movements and behavior. The software driven narrative-interpretation in Place-Hampi (a digitally reformulated corpothetics) operates in the zone of co-evolutionary interactions between the protagonists (the audience and the CG characters).

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