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The Challenge of Augmented Culture: Abstract

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We are told that the Internet is growing at a rate of 7 million new pages a day and that there are now more than 2.1 billion pages online. A convergence between fixed networks (with 70 million kilometers of new fiber optics in 1999 alone) and wireless communications (WAP, HAVI), will theoretically permit us to have universal access to information. In addition to the challenges of interoperability of the technological infrastructures, there is an equally great challenge of interoperability of content. Here there is need for fundamental work in the realm of meta-data.

In this context there are already a number of useful initiatives such as RDF (Resource Description Framework) and SVG (Scaleable Vector Graphics) of W3; JPEG 2000, MPEG 4 et 7 and MPEG 21. In addition the W3 Consortium in collaboration with the Dublin Core, has developed an important strategy. They use 15 categories as entry points into resources and as such focus on finding aids rather than resource description. The Schemas project of the European Commission adds the possibility of linking with various classification systems but remains more a stop-gap measure than a long term solution. This is partly because these initiatives are limited to the categories of metadata for content and do not really address the standardisation and harmonisation of names, terms and places within these categories in the form of authority files.

On a national basis most countries have made useful contributions in this regard. For instance, France has the databases of the Réunion des Musées Nationaux (RMN); Britain has those of the Museum Documentation Association (MDA) and the Arts and Humanities Data Service (AHDS); Italy has those of the Istituto Centrale del Catalogo et Documentazione (ICCD). European projects such as AQUARELLE and TermIT were in the right direction pointing to ways in which such databases could be integrated. This principle needs to be extended.

Full interoperability of culture requires links between:

1) a) the contents of our memory institutions (libraries, museums and archives);
   b) broadcast media (cinema, television and video);
   c) so-called unstable media (kinetic and performance art; interactive video and interactive television); and
   d) new products of Internet e.g. collaborative and personal nowledge.
2) Local, regional, national and international knowledge
3) Various languages and cultures
4) Various historical periods.

An article presented in the MEDICI Culture Track of WWW9 (Amsterdam, May 2000) established that the new media offer new possibilities in terms of dynamic knowledge which were not possible in print form. A more extensive paper for INET2000 (Yokohama) suggested how this can lead to new forms of augmented knowledge and culture and is leading to a new book on the subject.

Virtual reality allows us to reconstruct physical spaces. Augmented reality allows us to superimpose information onto a) the physical world or b) the virtual reconstruction of such physical spaces. To take a simple example: I can look at the stars in the night sky and using special glasses I can superimpose on the night sky the form of various constellations such as the Big Bear (*Ursus Maior*). The same technique allows me to superimpose the constellations of various cultures such that I can see the differences between Chinese, Indian, Persian, Mayan and other cosmologies.

Another example: great monuments as Santa Sophia (Istanbul) and Mezquita (Cordoba) were at different times both catholic churches and Muslim mosques. An adaptation of augmented reality would allow us to appreciate better the history of such monuments. A project at Bologna, NUME (NUovo Museo Elettronico) offers us a first vision of such an approach.

In fact there are already hundreds of examples of reconstructions in virtual reality of archeological and historical sites including the reconstruction of Galicia, available at the Complutense in Madrid), versions of Rome and Pompeii. These could be extended with augmented reality to make clear how different scholars interpreted the same material in very different ways. Hence the roman forum as seen through the eyes of Italian archeologists is very different from French, German, British, American and other interpretations of the same monuments. Augmented reality applied to culture thus introduces a new contextualization of knowledge, which allows us to visualize the consequences different world views (*Weltanschauungen*).

Inherent in this quest for contextualization lie new possibilities for a new synthesis of knowledge which integrates the seemingly opposed methods of science, technology and the arts. In science and technology there is a quest to arrive at generic, universal rules and laws. In the past decades this has led to new concepts of intelligent objects. In architecture, for instance, with the development of Industry Foundation Classes (IFC) all the essential characteristics of a door are collected in a single system. Hence when I begin drawing a door for a skyscraper the system knows that this door needs to be very different from the door for a cottage or a football stadium.

While such software helps in establishing generic norms it does not tell us anything about the unique doors in the Baptistery of Florence; in the Church of St Zeno in Verona, or the Cathedral in Hildesheim. Such individual doors, exceptions to the rules, which are unique and noteworthy, have traditionally been the subject of study of art historians. Needed somehow is a system which complements the technological universal, generic rules for doors in general, with a catalogue of examples of particular, individual, unique doors. Linking rules of technology with the exceptions of art will lead to new notions of intelligent objects.

Hence, intelligent objects will not only have awareness of their technological specifications but also their cultural and historical changes and contexts. A museum object such as vase could, via a wireless connection to a personal digital assistant, reveal a) its sides, which are normally invisible from its position in a display; b) provide a history of its restorations; c) offer links to other vases within its class and guide the viewer to related classes (thus providing visual forms of the broader, narrower categories in library classification systems; d) provide information about its earlier history before it reached the museum (e.g. in a church, archeological site etc. complete with alternative interpretations). Inherent in this approach is not just a coordination of knowledge in various memory institutions such as libraries, museums and archives, but also a co-ordination of enduring knowledge with new forms of collaborative and personal knowledge. This will require the use of virtual reference rooms which can serve as the search engines for the collective memory of mankind.

If one could make all these materials available online using the emerging high-speed networks (Internet 2, FING, CANARIE, TEN Telecom etc), and make them available to schools, universities and the public at large one would arrive at an appreciation of the fundamental consequences of technology which go far beyond the visions of edutainment foreseen by some American futurists.

To achieve such a challenge will require co-ordination at the European and ultimately at the global level of authority files of standardized names, terms etc. The European Commission already has a long-term Network of Excellence on Digital Libraries (DELOS). This should be extended to include other memory institutions, namely, libraries, archives, representatives of broadcast and unstable media. Within this framework it would be desirable to establish a long-term metadata initiative which deals with linguistic, cultural and historical dimensions of knowledge. One might call this initiative MEMECS (*Metadonnées et Mémoire Collective Systématique*), at once a reference to the vision of Vannevar Bush (1945) and a reflection of a European approach which maintains the enormous richness and variety of our heritage.

Many assume that digital culture is merely a case of scan and run. The challenge of augmented culture goes far beyond a mere reproduction of the physical world in electronic forms. It entails a new contextualization of previous knowledge, new concepts of dynamic knowledge which go beyond the static limitations imposed by print media. The enormous implications thereof have only begun. Ultimately they will change our conceptions of knowledge itself. It is a challenge that is as worthwhile as it is daunting.