

Metaverse(s) and Cultural Heritage: overview and perspectives of the Italian scenario

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Abstract – The paper sketches an overview of the current Italian situation in relation to the concept of metaverse describing the spreading enterprises in terms of platforms, tools and knowledge leveraged. At the same time, the perspectives of such initiatives (and of the metaverse itself, as final goal of a long-lasting dream in human story) are discussed.

I. INTRODUCTION: A BRIEF STORY OF A LONG-LASTING DREAM

The metaverse may be seen as the final goal of a long lasting history, in which Virtual Reality represents the ultimate reconjunction of words and images, of narration and visual representation of reality [1]. It is fascinating to check the historical traces of such a dream (literally a dream: recreating as in dreams the world scenarios and being able to interact into them) along human history. Although the general idea of fantastic worlds, alternative to reality, has been present since the dawn of human civilization, and represents the very core of art and creativity, the earliest example of shaping virtual words, in a sense quite close to modern digital ones, can be found in the 1940 novel "Morel's invention" [2], where the protagonist, victim of a shipwreck on a ghost island, is involved in a strongly exciting situation, meeting odd persons but being not able to completely interact with them, even when he tries to pursue a girl. The environment around him will finally show up as the virtual reconstruction of a party held decades before.

It is interesting to gradually realize, during the reading, how the virtual scenarios building is imagined in the novel, in a time when digital technologies were still too far to be even drawn in a science fiction work, that is to say: referring to the industrial scenarios of the thirties. Such an example shows how the dream of virtual interactive and participative worlds is well older than computer science.

Nevertheless, the earliest sketch of a metaverse in the current meaning came in the 1992 Neil Stephenson's novel "Snow crash" [3], where a unique, world-wide metaverse is the parallel playground of a reality dominated by big corporations.

This work was conceived in an age when the technical

possibility of such an environment was already clear to the scholars, although not yet existing. As a matter of fact, some ten years later, the most famous metaverse platform - Second Life - was created and rapidly spread, together with a series of other, open and closed environments.

The highest moment of success of Second Life, in terms of celebrity and communication, probably occurred around 2010, but during the pandemic period the platform had a new spread, and currently reaches about 900.000 active users [4].

Subsequently, a new era occurred, in which many videogames adopted a fully immersive and multi-user dimension as to make blurred the boundary between game and metaverse. The most famous examples of such applications was probably Minecraft [5], which features made it feasible also in educational and Cultural Heritage contexts [6].

In 2021 new claims for the metaverse concept were due to the decision announced by Facebook to start a new project in this sense, by changing the company in *Meta*, and planning a great effort in such direction.

II. METAVERSE AND CULTURAL HERITAGE IN THE ITALIAN CONTEXT

After such a renewed celebrity of metaverse, many initiatives spread in Cultural Heritage domain, trying to use the metaverse as a trigger for enhancing the potential of archaeological sites and museums. Such a phenomenon was particularly evident in Italy during 2022, when a series of applications and projects were presented.

Realverso Lucanum, created by *iinformatica* enterprise, is a digital environment where it is possible the interaction between avatar and objects in contexts enhancing and describing the territory of Basilicata (Southern Italy) [7]. Leaving from the city of Potenza one may occupy virtual areas and advertise services, products, places or make scientific and cultural dissemination. It is conceived as an ethic metaverse, aimed to enhance social responsibility, even creating a blockchain-based

cryptocurrency whose value is not connected to energy consumption (as the most part of the existing ones) but on actions aimed at keeping the environment clean and well preserved [8]. Such an example is interesting as it presents an aspect often characterizing commercial metaverses: the presence of a specific, customized currency. As a matter of fact, this was one of the innovative feature of some commercial metaverses since the earliest stage of such virtual worlds: a controversial aspect which, on the one hand, boosts the economic potential of a platform, on the other, fires up the discussion on the opportunity of a sort of private "digital coin minting".

The MAPOD4D project, created through the GODOT engine, spread in 2021, thanks to ArcheOs Tec, by Alessandra Mazzucchi and Progetto sl – LEICON, by Serenella Saccon, designed and developed by Roberto Taglioretti, is a "multiverse of metaverses", connecting different projects. Technically, it could be defined as a "Meta-metaverse", as it is aimed at connecting different virtual worlds targeted to archaeological and anthropological research.

The MAPOD avatar can move in three spatial dimensions and in any temporal direction. The platform, the framework and the related projects are developed exclusively on Free, Libre and Open source software [6], an aspect stressed by the authors, recalling as the openness and transparency of the resulting code.

MetaHeritage, by 7emezzo.biz is also a metaverse platform conceived for Cultural Heritage. It relies on a technology continuously upgradable, according to an exponential development model. It is made of a series of meta-worlds (archaeological sites) particularly close to real ones and completely browsable. Reconstructions are based on scientific data, academic papers and expert counseling. The user learns while browsing, and may access an ecosystem of structured informations thanks to the connections to the web, to online shops and links to social networks [9].

Archeoverso [10] is a metaverse environment conceived by Digilab Research Center of Sapienza University of Rome and CoopCulture, aimed to explore the potentiality of digital worlds for Cultural Heritage and providing environments, tools services and solutions for archaeological entities interested to the metaverse, through the planning of activities targeted both towards cultural heritage enhancement and to boost the creation of social communities [11]. This aspect touches a particular topic, crucial in the domain of virtual museums since their spread: the debate on how digital applications influence the presence of public in the real museums.

One of the critics to the development of digital replicas of cultural heritage objects for online visits, in fact, has

often been the worry that the digital experience could satisfy public's curiosity, discouraging from the real visit and thus taking the potential visitors away from museums and sites. Such a worry may even be more significant for the metaverse, as they are not only the objects, but the whole behavioral experiences that are immersively reproduced.

Indeed, this hypothesis has been proved to be unfounded: on the contrary, the online experience favors and stimulates the real one [12,13], unless particular situations occur, such as the pandemic period, when the frame conditions were significantly different [14]). Nevertheless, the (false) debate on digital vs real object fruition hides another, more relevant dilemma connected to the managing of our lifetime, which is finite, and has to be shared properly in an era where the growing amount of activities (and worlds containing them) is much higher than ever before, and where the real stakes are not *money* but *time*. A serious topic that we are going to face in the next chapter.

ATON (fig.1) is an open tool created by CNR ISPC, written in javascript/Ecmascript and used since many years for online view and manipulation of 3d models, real archaeological landscapes and reconstruction of ancient monuments in their original shape. It is a multi-platform tool based on modern standards which has been originally conceived as a suite for managing, editing and browsing 3d landscapes and models. Thanks to its integrability with html5 standards, it has been widely used in different directions: to integrate 3d model with multimedia contents [15], as well as for applications purely focussed on 3d model analysis. Given its many features, ATON may surely be used as to allow creating or integrating existing metaverses. As an open source product, ATON is feasible for self-customizing experiences and environments. [16] [17].

Finally, in this overview, it is favorable to mention private enterprises such as NoReal Interactive, creating CH contents for the metaverse since two decades, at the dawn of Second Life; as well as the amount of CH contents already present in the existing metaverses thanks to the modeling work of single users. An example in this sense is the initiative Apulia 53 centuries, by Gianni Spadavecchia, on Craftworld Open Sim.

These are just a few examples of a huge amount of cases, selected because of their original ethical and technological features, as the most of them are generally the re-proposal of similar applications to different contexts.

Such a wide presence of meaningful initiatives raises many questions on how deep the metaverse model is affecting cultural production and, at the same time, on which will be the perspectives and outcomes of such

an approach. In this sense Italian situation, although locally specific, may be considered meaningful because of the amount of world Cultural Heritage elements inside its borders.

Unfortunately, the future of the metaverse itself is, at the moment, highly uncertain [18], making hard to try to foresee the perspectives of its fallout on CH. Nevertheless, it is possible to attempt some reasoning on the topic.

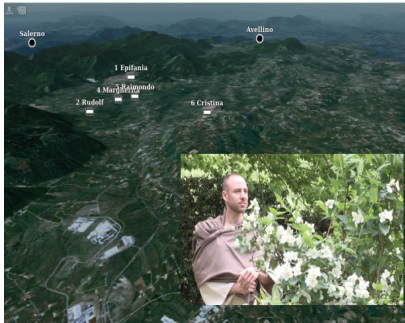


Fig. 1a,b. A snapshot of ATON environments, which may be targeted both to multimedia representation (a: historical fiction on a middle-age monk [10]) and to 3d reconstruction of ancient monuments (b: Augustus' Forum, Rome [14]).

III. WHAT IS A METAVERSE? BEHAVIOURAL MODELS

An overview of the existing cases reveals that there is not a common agreement on what a metaverse should be, despite the creation of a forum for metaverse standards [19]. Roughly speaking, we may rely the Oxford Dictionary definition of "a virtual-reality space in which users can interact with a computer-generated environment and other users." Nonetheless, to get deeper in this analysis we probably should ask a different question.

What do you do into a metaverse?

Indeed, you build the metaverse itself. As for other kind of web platforms (social networks, online games, etc.) contents are user-created, nevertheless there are some fundamental differences.

There are two ways in which users may build contents: through their own presence ("I reach the platform to meet people and to enjoy other users' contents"), and through the multimedia contents they share (I reach the platform to create my contents thanks to my expertise and share them).

In a social network the skills required for both actions are quite low. On the contrary, on a metaverse, the simple presence requires a medium level skill (interact with a complex user interface with many functions, perform movements in different ways, etc.), while the role of content (above all 3d models) builder needs a significant digital skill. In this sense, the skills required in approaching a metaverse are absolutely not comparable with the ones allowing to reach a social network and even an online game (where the ability may be obtained almost automatically through the game action itself, through time). In games and social networks the action is simple to learn and it is quite the same for everybody. In a metaverse there are two kinds of users much different: simple users and builders. Metaverse success needs contents and needs building (advanced) users.

Moreover, metaverses are probably the most meaningful example of features peculiar to digital storytelling [20][21]: interaction and immersivity. As the web browsing or social media interacting is characterized by the transmission of informations, not involving strong emotional impact. On the contrary, the metaverse represents an attempt of enhancing at most the "embodiment", that is to say, maximize the impact of virtual world on the senses. Thus, the emotional impact of metaverse is strictly connected to the level of interaction and, above all, immersivity. The Head Mounted Displays are then the most appropriate media to enjoy the metaverse (fig.2), as the use of mobile devices or displays is clearly a fall-back.

Nonetheless, if we can use mobile devices in many situation of every-day life, as they don't need a full attention and immersion, the HMD use requires a specific, dedicated time.



Fig. 2. Head Mounted Devices (HMD) are the most appropriate media for enjoying the Metaverse.

We are somehow facing a new situation in the field of digital application: the web services available so far, in terms of sites, social networks, online maps etc., may be conceived as ancillary to our everyday life and could be enjoyed while doing different activities (often working just as a support for such activities). We could define them as applications needing *hybrid* time, and hybrid time may contain many activities at once, in a conceptually infinite timeline.

On the contrary, metaverses and virtual world, to be fully enjoyed, need a complete immersion, precluding from other activities. We could define them as application needing *exclusive*, dedicated time. And exclusive time is a precious and limited treasure in our life.

Thus, as traditional web platform activities need an amount of hybrid time and soft skills, metaverses require exclusive time and quite higher skills. How much of such time is available, taken into account a market landscape partially already overflowing thanks to the existing metaverses? Probably analysts did consider such an aspect, nevertheless, it seems a heavy factor affecting future perspectives.

IV. UNIQUENESS VS MULTIPLICITY : A CHALLENGE BETWEEN BUSINESS AND COMMUNICATION

Imagining the future evolution of the metaverses there is one more aspect to be considered: the effort towards a uniqueness or a multiplicity scenario. At the moment, the most famous metaverses are closed worlds and, in general, there is no way of travelling directly between different platforms. This is certainly also due to technical issues but it is evident the will of the main actors to shape exclusive universes, forcing users to act, build contents and spend money just inside them, pursuing an ideal monopoly. Nevertheless, it is potentially feasible an opposite model, where all the worlds allow users to travel among them, and it is the specific target of a wide

initiative such as the Consortium for Open Metaverses Operability [19], despite it is not currently pursued.

On the contrary, the Cultural Heritage projects described above for the Italian context, for the most part, seem to move just towards a multiplicity model, suggesting the creation of different worlds for archaeological contexts, often using open source code and planning interchange among metaverses.

Probably, the cultural dimension, beyond commercial interests, pushes Cultural Heritage subjects towards a more communicative approach, which does not fit to the mainstream trend but, for the same reasons, may represent an alternative and maybe more flexible model, as explained below.

V. CONCLUSIONS: A QUICK LOOK TO THE FUTURE

Although it is not easy to try forecasting Metaverse's perspectives, some tips may be sketched on the basis of the analysis carried on so far.

Metaverse future is probably much less promising than it was considered some two years ago, and the firing of many workers hired in the moment of enthusiastic perspectives is a clear confirm in this sense [22]. Existing metaverses grew up slowly, according to a self-stimulating phenomenon, gradually infecting their users. Trying to build new ones from scratch is probably an hazardous task. Metaverses need contents and, thus, need fully dedicated time of skilled people, that is to say: a very precious and rare resource, whose significant part has already been taken by existing actors. It is then reasonable to forecast a future not as wonderful as it was planned.

Nevertheless, in such a scenario, Cultural Heritage may play an original and probably winning role, pursuing a different model based on multiplicity and communication between different world instead of closeness monopoly ambition, providing high quality contents and promoting an hybrid model mixing activities on line and on the sites in the real world, thus with a lesser need of everyday time fully dedicated to the virtual environments.

Summing up, probably Cultural Heritage metaverses and the related activities will enjoy a favorable situation in a wider environment less prosperous than it was supposed to be. In comparison to the earliest hypothesis, it is reasonable to suppose that metaverses in archaeology will probably reach a larger slice of a smaller cake, with interesting outcomes in terms of general growth of public knowledge.

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