DIGITAL TWINS

Janina PUIG
Polytechnic University of Catalonia (UPC)
Barcelona, 08028, Spain

Jaume DURAN
Universitat de Barcelona
Barcelona, 08035, Spain

Abstract

Today 580 million people in Internet have a profile in virtual worlds. In a virtual world the player represents an individual and takes on a role. Your digital alter ego interacts with other people online and live. It is a lasting world because it will still exist even if you abandon it. One prediction is that in 2012 one billion Internet users will be connected to virtual social nets. This perspective for the future has shown a new business niche. This niche is orientated to satisfy the basic requirements of the cybernetic population: To generate a characterised Digital Twin for every user.

There are two common methodologies to create your Digital Twin. The first one is by choosing preset configurations like hair colour, sex, high and weight. This originates a similar pattern of your real person. The second one is by 'pasting' a dimensional picture in to a generic 3D model, whose movements are limited by the incongruity between face and body. NUUME, a company located in Barcelona, has was the first one to propose the creation of an avatar which photo-realistic in order to identify yourself in your virtual relationships.

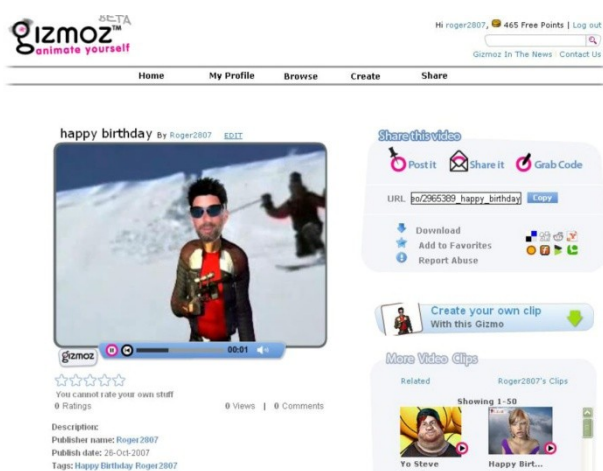**Keywords:** Digital Twin, virtual world, internet, avatar.

Figure 1.-Cartoon-avatar, human-alike.

1. INTRODUCTION

This article offers a new approach to business technology based on the particular experience of a young company, NUUME [1], which is looking for different ways to manage its knowledge of commercial and virtual 3D visualization resources. The management of this company, which exists thanks to having obtained international loans such as Neotec (€ 300.000), puts into question the value of high-technology in a free and democratic market like the Internet.

As teachers, researchers, simple students or members of congress, we tend to relate tech with university projects leaving these infrastructure, which are being used around the world by most companies behind. NUUME is an example of the technological research conducted by future companies selling entertainment.

2. WHAT IS NUUME?

Figure 2.-NUUMEs logo

The first time I contacted NUUME members, I didn't clearly know their work objective. I thought of creating avatars as something linked to a very elitist type of customer, a specific group of virtual worlds such as *Second Life* users, who are able to pay a large sum of money to get their virtual twin. The design process of an Avatar had seemed to me be hard and expensive, the same manner as virtual characters in the movies made by computer. When I asked to Roger Hubmann (the company founder) how long it takes and how much it costs to make an avatar in NUUME, his reply puzzled me: "*it takes 60 seconds and is cost free*": It is straightforward to create your digital double from www.nuume.com. Just sign in to this web address and follow the instructions to have at your disposal a digitized photograph of your face to passport size. With three simple steps and a brief physical description you're going to get your digital photo-realistic twin in less than a minute and you'll enable it redirect to other internet platforms where you want to appear. How is it possible to design an avatar in so little time? What business prospects are hiding behind a company that distributes its product for free?

At that moment I realized that the technology is available today worldwide and that researching 3D visualization has no meaning beyond a university environment. The technological process, which allows the adaptation of your photo and specific physical characteristics to a virtual character, is fully automated

thanks to the programmer on NUUME's team, Christoph Schibli, who has extensive experience in dimensional modeling projects. Chris improves ways to enhance the resemblance between user-person features and digital twin shapes: colors skin, nose type, bone structure, etc. Giving priority a photo-realist model over other kinds of avatars in internet, often two-dimensional designs, is going to increase user satisfaction in the fact that he'll feel more identified with his own representation in the web.
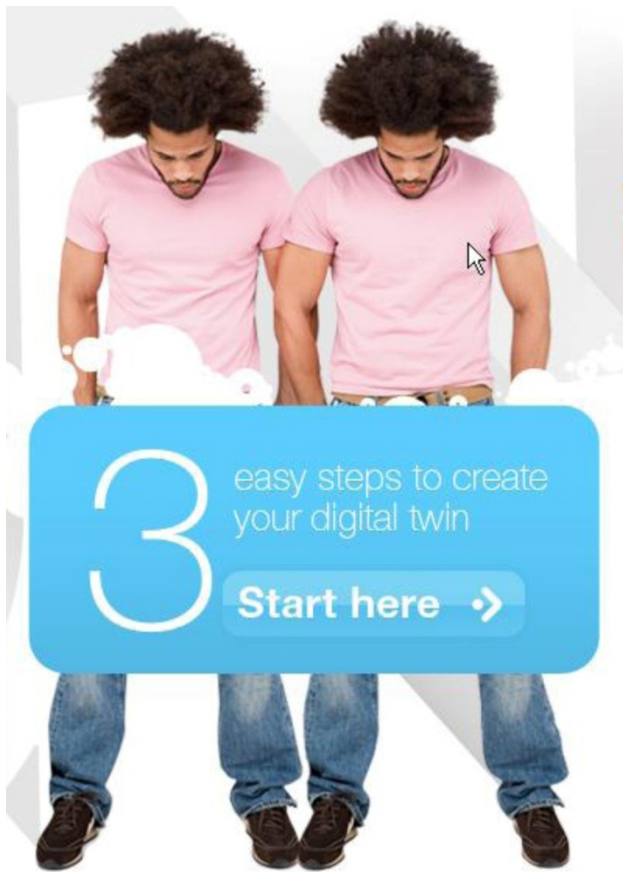

Figure 3.-Your avatar in three simple steps

"If I were to launch a web 2.00 business today, I wouldn't rely on advertising or subscriptions o maximizing pageviews. I wouldn't worry about technology at all in fact I'd become a personal avatar consultant, helping nervous people construct and manage their menagerie of online selves"

Nicholas Carr, author of *"it doesn't matter?"*[2]

NUUME has perfectly understood this 'Big Idea' put forward by Nicholas Carr, which gives priority to users over companies in their role as potential customers for the interests of any business related to Internet. Beyond the technological advances that have led to the globalization of communication system, we must take into account the social phenomenon that has accompanied this fact. The easy access to Internet and its universal and democratic character has developed a community of users whose objectives are both covering their leisure time and finding virtual relationships. The predictions and statistics provide for a big increase population in that uses internet games and virtual worlds, taking into consideration that within the virtual worlds group we mean not only *Second Life* (19 mil users), *Habbo* (135 mil users), *Poptropica* (76 mil users) or *Neopets* (54 mil users), but also *Facebook* (350 mil users) or

Tuenti (300 mil users). Sooner or later all these internet surfers will need to interact with more than a lifeless picture, like that shown on their email profile. What they are going to want is having their particular digital twin that enables their selves to express emotions and mobility on the social net.
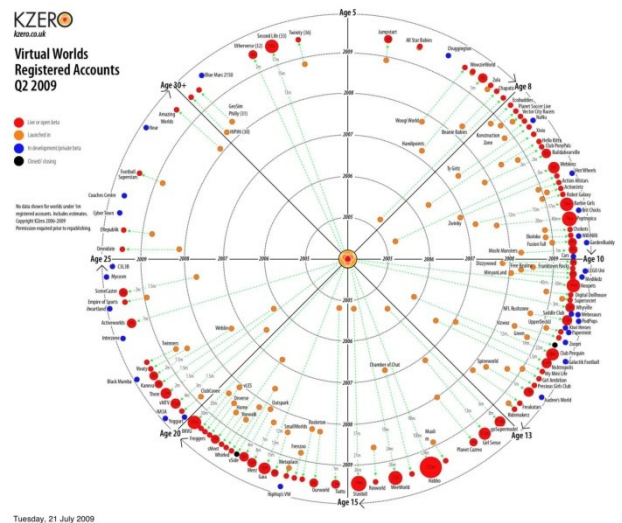

Figure 4.-Virtual Worlds Registered Accounts Q2

3. EDUCATION VERSUS ENTERTAINMENT

The title this Invited Session, "New Multimedia Technologies for Visual Education and Entertainment", suggests a little but important detail; multimedia technologies could be employed in two different ways, education and entertainment. It's common to relate education to the university environment and entertainment to customers willing to have a good time, thus we can conclude that entertainment proposals are usually owned by business projects, such is the case of Avatar [3], the movie produced by James Cameron last year. In my first approach to NUUME, I wanted explain the hardware used in these project types, but time has made me understand that the best contribution from my experience won't come from the technology itself, but from its use. Taking into account this great difference: entertainment doesn't use infrastructure as an aim, a product, but as media to achieve it.

Figure 5.-Avatar movie Poster

"We enable individuals to access online dimensions personally through their digital twin"

Roger Hubmann, NUUMEs founder

That's the description used by the company in all its presentations, note the absence of 'education' vocabulary: quality, technology, research, etc. Today, users aren't going to search for perfect resolution for their avatars; suddenly they are looking for an instrument that makes their internet relationships easier. Your 'virtual me' is thought of an application whose mission is to connect you with all your visited webs in a more interactive way, your double on the screen enables real time expressions and movements, an attached life to yourself up, like an endless sequence of an Emoticon. Full avatar design process is achieved through a close relationship between the user and NUUME, who has no intention of selling you anything more than your twin, where other companies use it in way to make a more attractive presentation of its own products and doesn't let you transfer it to other webs. Examples of this type management of custom avatars are currently shown by clothing sites or multi-players platforms to attract people. Although the twin-provided NUUME is owned by the company too, it has been expressly created under a universal extension: you can link it by any Internet connection, game or social network from the main page of NUUME.

At NUUME, the information, freely available on the Internet, leads up to technology, finally being included as strategic collaborations with several university projects such as MIRALab in Geneva or Multimedia in Ottawa. Among the most ambitious projects in MIRALab we can find the title 'virtual clothing', a particularly interesting program for the design of realistic avatars. This project borrows information from some anthropomorphic studies published by various European ministries in relation to the future change in standardized sizing system (S, M and L), in sense to include the physical reality of the population by having implemented many 3D body scanned at both the men and women. 3D scans show the incongruence between physical reality and the stylized models that currently appear in virtual worlds or selling clothes on web sites.
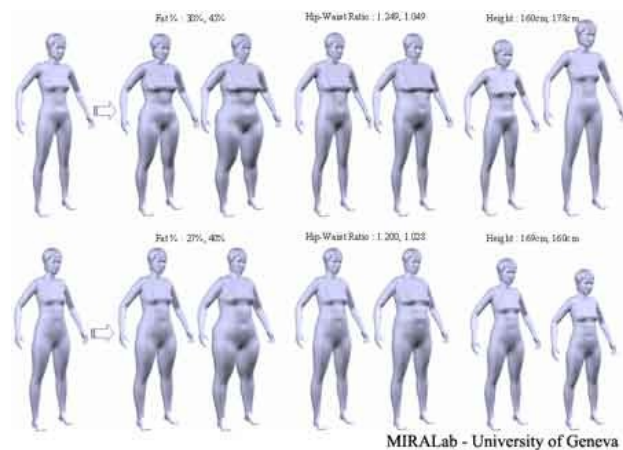

Figure 6.-Computer Graphics and Animation. MIRALab-University of Geneva [4]
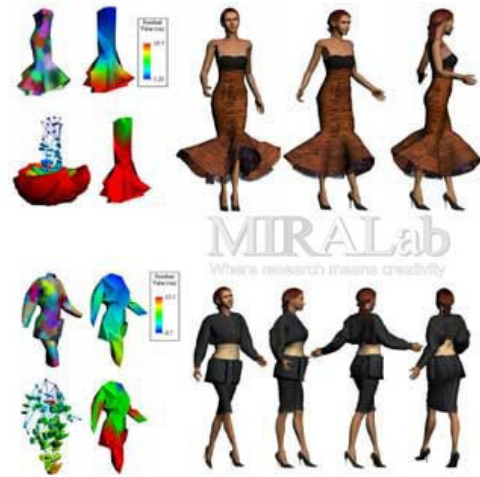

Figure 7.-Computer Graphics and Animation. MIRALab-University of Geneva [4]

Other studies followed closely by NUUME and focused by MIRALab led to specific areas of human three-dimensional representation: hair simulation, facial animation, modeling techniques, personality and emotion simulation, and so on. On the other hand the University of Ottawa provides the computer for possible haptic applications at cyberspace [5], whose results will transform keyboards into objects that vibrate and move in a forward step to the four dimensions of digital technology.
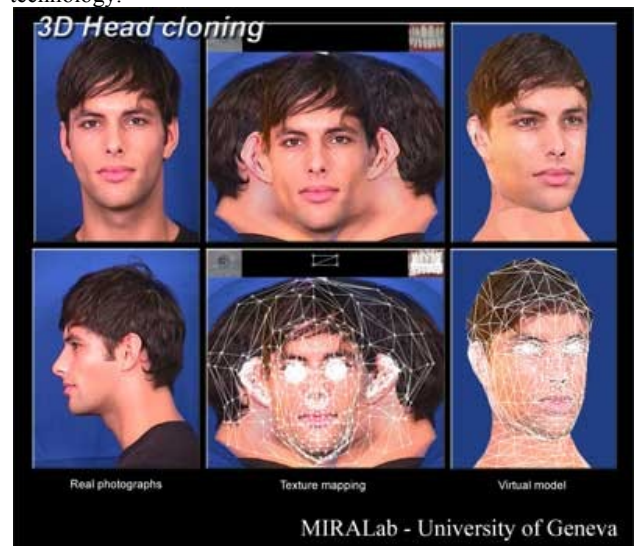

Figure 8.-Clooning techniques. MIRALab-University of Geneva

The open and participatory nature of NUUME's business relationships makes possible the free use of technology and programming from its virtual twins. Real 3D, its modeling system, is an infrastructure created by and for the company, with no license cost and free access, so that NUUME presents itself as viable and economically competitive compared to those who need to rely on external TIS (infrastructure technologies). The models biodiversity, which that the company is working forwards with its realistic avatars conception, represents a key aspect in its business ideal against potential competitors; Real 3D owner technology is finally settled as exportable for outside company programs, as happens with EPOCH [6] design projects of virtual environments focused by culture interests to the dissemination of heritage. These performances require a lot of anonym actors in historical costume, so that from this platform

it is decided provide incentive for trained teams in the creation of entire communities of avatars using digital programming that allows changing human features of race, ethnic clothes or anthropomorphic styles.

Figure 9.-Life simulation in ancient Pompeii. EPOCH [6]

Looking into this business methodology we should conclude that nouvelle and ambitious companies seeking to sell technology as NUUME orients more efforts to explore markets and to fix collaborations that in innovation. The incomes aren't getting from high-tech, but from the way the company manages its sources to bring itself closer to 3D visualization research programs.

4. CONCLUSIONS

I always thought that private initiatives were one step ahead of the official's duties, which has never had to fight in a competition as equals with other companies. Academic system must pay attention on the success of these companies that even having few economic resources, are prepared to present viable projects with a new point of view.

NUUME shares Nicholas Carr opinion on the secondary role of infrastructures in the design of a business, in fact fast dissemination of information makes impossible to control it properties and look after new hardwares (too easy to copy). In our communication age has no meaning to sell innovation, but organize management its access taking into account the common user's situation.

Even more the university is being focused on this way to favor transversal connections between different researches programs in sense to a marketing development. The Bologna Process, established now in Spain, which regulates a unique intra title to all graduates of countries of the European Community, is proof of this preference for an interdisciplinary and multicultural academician over the classic professor settled to a specific sector with fewer options for promotion.

5. REFERENCES

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[4]   MIRALAB - University Of Geneva. (Interdisciplinary Research Lab) www.miralab.com

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[6]   EPOCH (European Network of Excellence in Open Cultural Heritage) www.epoch-net.org