Poster: Superhumans: a 3DUI Design Metaphor

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ABSTRACT

We propose a design metaphor we call *superhumans* in order to empower 3D Interaction Designers to create and implement interactive mixed and virtual reality environments, and to help users familiarize themselves with interactive system's capabilities, behaviour and limitations. We describe how our *superhumans* metaphor can help 3DUI designers explore various sources of inspirations such as narration (storytelling) and transitional environments, when designing their systems.

Keywords: Virtual Reality, Immersion, User Interfaces, Design Metaphors.

Index Terms: I.3.7 [COMPUTER GRAPHICS]: Three-Dimensional Graphics and Realism—Virtual Reality; H.5.2 [INFORMATION INTERFACES AND PRESENTATION (e.g., HCI)]: User Interfaces—User-centered design

1 INTRODUCTION

We see the main power of virtual reality (VR) in providing users with an immersive experience well beyond their real world experiences. In order to fulfil more of the potential of VR technology we believe that radical changes need to occur in the ways designers approach the challenge of designing a new virtual environment (VE). We propose exploring a new design metaphor we call *superhumans* in order to support the design process and inform the intended users of the system purpose and use.

Design metaphors have been widely used in the design of user interfaces and interaction techniques. Design metaphors can help map familiar to unfamiliar knowledge, and help users reflect on and learn new domains based on their previous experiences [3]. The design of VR systems and interaction techniques was often inspired and motivated by metaphors from either the real or magic realms [2, Chapter. 10]. However, most of the existing VR design metaphors are focused on tasks, on specific interaction techniques, pointing to lack of holistic perceptual design metaphors that can empower system designers and end-users beyond the specifics of a task. Roussou [6] argued that interactive VR applications tend to focus on the construction of objects and spaces, but less on stories that tie them together. Early work such as Pausch et al. Disney's Aladdin [4], which allowed users to experience flying a magic carpet through a virtual world based on the animated film "Aladdin", highlighted the importance of seeing beyond the technology and onto the content and story. Pausch et al. reported that users experience in the VE was improved by providing them with a pre-immersion background story and by presenting them with concrete goals which related to the overall story. Users needed to know why they are in the VE and what they are expected to do within it. More recent efforts attempted to consider the aspects of transitional environment in order to prepare the user for the VE experience. For example, Sproll et al. [7] proposed a framework to facilitate transformation from reality to virtuality, through a conceptual model of a 5-stage transition involving physical and mental aspects.

Along the same lines, we propose the *superhumans* metaphor with the aim of empowering designers and users to think about VEs as unique experiences providing supernatural abilities and elastic interactions. People reflected on superhumans abilities, physical and cognitive, throughout the documented history. Such reflections allowed people to examine their own limitations, and to inspire new thinking and new approach to challenges. Our *superhumans* design metaphor builds on this legacy, and applies it to the realm of VE where out of the ordinary physical and cognitive abilities can actually materialize. The *superhumans* metaphor emphasizes the importance of character-driven design of 3DUI systems as opposed to task-driven design or goal-driven design. VR designers who apply the *superhumans* metaphor are advised to build their systems around familiar themes, by borrowing from storytelling/narrations involving superhuman characters, and to seek inspiration from other fields such as film, theater, or installation art.

In the remaining of this short paper, we start with a brief overview of key related works, and then we describe the main concept of the *superhumans* design metaphor followed by reflections on how it can be applied. We highlight some of the *superhumans* design metaphor limitations and strengths, and conclude with its potential impact.

2 RELATED WORK

A general discussion about the power of metaphors for 3DUI is presented by Bowman et al. [2, Chapter. 10]. They discussed physical metaphors as adaptation from the real world, and also discussed magic metaphors that extend and stretch the real-world metaphors, especially regarding inventing "magical" interfaces. Averbukh [1] extended the idea of magic metaphors in theory, and proposed considering magic fairy tales as source of inspiration for interface metaphors. On the other hand, a particular instance of a study that focused on the superhero ability of flying in VR has been recently presented by Rosenberg et al. [5]. Rosenberg et al. conducted an experiment in order to measure whether having the superhero ability of flying would encourage prosocial behavior, and their goal was to explore how giving participants an enhanced ability in VR affected helping behavior after they were out of the VR world. From another perspective, having a successful technical implementation of VR is important and that was the focus of the VR research in the past years. Here we aim to shift the focus more on the content because it also matters. Previous efforts attempted to consider the aspects of a pre-immersion background story [4] or a transitional environment [7] in order to enrich the experience of the user, and sets out the expectations. The benefit of considering such aspects could lead users to be more convinced, thus reach suspense of disbelief much faster.

The *superhumans* metaphor, we propose, is not limited to particular details such as the ability to fly, to have a deeper insight prior the experience, or to be a fairy. Rather, the *superhumans* metaphor encompasses all such details in a holistic way, with combination of other sources of inspirations such as narration (storytelling) and art. For that, we try to build and extend the aforementioned works.

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3 The Superhumans Metaphor

The goal of the *superhumans* design metaphor is to empower users and transform them into super-humans within the virtual world, capable of physical and cognitive traits beyond their real-life capabilities. Our proposed metaphor does not focus on the technical sensory visual/auditory aspects of interaction, but rather on perceptual motivations to enhance human performance within the virtual environments.

A Car, for example, is technological entity that empowers people to travel faster than their innate abilities. When a 21^{st} century person enters a car they expect to travel faster than what they could using their feet. Similarly, the *superhumans* design metaphor encourages users to imagine themselves as being empowered with superhuman abilities, and to expect a corresponding transformation when they are about to participate in the immersive experience.

The *superhumans* metaphor involves aspects at various levels during the development process. The *superhumans* metaphor aims to aspire designers to think about and relate the various elements of the virtual reality experience together, and to consider the user at the core of the design now and always. For example, by presenting the user with a pre-immersion *superhumans* background story, the designer is providing the set of expectations, goals, major characters, and set of rules that apply to the VE. Furthermore, by allowing users to expect to have specific *superhumans* capabilities in the VE the designer will be relying on rich legacy emerging from fantasy novels and film, history, myth, or religion. Users would be mentally prepared to go through the experience, reach suspension of disbelief faster, and would more likely be making an effective use of the interactive potential the VE offers.

3.1 Applying the Superhumans metaphor

Consider an example of a VR system which is used to control a simulation of landing a probe on another planet. A system like this can call for close collaboration between a number of different experts, each with their own perspective of the problem and each immersed in the VE. In such example, a traditional design approach would suggest that the system to be designed following a task-driven approach, ultimately asking each expert user to directly/abruptly engage in a VR experience, and to perform the required task within the VE. The *superhumans* metaphor on the other hand could empower each user to play a different role with the VE. For example, one of the users would be able to freely fly around the probe or to move it physically, another may be able to view heat and other sensory data from the probe by having insight-vision as superimposed visualization on the probe 3D model within the VE. In addition, the *superhumans* metaphor could easily lend itself to collaboration where each user is empowered with unique superhuman characteristics which support the team and allow more natural coordination of its members as each of them is aware of his as well as the others' roles (e.g. similarly to a member of X-men or Fantastic four team).

4 Implications and Limitations

Applying the *superhumans* metaphor does not require changing technical aspects of the VE. Rather, the use of the metaphor would empower designers through insight, guiding them to design a better user experience in the VE. The *superhumans* metaphor would allow designers to support users with a level of engagement beyond their human abilities and limitations and to fully utilize the true power of the virtual immersive experience. The *superhumans* metaphor would also empower end-users to be motivated and better prepared for the experience.

On the other hand, deciding to apply the *superhumans* metaphor involves several limitations. First, the designer needs to carefully consider the *superhumans* being used, their origins, inspiration, and how they will be perceived by the intended user. For example, users from different cultures may have different views and interpretations of *superhumans* abilities. Second, the *superhumans* metaphor present a risk of motivating users by setting high expectations and then failing to deliver due to lack of balance between the technical implementation and the background story. For instance, the experience of a *superhumans* capability could be reduced if the graphical representation is weak and if technical issues (such as latency) bar the user from a believable experience. Finally, the *superhumans* metaphor can fail if the task-at-hand doesn't lend itself well to the metaphor, and should not be rely on the user experiencing *superhumans* abilities during the VE interaction.

5 Conclusion and Future Work

We presented the *superhumans* design metaphor, a conceptual character-driven approach aiming to enrich the design of virtual environments and virtual experiences. The metaphor attempts to inspire designers, and empower end-users by explicitly supporting a set of super-humans, physical and cognitive, capabilities that users can exercise within the VE. Careful adaptation of the inspirational sources supporting the specific superhumans capabilities, such as history and fantasy, should be taken to avoid nullifying the virtual experience.

Our discussion of the *superhumans* metaphor is only conceptual at this point. In the future we plan to examine the implementation of various VEs following the *superhumans* metaphor. Following, we hope to be able to articulate more precisely the detailed aspects of the metaphor in a more structured way and with more attention to the subtleties of applying it to real design challenges.

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