

## WALKING CLOUDS AND AUGMENTED REVERIE

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### Abstract

The work, presented at the workshop *Water is in the air*, focuses on the imaginary aspects of the embodied exploration of a virtual matter. Thanks to a motion capture device and a real-time simulation system, modifications of the bodily density can be experienced through a cloud-avatar. The mutual influence of the cloud behaviour and the user's action offers a great deal of freedom for expressive performances and creative interactions. It also provides a new mode of engagement in virtual images allowing for the experience of a peculiar kind of dynamic reverie, which is virtually augmented and poetically enriched through the dialog with the cloud-matter.

CLOUD is a cross-disciplinary project devoted to the investigation of virtual materiality from both the sensory and the imaginary dimensions. It has been developed at LIMSI-CNRS (a scientific laboratory) in the context of an art-science thematic named VIDA (Virtuality Interaction Design and Art) [1]. From the contrast to much related work on virtual materiality, the experience of a cloud-avatar is more than an intuitive control of a virtual matter, usually regarded as a dynamic object or a texture intended to be manipulated or perturbed [2][3]. Within the proposed device, the user's body virtually turns into a cloud and his/her avatar has its own material properties (e.g. density, life time, spatial distribution...), which depend on the physical characteristics of the simulated matter. According to the cloud type, different kinesthetic sensations can be

felt and the avatar influence on the user's movements can be significant. Thus, a stratus-avatar (widespread cloud) cannot walk like a cumulus-avatar (compact cloud) and the user has to adapt his/her manner of walking to the "physical abilities" of the cloud (Figure 1).

The CLOUD prototype currently developed at LIMSI-CNRS (K1\_prototype) consists of a motion capture system based on an infrared camera (Kinect), which performs the user's gesture tracking and creates his/her avatar skeleton. A particle generator is used for the graphical rendering and a real-time mapping between cloud parameters and user's actions has been implemented. Note that the cloud shape is not generated from the user's silhouette, filled with a cloud texture. It originates from the particle flow emitted by the transmitters, which are located on each point of the skeleton. Thus, the reactivity of the cloud-avatar and its spatial expansion will differ with respect to the cloud genus (cumulus, stratus or cirrus) and the initial cloud shape will be altered by the user's gestures. Additional visual/audio wind effects and interactive zooms are proposed via the system interface, enabling a continuum of virtual transformations, from highly anthropomorphic representations to totally abstract images.

Technically speaking, the CLOUD installation is not a full-body immersive system because it requires no stereoscopic viewing helmet (head-mounted display) and the user can always see his/her real body. It is also to be pointed out that the cloud-avatar is projected onto a large screen and is of the user's size. Moreover, the diffusive properties of the cloud-matter produce a three-dimensional impression, allowing for a

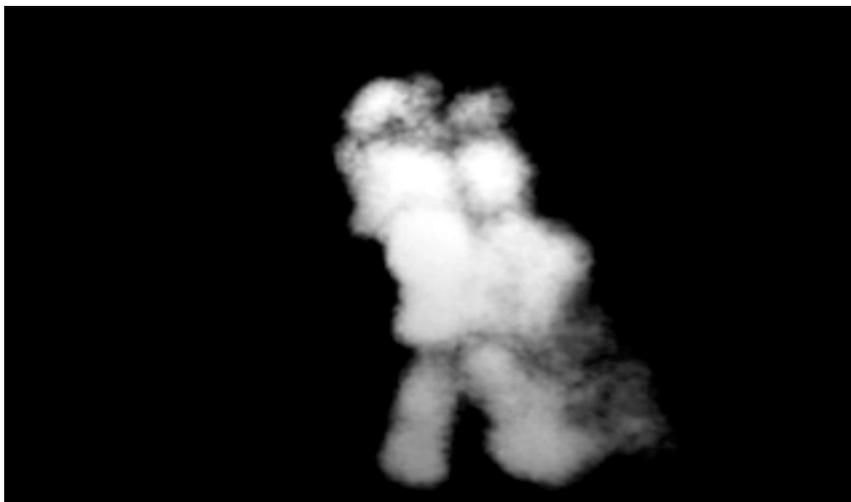
visual effect of depth. This may explain the strong feeling of being immersed within the cloud-matter when the interactive zoom is applied or the clear sensation of the body displacement caused by the wind effect.

The concept of cloud-avatar was inspired by the work of the french philosopher of science Gaston Bachelard who also made major contributions in the fields of the phenomenology of imagination and the analysis of poetic images related to a matter [4][5]. From a cross-disciplinary viewpoint between philosophy, psychology and poetics, he tried to map out the characteristics of each imagination type associated with the four fundamental elements (water, air, earth, fire) and studied what he called "material imagination".

In contrast to formal imagination, which focuses on the visual perception of images and surfaces, material imagination consists of "[...] this astonishing need for "penetration", which going beyond the seductive imagination of the forms, thinks matter, dreams in it, lives in it, or - in other words - materializes the imaginary" [4]. My reflection on embodied virtual materiality stems from the translation of Bachelard's study from poetic literary images into virtual images. This translation does not refer to a simple transposition of Bachelard's ideas into the context of material virtuality but rather to their confrontation to the virtual medium through their realization [6].

The unusual mediation of a "material" avatar between the real (the body) and the virtual components (the cloud) provides a new way of investigating some general issues in cognitive sciences (for instance, bodily awareness, self and space, bodily illusions...) [7]. More specifically, it raises the question of the role which the imaginary plays in the cognitive loop of perception-action [8] and might exemplify the so-called process of the "imagination externalization" through the medium of virtual materiality [9]. To what extent virtual images may be adjusted to imagination and not to perception only? How imagining within another materiality may modify our sensory feedback? Can we experience "a poetic transference of situation" through a (cloudy) virtual body [10]? There are many ways to address these questions, which mainly concern the interplay of sensory perception, sense making and imaginary in the context of immersive and interactive simulation systems. The interrelation between the

Fig. 1. *Walking Clouds 2*, 2012. (© N. Delprat. Photo © N. Delprat.)



first two topics has been extensively studied in the field of Human-Computer Interaction in order to improve the user's action and his/her decision making in virtual environments. The influence of imaginary has been generally neglected in scientific or engineering applications and its investigation has been usually confined to the realm of fantasy (imaginary worlds) for imaginative fiction creation (video games or artistic works). The conceptual and experiential framework developed in the CLOUD experiment challenges this conventional perspective in jointly questioning the three dimensions (perception, action and imaginary). It also allows for the exploration of a new mode of engagement in virtual images in redirecting the user's attention from the (external) virtual world to his/her (internal) bodily sensations through his/her (personal) imaginary experience.

The cloud-matter control and its appropriateness, especially for dense clouds or when wind effects are simulated, require the user to slow down his/her movements or even to stay motionless, until the cloud recovers its initial form. This unusual "suspended" or contemplative activity in an interactive environment calls for a receptive awareness of the bodily sensations. At the same time, it fosters an imagining consciousness state, whose source lies in both the poetic and material aspects of clouds. Thus, the intimate connection with the cloud-avatar enables the user to enter into a poetic reverie (creative day-dream), which is sensorially enriched and virtually augmented through the interaction with the simulated matter [5].

This new way of "being" may be viewed as an experiment in, what I propose to call, Augmented Reverie with reference to Augmented Reality systems, which incorporate virtuality within the real world to augment it. In order to better characterize the sensations and perceptual illusions, which may be felt with a cloud-avatar, an experimental protocol is currently being developed. Once validated, it will be used for medical researches on the relationship between the modification of body perception and the evaluation of global chronic pain.

*Is it you or me? Where am I? Is there wind? It is like a sky and we are clouds. [...] "then to see successively the formless, the faded, the unreal" [4].*



Fig. 2. *Almost Blue 4*, 2012. (© N. Delprat. Photo © N. Delprat.)

In parallel to these studies, my work on *Walking Clouds* explores the feelings of body projection and immersion into a virtual matter as a source of an aesthetic experience, in which subject and object are intimately intermingled (Figure 1). How does the matter fashion our (real and imaginary) body-space relationship? Which part of ourselves is affected by the identification with the cloud? Do we help the cloud learn to walk or does it rather help us behave like a cloud?

Since the current CLOUD prototype makes the interaction between two users technically possible, the Augmented Reverie experience can be shared through a collaborative process with different combinations of cloud types and effects. Among them, the *Almost Blue* installation deals with the dissolution of the boundaries between self and space [11] and investigates the sensation of body effacement through the co-creation of a sky with two cloud-avatars, one blue and one white (Figure 2). So long as one user slightly moves, the sensory feedback (visual and audio) is continuously modified, providing a great deal of freedom for creative and expressive interactions with the virtual medium.

Except in artistic approaches, the investigation of the imaginary dimension associated with virtual images is most often overshadowed by the strong desire of sense making and performance [12]. Yet, this dimension is critically relevant to the understanding of any new technical object, especially when its use may affect our sensibility or alter our body perception and representation. In Augmented Reverie, this intimate and fundamental part of ourselves is explored through the embodied experience of a virtual matter, engaging us in a poetic

reverie, wherein we can act and react in real-time. A fascinating and enjoyable experience, which simply consists in looking at, crossing through, being in and finally being (a cloud).

#### References and Notes

1. The project has benefited from the interaction/advice of researchers from different disciplines and from the ARNUM-ESIEA collaboration during the first year of its development. More details on <http://vida.limsi.fr>.
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