

Chapter 13

Conversational Metabots for Educational Applications in Virtual Worlds

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ABSTRACT

Education is one of the most interesting applications of virtual worlds, as their flexibility can be exploited in order to create heterogeneous groups from all over the world who can collaborate synchronously in different virtual spaces. Additionally, they can create opportunities to offer educative contents with the advantages of online courses, but also the feel of “presence” that only virtual worlds can provide. However, the interaction in social virtual worlds usually takes place in text mode, given that usually only textual and chat facilities are provided to communicate with avatars and bots. This makes it difficult for people without enough technical knowledge, or with visual or motor disabilities, to interact with such systems. To solve this problem, the authors propose a methodology for building bots as intelligent embodied conversational agents that can communicate with the users through oral as well as visual modalities.

INTRODUCTION

The contents of the chapter are structured as follows. In Section 1, we introduce the topic of virtual worlds and contextualize the rest of the chapter and our proposal. Section 2 presents the

potential of virtual worlds as an educative tool and describes the main experiences carried out recently in the application of these technology to teaching and learning. In Section 3, we center on Second Life, which is one of the most extended virtual worlds, and pay special attention to the

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specific resources it provides for educational purposes such as Sloodle.

Section 4 examines the barriers that some users may find in using these applications and explains how speech can be useful to address this problem. The section focuses on the so called *spoken dialog systems*, explaining their classical architecture and discussing three applications: learning, assistance to elderly and handicapped users, and virtual environments. Section 5 presents our proposal to integrate voice interaction into Second Life by developing conversational bots for educational purposes in this virtual world. In this section, we propose our own methodology for creating conversational metabots. We describe in detail the architecture of the proposed conversational metabot and the technologies and protocols employed for developing its conversational behavior and its synchronization with the avatar. Finally, Section 6 presents the conclusions derived.

1. INTRODUCTION TO VIRTUAL WORLDS

The stunning increase in the amount of time people are spending socializing online is creating new ways of communication and cooperation. With the advances in the so-called Web 2.0, virtual worlds have grown dramatically over the last decade. These worlds or “metaverses” are computer-simulated graphic environments in which humans, through their avatars cohabit with other users. Traditionally, virtual worlds have had a predefined structure and fixed tasks that the user could carry out. However, social virtual worlds have emerged to emphasize the role of social interaction in these environments, allowing the users to determine their own experiences.

Social Networking has been a global consumer phenomenon during the last few years. According to Nielsen (2009), two-thirds of the world’s Internet population visit a social network or blogging site and the sector now accounts for almost 10%

of all Internet time. Member Communities has overtaken personal Email to become the world’s fourth most popular online sector after search, portals, and PC software applications. The staggering increase in the amount of time people are spending on these sites is changing the way people spend their time online and has ramifications for how people behave, share and interact within their normal daily lives. The development of so-called Web 2.0 has also made possible the introduction of a number of applications into many users’ lives, which are profoundly changing the roots of society by creating new ways of communication and cooperation.

The advance of social networking has entailed a considerable progress in the development of virtual worlds (Arroyo, et al., 2009; Lucia, et al., 2009), in which humans, through their avatars, “cohabit” with other users. This new model is more humane because it simulates the real environments characteristics in which the human being is and has become. For humans, a 3D world is “more real,” a world in which we can feel the distance, color, sunset, the presence of our friends, in which we can use the capabilities of our senses and we can interact with objects and avatars that inhabit it. These virtual worlds or metaverses are in fact true social networks and they are useful for interaction between people in different locations. Likewise, in the three-dimensionality context it is very appropriate to develop virtual robots with the same appearance as that of the human-driven avatars. These new virtual robots are called metabots term coined from the contraction of the terms metaverse and robot. A metabot will therefore be a fully capable software completely able to interact in one or more metaverses through one or more avatars.

Metabots, with the same appearance and capabilities that the avatars for human users, thus intensify the perception of the virtual world, providing gestures, glances, facial expressions, and movements necessary for the communication process. Therefore, these virtual environments are very useful to enhance human-machine interac-

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