

## Chapter 44

# Three-Dimensional Virtual Environment and NPC: A Perspective about Intelligent Agents Ubiquitous

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### ABSTRACT

*The use of intelligent agents aware of the individual characteristics and context of students, allow to offer a suitable support to the real requirements. Allied to this, the implementation of these agents in the three-dimensional virtual environments, tend to transcend the existing potential in the interactions with the learning objects it contains and also to expand the alternatives of building the students' knowledge. Throughout this chapter it will be presented the development of intelligent agent called ELAI, by using the NPC strategy on the virtual world platform OpenSimulator. The ELAI provides support for teaching Computer Networking (CN), being sensitive to the context of learners to their level of expertise. In order to maximize the flexibility of interactions between the student, through the student's avatar and the NPC, an interconnection with a chatterbot was established, whose knowledge base was increased by files in AIML inherent to the topic of CN.*

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## **INTRODUCTION**

With the increasing use of Information and Communication Technologies (ICT) in the educational field, many requirements were emerging and changing in the current scenarios, making it necessary to reflect on the new computing paradigms in education. Given this conjuncture, research on intelligent agents in immersive environments applied to education become crucial, as it is highlighted in researches done by Iglesias & Luengo (2004), Callaghan et al. (2009), Garrido et al. (2010), Esteves et al. (2010), (Vilela, 2011) and Griol et al. (2014), since they are able to give students the ability to be immersed in the environment and interact with the learning objects, besides allowing the intelligent support to the students, assisting on their process of teaching and learning.

In this same line of this research, De Lucia et al. (2009), Bainbridge (2010), Dalgarno and Lee (2010), Ai-Lim Lee (2011), Nelson and Erlandson (2012), Childs and Peachey (2013) and Richards and Taylor (2015), discuss and points out the creation of immersive virtual environments aimed at education. The implementation of these environments demand that several factors are considered for development, such as: educational objectives, teaching strategies based on learning theories, friendly and instructional design, objects, experiments and exercises able to encourage the interaction and collaboration among users, besides passing the feeling of being immersed in the environment. Because, according to Medina (2004), learning obtained through the personal experiences of the participants and their interactions with other participants, becomes more productive, consolidated and dynamic.

Intelligent agents integrate fully to the development of these immersive virtual environments, as they offer support to its users. The relevance of intelligent agents focused on education is discussed by Soliman and Guetl (2010), in which the authors claim that in virtual learning environments, students have great flexibility in the face of numerous learning opportunities and, therefore, it is necessary to support and an intelligent orientation. Therefore, as Russel & Norvig (1995), intelligent agents must have the ability to perceive the environment in which they belong and, through sensors, operate adopting the best possible actions to solve given situations.

Furthermore, immersive experiences tend to further the engaged students with the objectives proposed in the environment, and thus it is possible to say that the intelligent agent can significantly contribute to the students' learning process. According to Soliman and Guetl (2010), the agent can act as a teacher, learning facilitator or as a colleague in collaborative environments. The agent can interact with students at different moments and places, guiding the student in the virtual environment, explaining topics, asking questions, giving feedback, helping students to collaborate with other students, offering support to the learning personalized.

This chapter of book presents the development of an intelligent agent, whose name is Intelligent Agent adaptive to the Level of Expertise of Students (ELAI). This tutor was developed through the conception of Non Player Characters (NPC), that is a perspective existing in the development platform of virtual worlds OpenSimulator and that was implemented in the Teaching Computer Networks in a Free Immersive Virtual Environment (TCN5) virtual world (Voss, 2014). This agent has as an objective to contribute in the students' teaching in disciplines of Computer Networks, presenting the ability and aspects of intelligent agents with characteristics of context-aware in the level of students' expertise to collaborate more active in this process. In order to maximize the flexibility of the interactions between the student, through his avatar and the NPC, an interconnection of the tutor with a chatterbot was established, whose knowledge base was expanded with topics about computer networks.

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