Traveller: An Intercultural Training System with Intelligent Agents

(Demonstration)

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ABSTRACT

There is a growing demand for new forms of intercultural training. We describe a demonstration of an agent-based application designed to teach young adults (18-25) general patterns of behaviour that can distinguish a broad range of cultures. Training is done through an interactive-story telling approach where the user must go through a series of critical incidents, interacting with agents capable of simulating different synthetic cultures in their behaviour.

Categories and Subject Descriptors

I.2.11 [**Artificial Intelligence**]: Distributed Artificial Intelligence—*Intelligent Agents*

Keywords

Intercultural Training, Virtual Learning Environments

1. INTRODUCTION

Virtual Learning Environments (VLEs) have the potential to be a novel and effective tool for intercultural training as they allow the user to face complicated intercultural situations in a controlled environment. Moreover, unlike in more traditional role-playing approaches, a VLE eliminates the dependency on having other human participants as the user learns by interacting with autonomous characters.

In this paper we describe a demonstration[1] of an agent-based application for intercultural training that is being currently developed. The application is targeted at young adults (18-25) and uses an interactive storytelling approach for training. The user learns by playing an active role in a narrative where he or she must find out how to successfully interact with characters from different cultures in order to progress in the story. By being story-driven and allowing the user to interact with characters that can express believable emotions, the application aims to promote user engagement.

Most agent-based applications for intercultural training target specific cultural aspects of a particular country, such as in [3]. Unlike these applications, Traveller aims to teach cultural differences on a more generic level, without focusing on any particular country. This is achieved by having users interact with characters from synthetic cultures. These cultures, defined in [2], are advantageous in the sense that they can isolate and exaggerate behavioural differences found in real cultures whilst avoiding their enormous complexity. Moreover, they avoid possible objections users would have towards a realistic representation of their own culture.

2. LEARNING THROUGH CRITICAL INCIDENTS

In Traveller, the user plays the role of a character that decides to go on an adventure across different countries to find a hidden treasure that his grandfather left him. At the end of the story he finds the last page of his grandfather's journal, and in here he discovers that the treasure is the experiences that his grandfather had while travelling.

To progress through the story, the user must deal with a number of practical problems in each of the countries visited. This will require the user to interact with characters that behave in a culturally-distinct manner. We refer to these situations, designed to evoke cultural misunderstandings, as Critical Incidents. After a certain number of such incidents the user will proceed to the next country.

The goal of the critical incidents is to confront the user with different behaviours from characters that have distinct cultural profiles. By doing so, they not only learn to understand how to deal with conflicts emotionally, but also gain a greater understanding of how behaviour can differ over cultures. Moreover, the user will have to talk about their experiences in-between sections where they have to write a postcard to their grandmother. This promotes a reaction from the user and is also a non-intrusive evaluation of how the user is perceiving the experience.

[1] Video at: http://gaips.inesc-id.pt/∼smascarenhas/trav/

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In the playable demonstration, there is currently one country, named Malahide, with two Critical Incidents. The first one takes place in a bar (see Figure 1) where the user needs to get directions to his hotel and the second one occurs in a museum where the user needs to ask a park supervisor for his permission to enter a park. The behaviour of the characters emerges from their ascribed cultural parametrisation. This allows the scenarios to be replayed with the user dealing with multiple cultures in similar situations.

Figure 1: Small talk in the Bar

3. CULTURALLY-ADAPTIVE AGENTS

In Traveller we aim at creating agents that not only react and behave in a believable way (as they are meant to be included in a computer-based learning game) but also do so while being able to express cultural differences in their behaviour. As such we need to consider not only a generic set of "basic" components that the agent's architecture may embed (such as a reactive component, a planner, an emotional component) but also, specific requirements associated with the need to behave in a culturally shaped manner.

In order to address this issue, we have extended an agent architecture for virtual agents that has emotional capabilites [1] with a culturally-adaptable model of relational behaviour. The model [5] enables the encoding of cultural conventions on how agents perceive others, how much they are willing to act for others and how much they feel entitled to have others acting in their favour. As an example, in one of the cultures in the demonstration, the agents make a clear distinction between outsiders and locals, finding inappropriate when outsiders directly approach them. Such distinction is meant to reflect a highly collectivistic culture [2].

4. TECHNOLOGY

The application is being developed with Unity 3D[2], a game engine, and ION [6], a framework that manages the communication to the agent architecture. Moreover, users interact with the application through the Kinect allowing the user's choices to be made by gesture facing a large screen in free space rather than tying the user to a keyboard and small screen. Kinect interaction has been built into the application using FUBI [4], an open source framework for recognizing full body gestures from a depth sensor as the Microsoft Kinect. Gestures are defined via XML and consist of several states that contain certain body postures or joint movements. Body postures can be defined by joint angles or the relative positions between joints, while joint movements need a specific direction and speed. The states of one gesture are composed to a sequence with specific time constraints between the states. As soon as a user input is requested, a gesture symbol or animation for every possible input gesture is shown on screen accompanied by short text describing the corresponding in-game action (see Figure 2). Finally, characters in the application are given voice using the Microsoft Speech API and voices from CereProc[3].

[2]http://unity3d.com

Figure 2: Kinect gestures at start of the bar scene

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6. REFERENCES

[1] J. Dias, S. Mascarenhas, and A. Paiva. Fatima modular: Towards an agent architecture with a generic appraisal framework. In *Proc. of the Int. Workshop on Standards for Emotion Modeling 2011*.

[2] G. Hofstede. Role playing with synthetic cultures: the evasive rules of the game. In *Proceedings of the 9th International workshop of the IFIP*, pages 49–56. Helsinky University of Technology, SimLab Report no 10, 2005.

[3] W. Johnson, C. Beal, A. Fowles-Winkler, U. Lauper, S. Marsella, S. Narayanan, D. Papachristou, and H. Vilhjálmsson. Tactical language training system: An interim report. In J. Lester, R. Vicari, and F. Paraguaçu, editors, *Intelligent Tutoring Systems*, volume 3220 of *LNCS*, pages 336–345. Springer Berlin Heidelberg, 2004.

[4] F. Kistler, B. Endrass, I. Damian, C. T. Dang, and E. André. Natural interaction with culturally adaptive virtual characters. *Journal on Multimodal User Interfaces*, 6:39–47, 2012.

[5] S. Mascarenhas, R. Prada, A. Paiva, N. Degens, and G. J. Hofstede. "can i ask you a favour?" - a relational model of socio-cultural behaviour (extended abstract). In *Proc. of the 12th Int. Conference on Autonomous Agents and Multiagent Systems (AAMAS 2013)*, 2013.

[6] M. Vala, G. Raimundo, P. Sequeira, P. Cuba, R. Prada, and C. Martinho. Ion framework - a simulation environment for worlds with virtual agents. In *Proc. of the 9th Int. Conf. on Intelligent Virtual Agents*, 2009.

[3]http://www.cereproc.com