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Cognitive Feedback for Embodied Conversational Agents

Joanna TAOUM, Bilal NAKHAL, Elisabetta BEVACQUA and Ronan QUERREC

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1 Introduction

This research work aims to define a model for real-time simulation of multimodal and social behavior of virtual agents when interacting with a learner in an informed virtual environment. We present the main ideas of a cognitive feedback model based on the knowledge of the environment.

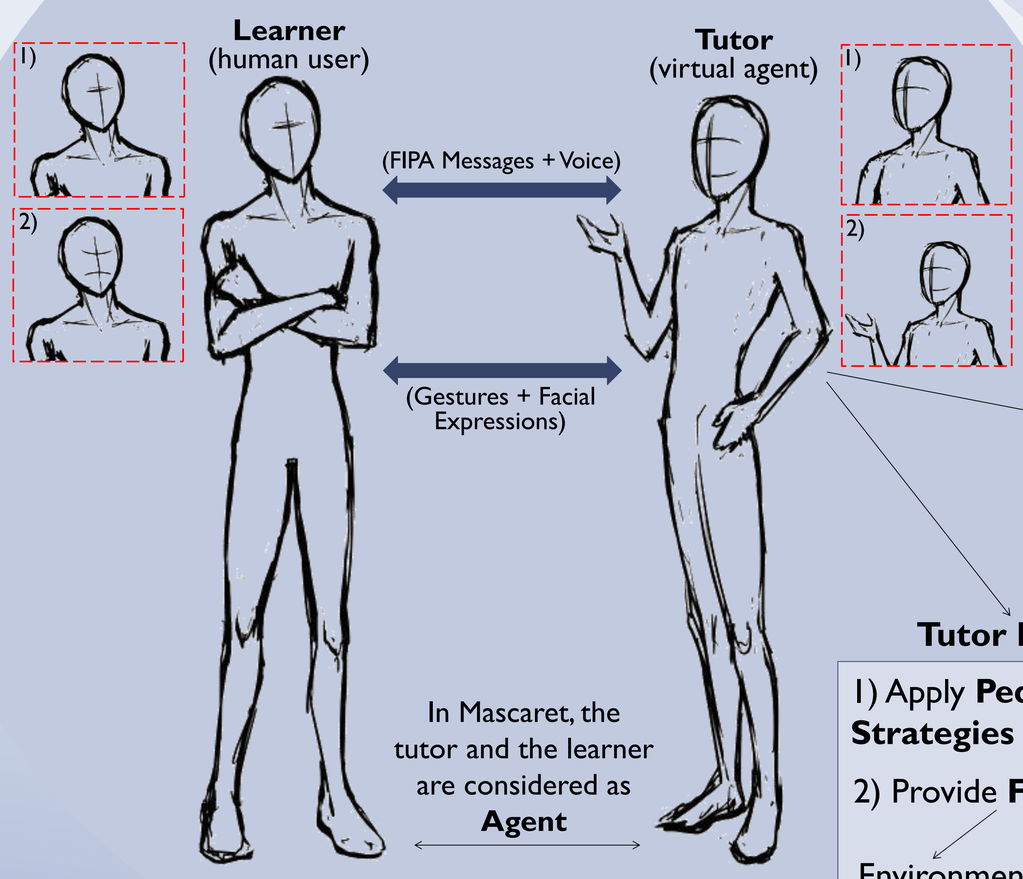
Keywords: Embodied Conversational Agents; Interaction; Feedback; Learning; Informed Virtual Environment

2 Objective

Speech Recognition
(Natural Language → FIPA Messages)

Facial Expression Recognition

Actions Recognition



Tutor Behavior

1) Apply **Pedagogical Strategies**

2) Provide **Feedback**

Environment Knowledge | Interaction

Knowledge Base
(MASCARET)

Domain Ontology

Environment Structure

Entities Behavior

Users & Agents activities and interactions

Embodied Conversational Agent
(Greta Platform)

3 Evaluation Methods

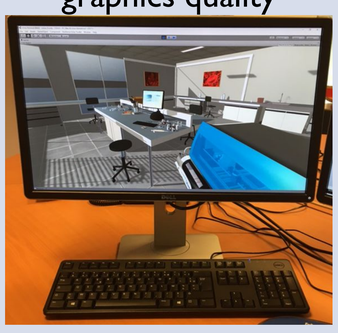
Subjective Questionnaire
vs.
Objective Performance Measures (OPM)

Hoareau's Experimental Protocol:
Interest of VR for learning,
based on OPM.
Execution time, consulting assistance, number of errors, etc.

Hoareau's Experiment
(Non-immersive VR devices):

First Experiment
(Different immersion level):

PC with good graphics quality



CAVE

VR head mounted display

Final Experiment:
Integration of a virtual agent with a cognitive feedback behavior.

4 Application

Informed Virtual Environment for procedural learning for blood analysis

- Actions of the automaton
- Actions of the reagents preparation

5 Conclusion & Perspective

In order to demonstrate the genericity of our model, we also plan to apply this work in the **Cultural Heritage Domain**.

The proposed model will perform agent behavior having knowledge not only about learning but also on a social-cultural heritage, such as the ancient bridge of Brest. Agents will be able to participate in activities and interact in a natural way with visitors.

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