# A BML Based Embodied Conversational Agent for a Personality Detection Program

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## 1 Introduction

This paper presents a project in which an Embodied Conversational Agent (ECA) attemtps to detect the personality of the user by asking him (or her) a series of questions. The project uses the Elckerlyc platform, a Behavior Markup Language (BML) compliant behavior realizer for ECAs [1]. BML allows the design and implementation of verbal and nonverbal behaviors in an abstract way, without reference to the ECA model in question. This means the designer only needs to decide "what" kind of behaviors should be performed by the ECA and to specify "when" these behaviors should be performed, without needing to know how the realization engine actually displays these behaviors on the ECA's embodiment.

The aim of this research was to extend the Psychometer [2], a text based dialogue system for personality detection, with a virtual embodiment that uses gaze behavior and facial expressions. The Psychometer asks the user questions, adapted from an existing questionnaire, until it has enough answers to classify the user's personality according to the well-known Big Five theory of personality traits.

## 2 System

The system presented here captures the output of the Psychometer program and connects it to the ECA controlled by Elckerlyc. To create appropriate gazing behavior we adapted an existing gazing algorithm [3] to the different conversational states of the Psychometer ("greeting", "asking", "listening", "farewell" and "user invalid input"). For each state, the appropriate sequence of behaviors is triggered. The gazing algorithm makes a strong distinction between long and short utterances, based on the idea that a speaker who starts a longer utterance tends to look away in order to concentrate, avoiding distraction and sending to the listener the message that he does not want to be interrupted. In addition, at the end of a turn and/or the end of a phrase, speakers tend to seek eye contact with the listener (looking up) to monitor their reaction.

More than fifty gazing behaviors and twenty-three facial expressions (and combinations of them) have been included in a repository, along with some

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pseudo-random methods to introduce variety during the generation of behaviors. The gaze behaviors and facial expressions are selected as function of the dialogue state. For example, when the user enters an invalid input, the reaction of the ECA ranges from surprise for getting an unexpected answer to anger if the user repeatedly enters incorrect input.

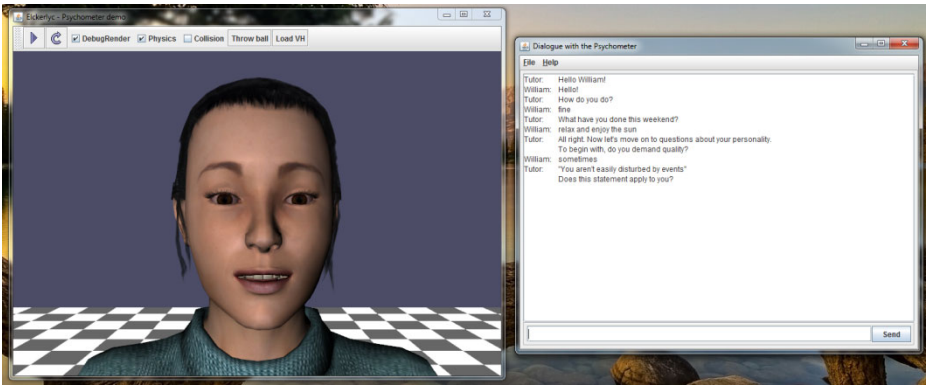


**Fig. 1.** Example of the ECA performing a behavior (left) during the dialogue

## 3 Evaluation

The system was evaluated by ten students using AttrakDiff (www.attrakdiff.de), complemented with a more focused questionnaire and open discussion. In general, the participants found the ECA natural and interesting, giving the system an average rating of 4.1 out of 5. The AttrakDiff evaluation classified the project as very attractive. Critical comments by the participants mostly involved dialogue aspects and not so much the nonverbal behavior of the ECA. A point of improvement mentioned by several participants was the visual integration of the ECA with the dialogue system (currently shown in separate windows).

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