Varying Personality in Spoken Dialogue with a Virtual Human⋆

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This poster reports the results of two experiments to test a personality framework for virtual characters. We use the Tactical Questioning dialogue system architecture (TACQ) [1] as a testbed for this effort. Characters built using the TACQ architecture can be used by trainees to practice their questioning skills by engaging in a role-play with a virtual human. The architecture supports advanced behavior in a questioning setting, including deceptive behavior, simple negotiations about whether to answer, tracking subdialogues for offers/threats, grounding behavior, and maintenance of the affective state of the virtual human. Trainees can use different questioning tactics in their sessions. In order for the questioning training to be effective, trainees should have experience of interacting with virtual humans with different personalities, who react in different ways to the same questioning tactics.

We extend the existing architecture by allowing the domain designer to author different personalities for the same character. To model the personality, we use the well known five factor model, where each factor can be further decomposed into 6 facets [2]. Here, we choose to model facets that are relevant for a tactical questioning dialogue character. The personality model is implemented by manipulating two aspects of the dialogue manager, the affect model and subdialogue networks used for responses. The **affect model** governs the choice of whether to be compliant with the questioner. It is composed of several affective variables that are updated when relevant dialogue moves are made. We model some aspects of personality as changes to these updates. For example, the facet of *Vulnerability (Neuroticism)* is modeled as the factor by which the social bonding variable decreases for face-threatening dialogue moves such as insults. The **response generation subdialogue networks** decide the appropriate response for a given dialogue state. For example, the facet of *Honesty (Agreeableness)* is modeled as a 4-category variable, which determines the frequency and conditions under which the virtual human will lie or refuse to answer questions about sensitive information.

In our first experiment, we evaluate whether the trainees can perceive the intended personality of a virtual human through a single interaction. We have

implemented two personalities that differ in the traits of assertiveness, modesty, honesty, trust, positive emotion, activity, compliance and conscientiousness. 12 participants interacted in text-only modality with a virtual character twice; once with each personality. After each interaction, the participants scored the character's personality facets on a 5-point Likert scale. Results show that our model produced significant results for trust, conscientiousness and compliance; and some trends in the right direction for modesty, honesty and positive emotion. This suggests that our personality model can generate perceptible differences. This does not answer the question of which parameter changes produce differences in which perceived personality facets.

To begin addressing this, our second experiment focuses more narrowly on one of the personality facets that is most salient for tactical questioning, *Assertiveness*. Two different personality conditions were tested, one being more assertive than the other. Each of the 16 participants in the experiment completed two dialogues; one for each personality condition. The interactions used speech and non-verbal interaction with an animated virtual human. After completing each dialogue, the participants filled out a survey, which consisted of a modified version of test items associated with *assertiveness* in the International Personality Item Pool (IPIP) [3]. The scores for the 10-item survey are in the range of 10–50, with a larger number indicating the greater amount of assertiveness. The assertive condition was perceived as more assertive than the nonassertive condition (Assertive: mean 37.4, SD 4.73; Nonassertive: mean 34.7, SD 8.77). The difference between the two conditions was significant on a one-tailed paired (within subjects) t-test ($t(15) = 1.77$, $p = 0.049$).

Subjective feedback from the participants suggested that the non-verbal behavior may have been a confounding factor. In focus more clearly on the role of the textual dialogue aspects, we asked two judges to evaluate the transcripts of these dialogues for assertiveness. The results showed a much larger significant difference with one-tailed t-test (Judge 1: Assertive: mean 36.25, Nonassertive: mean 27.25, $t(7) = 2.415$, $p = 0.023$; Judge 2: Assertive: mean 42.63, Nonassertive: mean 32.38, $t(7) = 4.012$, $p = 0.003$). More detailed descriptions of the personality models and the experiments can be found in [4].Future work will look at incorporating gesture and facial expressiveness as part of the model.

References

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