

Auto Generating APA Persona

A Proposal

Ireti Fakinlede, Vive Kumar, Dunwei Wen, Sabine Graf
School of Computing and Information Systems
Athabasca University
Athabasca, Canada

iretifakinlede@athabascau.ca, vive@athabascau.ca, dunweiw@athabascau.ca, sabineg@athabascau.ca

Abstract— Contemporary research lacks a well-defined and robust psychometric model for defining and operationalizing the persona and functional roles of anthropomorphic pedagogical agents. This paper addresses this shortcoming by outlining the design of a framework for generating the persona of an agent based on the theory of social distance. Here we characterize the APA's persona as a cumulative result of the agent's pragmatic use of language to create social proximity or distance in order to fulfill its functional role.

Keywords- anthropomorphic pedagogical agents; agent persona; psychometric models; HCI

I. TOWARDS A PSYCHOMETRIC MODEL OF APA PERSONA

The “anthropomorphic approach” [1] to pedagogical agent (PA) design aims to mimic human-like qualities that will increase a learner's willingness to anthropomorphize pedagogical agents and see them as social co-actors. However, there are few well-defined psychometric models in contemporary research for defining the relationship between the persona and functional roles of anthropomorphic pedagogical agents (APA). Existing models [2–5] are plagued with the use of highly subjective measures and ill defined terms. In addition they use coarse scales for measurement and are therefore not robust enough to uniquely define all the possible roles that an APA can play.

A. Purpose

This proposal outlines the development of a high-level descriptive model for persona and function role definition. Here we define persona as an agent's identity in a social world and explore a framework whereby that identity is created, reinforced, and maintained in communicative interactions through linguistic choices. The framework will (a) enhance the believability of the APA by supporting both on task and off task conversations (b) explore the possibility of tailoring the agent-user interaction to an individual learner's perceptions and expectations. This research will help us address the following research questions for which there is little empirical research:

- How to mirror patterns in human-human dialogue turns that show recognizable persona variations based on social context?

- What do these patterns look like (e.g., politeness and motivational strategies)?
- How does student learning presence manifest when we compare interactive forms documented in student discussions with APA versus interaction with human instructor?
- Do students' motivational experiences improve as they interact with our APA?
- Finally we measure how much our APA's persona matches it's intended persona

B. Background

In illuminating the pragmatics of language, J. L. Austin emphasized the idea that people used language not only to convey information, but more frequently to facilitate everyday activities. As Schlenker and Weigold put it: “Words to not just describe; they ‘do things’ such as influence the ideas and behaviors of others” [6]. These acts are powerful and can have a substantial impact on the speaker's fortunes and the relationship between speaker and hearer [6]. Research shows that people, therefore, employ various strategies to ensure that the outcomes of interpersonal interactions are rewarding. In his seminal work, *The Presentation of Self in Everyday Life*, Erving Goffman portrays interpersonal interaction as a performance by which individuals regulate the impressions they create of themselves in social settings [7]. In order to interact, people must define the situation (e.g. select the relevant cognitive scripts) and the roles each will play [6]. “When an individual or performer plays the same part to the same audience on different occasions, a social relationship is likely to arise” [7].

Svennevig proposes a multidimensional approach to modeling social relation which draws from social distance theories and a principled account of social identity [8]. His model of social distance has as its basis three independent variables i.e. affective social distance, normative social distance and interactive social distance. Affective Social Distance deals with the amount of sympathy towards or confirmation and acceptance to the other's self-image which could lead to emotional interdependence. Normative Social Distance refers to norms that differentiate the insider from the outsider. Finally, Interactive Social Distance is an outcome of the frequency of contact and depth of social interactions.

II. METHODOLOGY

A. Social Relation Model

In the computational model of an APA, its social relations are represented by the three dimensions of social distance. Formally, the relation of two roles in a relationship i and j , from the point of view of i at time t is represented by:

$$\text{socialRelationship}_{ij}(t) = \langle A_{SD}, N_{SD}, I_{SD} \rangle$$

B. Strategies and Decision Making Process

We identify social interaction as the tool by which the agent collects information about the cognitive and affective states of human learners. The agent's main strategy is to use social interaction to engage the user and collect as much information as possible. Just like police detectives routinely play various roles (e.g. Good cop, Bad cop) and ask indirect questions directed at forging the right relationship with witnesses, victims and suspects that get's them to provide crucial information. The agent employs a feedback loop whereby it measures the social distance achieved in the following ways:

- Amount of Personal Knowledge collected through interaction
- Frequency of interaction i.e. how frequently the user initiates interaction
- Face threat of the users statement i.e. how much the user is willing to support the agent's face
- How frequently the user employs in-group pronouns i.e. we, us, our.

This is used within a decision making process to determine the best strategies to carry out.

III. RELATED WORK

Cassell and Bickmore use Svennevig's model of interpersonal relationship to model trust and collaborative behavior between intelligent agents and human users [9]. Cassell and Bickmore's models do not take into account the dynamic nature of interpersonal relationship; they both treat the social distance as a fixed variable. Cassell and Bickmore's model is an open loop system whereby they do not measure the effect of their strategies i.e. if the desired level of social distance was achieved or the face threat averted. When measuring the various distance dimensions, Cassell and Bickmore use the range [0, 1]. This range is too coarse for our application which needs a finer grained scale to allow for various degrees of distance or proximity.

Ochs and Sabouret et la., [10] modeled the emotions displayed by agents during social interaction using Svennevig's model. However they introduce power as a fourth dimension which Svennevig's model already defines in terms of normative social distance. They also use very coarse scales to measure the various dimensions of distance. Ochs and Sabouret model defines social relationship between individuals; however, this research looks at social relations

in terms of the relationship between social roles and not individuals.

IV. CONCLUSION

This work is part of a greater project to create cost effective APAs that are easy to deploy and use by automating aspects of the design. Our approach is grounded on the idea that persona or self is not a static phenomena based on traits but a dynamic process that changes and regulates itself in order to influence social interaction for its benefit. Here we characterize the APA's persona as a cumulative result of the agent's pragmatic use of language to create social proximity or distance in order to fulfill its functional role.

V. ACKNOWLEDGMENT

This work is supported by the Alberta Innovates Technology Futures as well as the NSERC/iCORE chair at Athabasca University.

REFERENCES

- [1] R. E. Eberts, *User Interface Design*. Englewood Cliffs: Prentice Hall, 1994, p. 649.
- [2] A. L. Baylor, "The design of motivational agents and avatars," *Educational Technology Research & Development*, vol. 59, no. 2, pp. 291–300, 2011.
- [3] A. Gulz, M. Haake, A. Silvervarg, B. Sjödn, and G. Veletsianos, "Building a Social Conversational Pedagogical Agent : Design Challenges and Methodological approaches," in *Conversational Agents and Natural Language Interaction Techniques and Effective Practices IGI Global*, D. Perez-Marin and I. Pascual-Nieto, Eds. IGI Global, 2011, pp. 128–155.
- [4] M. Walker, "PERSONAGE: Personality generation for dialogue," *Annual Meeting-Association For ...*, no. June, pp. 496–503, 2007.
- [5] T. Li, Y. Qiu, P. Yue, and G. Zhong, "Exploiting Model of Personality and Emotion of Learning Companion Agent," in *Computer Systems and Applications 2007 AICCSA 07 IEEEACS International Conference on*, 2007, pp. 860–865.
- [6] B. R. Schlenker and M. F. Weigold, "Interpersonal processes involving impression regulation and management," *Annual review of psychology*, 1992.
- [7] E. Goffman, *The presentation of self in everyday life*. Carden City, New York: DOUBLEDAY ANCHOR BOOKS, 1959.
- [8] J. Svennevig, "Identity and Social Relations," in *Getting Acquainted in Conversation*, John Benjamins Publishing Company, 2000, pp. 20 – 37.
- [9] J. Cassell and T. Bickmore, "Negotiated collusion: Modeling social language and its relationship effects in intelligent agents," *User Modeling and User-Adapted Interaction*, 2003.
- [10] M. Ochs and N. Sabouret, "Simulation of the dynamics of virtual characters' emotions and social relations," *2009 3rd International Conference on Affective Computing and Intelligent Interaction and Workshops*, pp. 1–6, Sep. 2009.