Adaptive Self-Feeding Natural Language Generator Engine

Jovan David Rebolledo Méndez and Kenji Nakayama

Graduate School of Natural Science and Technology,
Kanazawa University, Kanazawa-shi, 920-1192 Japan
{jovan,nakayama}@leo.ec.t.kanazawa-u.ac.jp
http://leo.ec.t.kanazawa-u.ac.jp

Abstract. A Natural Language Generation (NLG) engine is proposed based on the combination of NLG and Expert Systems. The combination of these techniques paves the way to employ user defined behaviors in virtual worlds as inputs to an expert system. Adaptive Algorithms can then be used to retrieve information from the Internet to give feedback to the user via the NLG engine. The combination of these AI techniques can bring about some benefits such as believability in the interaction between AI-driven and human-driven avatars in virtual worlds.

Keywords: NLG, Expert System, Machine Learning, Believable Agent.

1 Introduction

For years there have been attempts to incorporate Artificial Intelligence into games, educational systems, and some other different kinds of interactions [1] between a humans and computers. Those attempts shared a common goal: to develop *intelligence* that would give certain degree of independence, and decision-making to the computer system when interacting in an autonomously driven behavior with the user. There are also other systems that measure users' preferences by ranking interactions with links or applications. In order to get a better interface between users and systems, the concept of believability has been very important[2]. This paper explains a way for a user and an agent to interact by giving believability to the agent while keeping some common user's learned *traits*, by using a Natural Language Generation [3] and adaptive learning expert system [4] to achieve those objectives. Such a system could provide relevant categorized data from learnt criteria to its user, allowing it to preserve user patterns.

2 Natural Language Generation Engine Architecture

The proposed architecture for an *self-feeding NLG engine* is as follows: 1) The agent is initially fed through batteries of questions to the user, and an expert system will categorize the information provided by the user to fill the user's *knowledge base* of common patterns. Thus, the input data would serve as way to

H. Prendinger, J. Lester, and M. Ishizuka (Eds.): IVA 2008, LNAI 5208, pp. 533–534, 2008.

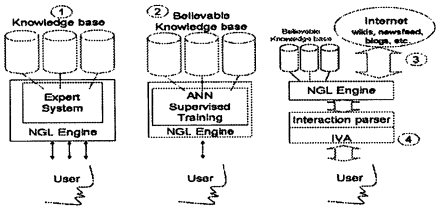

Fig. 1. Architecture of the proposed self-feeding believable NGL Engine

get to know the user's preferences; 2) Next, the system is trained by an Artificial Neural Network, where new information is presented, and by using a supervised learning method it would re-categorize new data. During this step, the system would gain some randomness, which would enable *believability* for the proposed agent; 3) Then, it would have a module for retrieving data that matches with its *knowledge*, from the web (wikis, newsfeed, blogs, etc.). By using machine the module would select in accordance with the previous *classified knowledge bases*. 4) Finally, by a dedicated module that interacts between the knowledge bases and the real time information, all of the system would be ported to an embodied IVA. By using a parser language that identifies the current subject, the system would present current themes, news, and comments about different topics, permitting a *conversational mode* with its original user, so it will help him in achieving certain tasks. The proposed architecture can be seen in Fig1.

3 Future Work

This proposed engine is the first stage of more complete AI interaction approach called *iTwinning System*, a dedicated personal agent that learns some user's behaviors, *generalizing* from their interaction, to assist him in achieving certain tasks in a virtual world or the internet, as well as being helpful, and *loadbalancing* work, and preserving the specific user's characteristics. The plan is to conduct a set of tests to users, providing a pool of question and answers, so that each user would select his preferences. By employing a generic algorithm it would separate the relevant information, and by a programmed robust feeder it would retrieve information from the Internet.

References

1. Schröder, M., Cowie, R.: Developing a consistent view on emotion-oriented computing Machine Learning for Multimodal Interaction Washinton, USA (2006)
2. Bates, J.: The role of emotion in believable agents. Communications of the ACM. 37(7) (1994)
3. Strong, C., Mishra, K., Mehta, M., Jones, A., Ram, A.: Emotionally Driven Natural Language Generation for Personality Rich Characters in Interactive Games. In: 3rd Conference on AI for Interactive Digital Entertainment CA, USA (2007)
4. Wiriyacoonkasem, S., Esterline, A.C.: Adaptive learning expert systems Southeastcon 2000. In: Proceedings of the IEEE Nashville, TN, USA (2005)