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Building Tutor and Tutee Pedagogical Agents to Enhance Learning in Adaptive Educational Games

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Abstract : This paper describes the application of two types of pedagogical agents' technology with different functions in an adaptive educational game with the sole aim of improving learning and enhancing interactivities in Digital Educational Games (DEG). This idea could promote the elimination of some problems of DEG, like isolation in game-based learning, by introducing a tutor and tutee pedagogical agents. We present an analysis of a learning companion interacting in a peer tutoring environment as a step toward improving social interactions in the educational game environment. We show that tutor and tutee agents use different interventions and interactive approaches: the tutor agent is engaged in tracking the learner's activities and inferring the learning state, while the tutee agent initiates interactions with the learner at the appropriate times and in appropriate manners. In order to provide motivation to prevent mistakes and clarity a game task, the tutor agent uses the help dialog tool to provide assistance, while the tutee agent provides collaboration assistance by using the hind tool. We presented our idea on a prototype game called "Pyramid Programming Game," a 2D game that was developed using Libgdx. The game's Pyramid component symbolizes a programming task that is presented to the player in the form of a puzzle. During gameplay, the Agents can instruct, direct, inspire, and communicate emotions. They can also rapidly alter the instructional pattern in response to the learner's performance and knowledge. The pyramid must be effectively destroyed in order to win the game. The game also teaches and illustrates the advantages of utilizing educational agents such as TrA and TeA to assist and motivate students. Our findings support the idea that the functionality of a pedagogical agent should be dualized into an instructional and learner's companion agent in order to enhance interactivity in a game-based environment.

Keywords : tutor agent, tutee agent, learner's companion interaction, agent collaboration
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