



Increasing the competitiveness of non-player agents through knowledge-sharing

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Aim of study: The study aims to verify that the competitiveness of a non-playable character agent can be increased by sharing knowledge of experiences between agents and to verify that the competitiveness of an agent can be strengthened by using the splinter principle explored in the SPLINTER framework (Gouws & Ehlers, 2021).

Problem: In many game genres, a human player is faced with an intelligent non-playable character (NPC) adversary. An NPC adversary that makes a series of bad decisions can limit the human player's immersion in the game. These bad decisions can be a result of weak NPC design. Immersion is often needed for game enjoyment (Jennett, Cox, Cairns, Dhoparee, Epps, Tijs & Walton, 2008). The immersion and enjoyability experienced by the human player are decreased if the NPC is perceived as acting irrationally or erratically.

Expected solution: The enjoyability experienced by the human player can be increased by using knowledge sharing to transfer knowledge and insights gained from past experiences between symbiotic NPC agents (Cotterrell & Ehlers, 2014). The symbiotic agent can then use this gained knowledge to make more insightful decisions and swap out components during runtime using the SPLINTERS superposition principle.

Expected results: It is expected that the symbiotic NPC agent's competitiveness will be increased as more knowledge is gained and transferred between the agents. This will result in the competitiveness of the NPC increasing as the human player plays the game. When the NPC is too competitive and the player's performance drastically decreases, a less competitive symbiotic agent or previously encountered symbiotic agent can be swapped to maintain the player's satisfaction. It is expected that this will provide a more enjoyable experience for the human player due to the increase in NPC competitiveness.

Research process: The research will be a qualitative study (Olivier, 2009) and will follow the below process.

1. Conduct a literature survey
2. Design a model
3. Conduct a feasibility study
4. Develop a prototype
5. Test prototype
6. Validate model

Aspects to be investigated: History of computer games • AI in Computer Games • Intelligent Agents • Symbiotic Game Agent model • SPLINTER Framework • Transfer Learning • Disruptive Technologies

References: Cotterrell, D. & Ehlers, E.M. (2014). "Symbiotic game agents in the cloud". MSc Thesis. University of Johannesburg. Gouws, G. & Ehlers, E.M. (2021). "Holon superposition collaborative multi-agent systems architecture". PhD Thesis. University of Johannesburg. Jennett, C., Cox, A.L., Cairns, P., Dhoparee, S., Epps, A., Tijs, T. and Walton, A. (2008). "Measuring and defining the experience of immersion in games". Int. J. Human-Computer Studies 66, pp. 641-661. Olivier, M.S. (2009). "Information technology research: A practical guide for computer science and informatics", third edition. Van Schaik