MCAST

ASSESSMENT AND INTERNAL VERIFICATION FRONT SHEET (Individual Criteria)

Course Title	**BSc. Multimedia Software Development**		**Lecturer Name & Surname**	**David Deguara**	
Unit Number & Title	**ITMSD-506-1604 – Soft Computing for Games**				
Assignment Number, Title / Type	Designing and developing an AI-augmented game (Home-Based Assignment)				
Date Set	22nd November 2022	Deadline Date	Deadlines listed in document.		
Student Name	Mikael Zammit	ID Number	3403L	Class / Group	MSD6.2B

Assessment Criteria	Maximum Mark
KU 1.2 - Describe AI Authoring.	5
AA 2.1 - Produce a storyboard for a game or multimedia.	7
AA 2.2 - Produce evidence supporting the choices made in the development of the game or multimedia.	7
AA 4.2 Compare codes developed autonomously with the industry standard artificial intelligence tools available.	7
KU 1.4 Outline the goal-driven autonomy.	5
KU 1.5 Describe the uses of Monte-Carlo Search Tree for strategy games and the use of combat artificial intelligence in FPS games.	5
KU 4.1 Describe available readymade artificial solutions.	5
KU 4.3 Identify and utilise readymade artificial intelligence tools already available.	5
AA 3.1 Produce an augmented game and/or multimedia.	7
SE 2.3 Evaluate the choices made within the storyboard in the development of the game or multimedia.	10
SE 3.4 Evaluate and justify techniques used and the final outcome.	10
KU 1.1 Describe crowd simulation using Swarm Intelligence.	5
KU 1.3 Describe the uses if pathfinding in games and navmesh agents.	5
AA 3.2 Prepare a final presentation to showcase the game or multimedia.	7
SE 3.3 Explain the soft computing and artificial intelligence techniques used.	10
Total Mark	100

Notes to Students:

- This assignment brief has been approved and released by the Internal Verifier through Classter.
- Assessment marks and feedback by the lecturer will be available online via Classter (Http://mcast.classter.com) following release by the Internal Verifier
- Students submitting their assignment on Moodle/Turnitin will be requested to confirm online the following statements:

Student's declaration prior to handing-in of assignment

- I certify that the work submitted for this assignment is my own and that I have read and understood the respective Plagiarism Policy

Student's declaration on assessment special arrangements

- I certify that adequate support was given to me during the assignment through the Institute and/or the Inclusive Education Unit.
- I declare that I refused the special support offered by the Institute.

2.2.1 Task 1: MCTS and Combat AI

MCTS [3] and Combat AI [1] in modern single-player games.

Monte-Carlo (MC) methods are indeed a popular strategy for intelligent game play. MC simulations were first utilized as an evaluation function within a traditional search tree. Backgammon, Clobber, and Phantom Go have all profited from MC simulations in this ability. Monte-Carlo Tree Search (MCTS) is a potential solution for one-player games in which the A* and IDA* methods fail. Then, a new MCTS variant known as Single-Player Monte-Carlo Tree Search was created. SP-MCTS vary from standard MCTS. Moreover, SP-MCTS employs a simple Meta-Search extension. [1] tested the method to a test on the puzzle named SameGame. Their SP- MCTS campaign ended up with the highest score on the normalized testing sample so far. [1] also investigated that Kuniaki Moribe formed SameGame in 1985 under the name Chain Shot!. This was distributed in a monthly personal allocation for the Fujitsu FM-8/7 series. Gekkan ASCII is a computer magazine. Eiji Fukumoto afterwards recreated the puzzle under the title SameGame in 1992. Billings has created the greatest SameGame program to date.

The ability of AI algorithms to model complex systems is an important selling point. Gamers are constantly striving to enhance the immersive experience and realism of their games. Reality, in contrast, is difficult to model. To take full responsibility for in-game complexity, AI algorithms in games can predict the consequences of player decision making as well as things like weather and emotions. As [2] mentions in regards to chemistry, the ultimate team mode in FIFA is a good demonstration of this technology in action. FIFA determines a team chemistry score based on the personality types of the players in a football club. The mood of the team varies from bad to great based on the outcome of the game (such as losing the ball, making a well-timed pass, etc.). Teams with better players may end up losing in this circumstance against weaker sides because of their morale. In this way, AI could be used to add another layer of complexity.

Often these existing games' AI is pre-programmed NPCs; however, this is soon to change. This tends to make them more hard to predict and enjoyable to engage with. AI has many benefits in the game. The most noticeable change is that as the game continues, NPCs are becoming more intelligent and react to the game world in unique and creative ways. Many gaming companies are already using AI in their games. Even though coding behavior into NPCs is time-consuming and demanding, this method will significantly accelerate NPC formation.

Bibliography

[1] E. Eliaçık, “Ai in gaming: A complete guide,” *Dataconomy*, 28-Aug-2022. [Online]. Available: https://dataconomy.com/2022/04/artificial-intelligence-games/. [Accessed: 04-Jan-2023].

[2] Maarten P.D. Schadd, Mark H.M. Winands, H. Jaap van den Herik, Guillaume M.J-B, Chaslot, and Jos W.H.M. Uiterwijk, “Single-player Monte-Carlo Tree Search - Maastricht University,” *Single-Player Monte-Carlo Tree Search*. [Online]. Available: https://dke.maastrichtuniversity.nl/m.winands/documents/CGSameGame.pdf. [Accessed: 04-Jan-2023].