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.

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