

Analysis of Development of Artificial Intelligence in the Game Industry



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Abstract

A game, sometimes known as a video game, is a form of modern technology-based game. Gaming is currently one of the major industries on the planet. Because gaming aficionados from all over the world number in the hundreds of millions, if not billions, this sector is very substantial. The game may be played on a PC, an Android device, or a game machine both offline and online. Artificial intelligence is also used in video games. Artificial Intelligence (AI) is artificial intelligence implemented on a computer system that allows players to compete against the computer in a game similar to that of other players. Artificial intelligence, often known as machine intelligence, is a mimic of human intellect that has been trained to think like humans. Artificial intelligence is a technology that uses data as knowledge in order for the intelligence created to improve and learn from prior failures. When employed by humans, artificial intelligence can be activated by human orders or by itself based on AI experience. The goal of this research was to figure out how artificial intelligence was progressing in the gaming business.

Keywords : Games, Artificial Intelligence, Industry.

1. Introduction

Technology advances at a breakneck pace. There is a lot of modernisation in many media in this digital era, one of which is amusement media, specifically games. A game, sometimes known as a video game, is a form of modern technology-based game [1]. The video game industry is now one of the largest in the world. Because of the large number of video game fans all around the world, this business is massive. The game may be played on a computer, smartphone, or gaming console, and can be played both offline and online.

There are game rules in the game, which describe how a game should be managed or performed in order for players to reach a certain objective or achievement. Artificial Intelligence is highly significant and vital in single player video games [2]. Artificial Intelligence or artificial intelligence placed in a game seeks to improve the gaming or playing experience for gamers (game players). In a game, Artificial Intelligence (AI) is frequently applied to NPCs (Non Playable Characters) to make them appear intelligent. In order for the game's



environment to feel more alive and authentic. For game creators, creating AI is a difficult task [3].

Artificial intelligence, often known as machine intelligence, is a mimic of human intellect that has been trained to think like humans. Artificial intelligence is a technology that uses data as knowledge in order for the intelligence created to improve and learn from prior failures [4]. When employed by humans, artificial intelligence can be activated by human orders or by itself based on AI experience. Artificial intelligence can repair itself since it is programmed to learn from its mistakes. Artificial intelligence can do one of the following four factors, namely; acting humanly or acting like a human, thinking humanly or thinking like a human, thinking rationally or thinking rationally and acting rationally or acting rationally [5].

The AI in the game can help the user improve their abilities. This is important for players because developers provide game experiences across a variety of devices. This technology is also important for developers because it allows them to change their skills aside from development skills. Game developers today must master this AI technique in order to create smarter, more realistic, and evolving games [6].

Artificial intelligence in games has been around for a long time. A responsive gaming experience is what AI in games refers to [7]. In game AI creation known as procedural in game data produced in programming and algorithms where each element is built specifically for the developer, it can usually be generated on NPCs that act on artificial intelligence as has been done with Radiant AI technology, in AI creation in games known as procedural in game data produced in programming and algorithms where each element is built specifically for the developer, in AI creation in games According to the Techjury website, the gaming business will be worth \$90 billion by 2020 [8].

2. Method

The implementation method used in this research is as follows:

1. Library

The library method is by reading and analyzing research studies related to writing.

2. Observation method

The method of observation is to conduct direct research on objects related to writing.

3. Needs Analysis

Needs analysis is the initial stage of this research. The goal is to collect information on hardware, software requirements, as well as content and system requirements in the game. The needs to be analyzed are obtained by observing the parties related to the research, and also by looking for references regarding similar games.

3. Results

The results of a review of the development of artificial intelligence or artificial intelligence in the game industry are as follows:

1. The earliest artificial intelligence games were played in the 1960s by two humans with no algorithms or computations. Consider Spacewar.
2. The game then began to evolve in 1974, with the introduction of adversaries and targets that forced players to follow the game's pattern. Game Fight was also published this year.

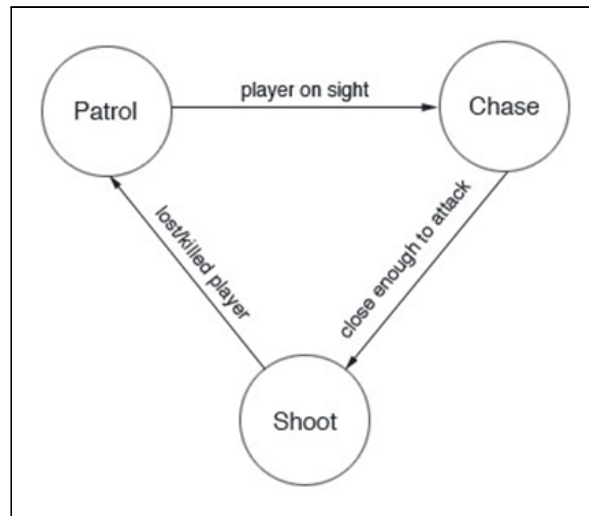


Figure 1. FSM Algorithm

3. In 1979, gaming tactics were determined using algorithms and computers. The mobility is still restricted, and there is a lag [9]. Consider the video game Pac-Man. The "Greedy Algorithm," in which the enemy pacman is programmed to discover the current quickest and most effective route or path from the opponent's position to the player character's position, is an example of an algorithm.

For the description of the selection function, among others:

1. If Player Pacman is to the right of the adversary, the enemy will chase or move to the right or left automatically.
2. When Player Pacman is on top of the adversary, the enemy will chase him or move up and down. Before the enemy is moved, it is first determined if the chase is practicable, that is, whether there are no hostile walls or barriers [10]. However, there are some disadvantages to the Breedy Algorithm, such as the fact that it does not verify all options and only chooses the best and relevant to the interpreted selection function.
3. The Finite State Machine algorithm was first used in 1990, and it basically uses if (if), which means that the NPC reacts if a parameter meets the requirements. For example, in FPS (First Person Shooter) games, if the player is seen by the NPC, the NPC will shoot the player; if the player hides, the NPC will chase the player. Because AI that implements this algorithm has a defined aim, its disadvantage is that it is easier to anticipate [11]. Because NPCs only have a few limited states or situations, players can simply predict what they will do.

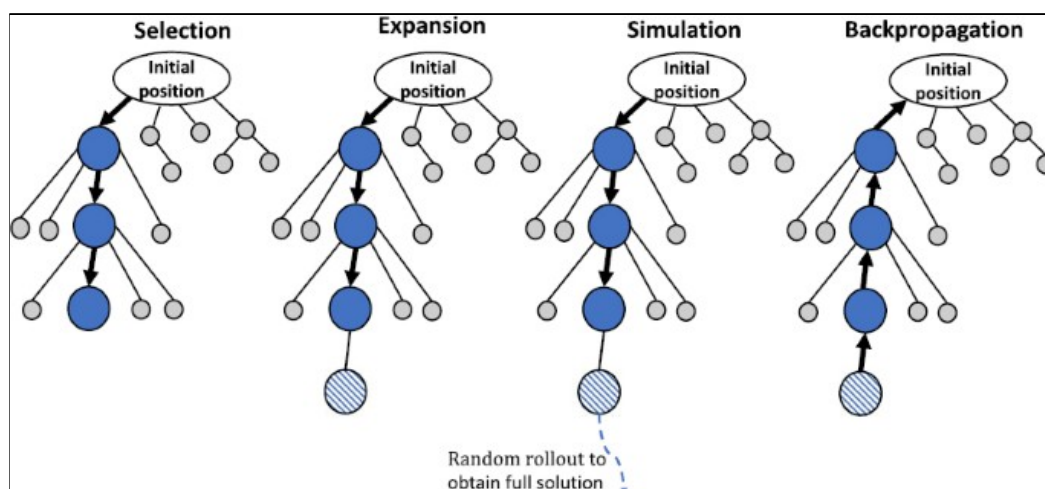


Figure 2. Monte Carlo Tree Search Algorithm

4. The capacity of artificial intelligence in games was further enhanced in 1996, with the addition of tactical reasoning, or the ability to make judgments in current environmental settings utilizing stages or processes [12]. For instance, deciding on the best path or plan.
5. Between 1999 and 2006, a crucial advance occurred: NPCs began to be able to detect the existence of other NPCs, allowing for a more reasonable and effective group strategy to be devised [13]. The use of AI during this time period gave NPCs the appearance of being separate beings. The game *Left 4 Dead*, which employs the Adaptive Dramatic Pacing algorithm, is one example of its utilization.
6. The Monte Carlo Search Tree Algorithm was employed in 2006. Monte Carlo Search Tree, unlike FSM, has more sophisticated and varied rooted derivatives [14]. Each state has its own likelihood percentage, which will be determined based on a subset of current conditions [15]. NPCs will seem more alive if this method is used since they will have several levels of considerations to make decisions and actions. Its use in the game *The Last of Us* is an example.

4. Conclusions

Every year, a review of artificial intelligence progress in the gaming business reveals that the capacity to produce intelligence continues to improve, although not dramatically. When it comes to enhancing the visuals and playability of games, artificial intelligence is sometimes disregarded. The implementation of AI, ranging from basic to AI that employs a variety of advanced algorithm approaches, has one common goal: to make the game more engaging and alive, hence attracting players' interest in playing the game.

There is a lot of modernisation in many media in this digital era, one of which is amusement media, specifically games. The video game industry is now one of the largest in the world. In a game, Artificial Intelligence (AI) is frequently applied to NPCs (Non Playable Characters) to make them appear intelligent. In order for the game's environment to feel more alive and authentic. Artificial intelligence is a technology that uses data as knowledge in order for the intelligence created to improve and learn from prior failures. Artificial intelligence can repair itself since it is programmed to learn from its mistakes. The earliest artificial intelligence games were played in the 1960s by two humans with no algorithms or computations. The game then began to evolve in 1974, with the introduction of adversaries and targets that

forced players to follow the game's pattern. The mobility is still restricted, and there is a lag. Consider the video game Pac-Man. When Player Pacman is on top of the adversary, the enemy will chase him or move up and down. The Finite State Machine algorithm was first used in 1990, and it basically uses if (if), which means that the NPC reacts if a parameter meets the requirements.

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