



Innovative Teaching Method

Course Name with code: Artificial Intelligence (CSC604) **SEM:**VI

Activity: GAME PLAYING ARTIFITIAL INTELLIGENCE

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Report of GAME PLAYING ARTIFITIAL INTELLIGENCE

Game Playing is an important domain of artificial intelligence. Games don't require much knowledge; the only knowledge we need to provide is the rules, legal moves and the conditions of winning or losing the game. Both players try to win the game. So, both of them try to make the best move possible at each turn. Searching techniques like BFS(Breadth First Search) are not accurate for this as the branching factor is very high, so searching will take a lot of time. So, we need another search procedures that improve –

- **Generate procedure** so that only good moves are generated.
- **Test procedure** so that the best move can be explored first.

Game playing is a popular application of artificial intelligence that involves the development of computer programs to play games, such as chess, checkers, or Go. The goal of game playing in artificial intelligence is to develop algorithms that can learn how to play games and make decisions that will lead to winning outcomes.

There are two main approaches to game playing in AI, rule-based systems and machine learning-based systems.

1. **Rule-based systems** use a set of fixed rules to play the game.
2. **Machine learning-based systems** use algorithms to learn from experience and make decisions based on that experience.

In recent years, machine learning-based systems have become increasingly popular, as they are able to learn from experience and improve over time, making them well-suited for complex games such as Go. For example, AlphaGo, developed by DeepMind, was the first machine learning-based system to defeat a world champion in the game of Go.

Game playing in AI is an active area of research and has many practical applications, including game development, education, and military training. By simulating game playing scenarios, AI algorithms can be used to develop more effective decision-making systems for real-world applications.



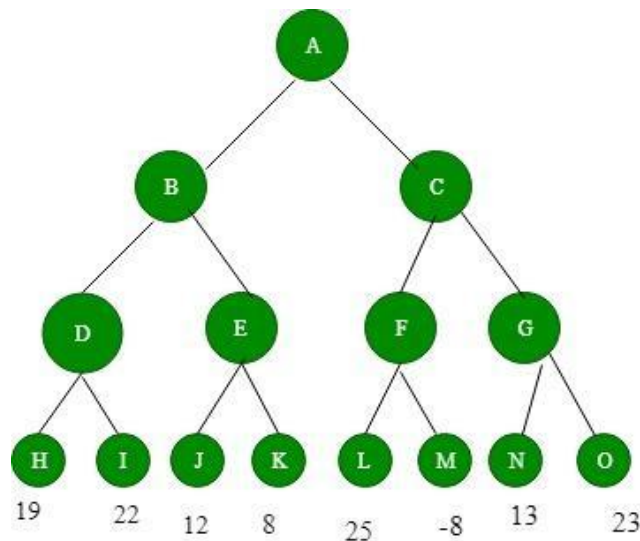
The most common search technique in game playing is [Minimax search procedure](#). It is depth-first depth-limited search procedure. It is used for games like chess and tic-tac-toe.

Minimax algorithm uses two functions –

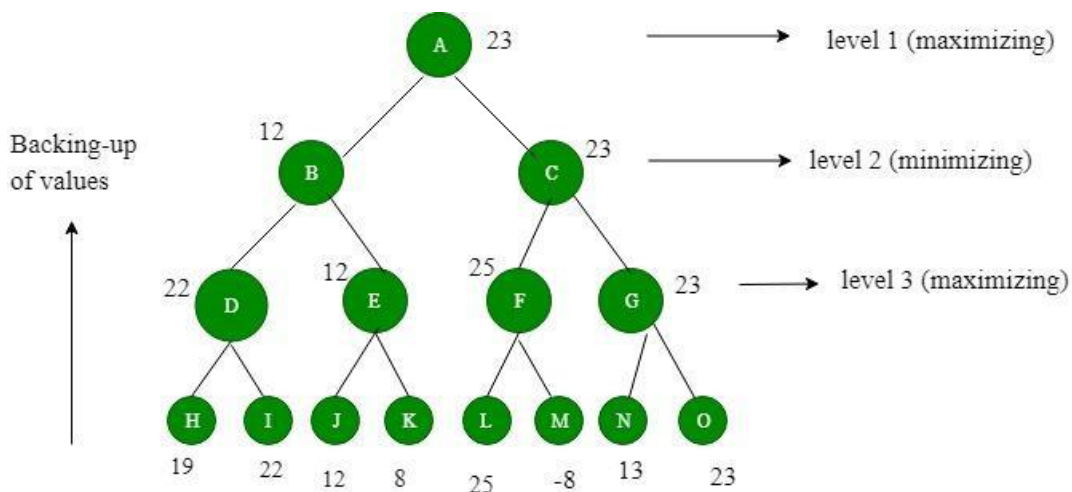
MOVEGEN : It generates all the possible moves that can be generated from the current position.

STATIC EVALUATION : It returns a value depending upon the goodness from the viewpoint of two-player

This algorithm is a two player game, so we call the first player as PLAYER1 and second player as PLAYER2. The value of each node is backed-up from its children. For PLAYER1 the backed-up value is the maximum value of its children and for PLAYER2 the backed-up value is the minimum value of its children. It provides most promising move to PLAYER1, assuming that the PLAYER2 has make the best move. It is a recursive algorithm, as same procedure occurs at each level.



Before backing-up of values





After backing-up of values We assume that PLAYER1 will start the game.

4 levels are generated. The value to nodes H, I, J, K, L, M, N, O is provided by STATICEVALUATION function. Level 3 is maximizing level, so all nodes of level 3 will take maximum values of their children. Level 2 is minimizing level, so all its nodes will take minimum values of their children. This process continues. The value of A is 23. That means A should choose C move to win.

Reference : Artificial Intelligence by Rich and Knight



Outcomes of Game Playing in AI:

- 1.Improves mental functions.
- 2.Memory and thinking skills may improve with Game practice in AI.

(PO, PSO) Mapping				
Topic of Innovative Teaching Method	PO	Mapping Level	PSO	Mapping Level
GAME PLAYING ARTIFITIAL INTELLIGENCE	9.Individual and team work	2	PSO1 and PSO2	2
	10.Communication	2		
	12. Life-long learning	2		



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