Table1: List of Searching Techniques used in AI towards problem solving

Name of the Algorithm	Type of the Algorithm	Advantage	Description	Limitation	Application
BFS	Uninformed Search	1.BFS will provide the solution with low cost. 2.BFS has the potential to find the goal.	BFS is a general-graph or tree searching algorithm, which searches in breadth wise starting from the root (HEAD) to following nodes.	1.Not memory efficient because BFS will store states (current) to expand through that. 2.Need more computationa l power	1.To find nodes(USERS) with-in the range. 2.Broadcasting in Network-to reach all nodes
DFS	Uninformed Search	1.We know BFS stores the states , but DFS no need to, as it follows a linear path(depth). less time complexity 2.Less time-complexit y	DFS searching algorithm Will start searching from the root and traverse through the depth to find the solution	1. Unlike BFS DFS will not guarantee a solution. 2.If the depth of a larger , time complexity will be high.	1.Topological sorting. 2.Finding Connected components.
UCS	Uninformed Search	1.UCS chooses the optimal path in each state. 2.UCS is optimal compared	UCS traverse through the tree or graph , Here cost wise searching happens , so unlike BFS,DFS .UCS will focus on cost for searching and reaching the goal	1.No information on goal location. 2.Explores different paths in each and every state.	1.Delivery software-(they can calibrate in every delivery) 2.Plane air route planner.
Best First Search	Informed Search	1.Best first search can switch between BFS and DFS by gaining the advantages of both the algorithms.	BFS always chooses the best path at that moment.	1.As it takes decision on each and every state , it may end up in a loop.	1.GPS Navigation systems. 2.Web Crawlers

A*	Informed Search	A* is the best algorithm and the smartest 1.Best Algorithm 2.less Time and memory .	A* is essentially a best-first search algorithm and popular techniques used for pathfinding and graph traversals.	1.cost is fixed 2.the speed is dependent on heuristic function.	1.Games 2.Web maps
AO*	Informed Search	1.It is an optimal algorithm than others. 2.And it can use OR and AND .	AO* algorithm is nothing but A* with AND-OR tree, which gives advantages, the main difference lies in the way termination conditions are determined, since all goals following an AND nodes must be realized; where as a single goal node following an OR node will do.	1.If the it gets unsolved goal,complexity will be high	1.Fintech 2.E-comm
Hill Climbing	Informed Search	1.Hill climbing is good if the value is continuous (Node). 2.If goal is in first maxima then high performance we can get	Hill Climbing is a heuristic search used for mathematical optimization problems in the field of Artificial Intelligence.	1.Local maxima 2.If it get same values , not possible to get best goal state	1.Automation 2.Map routing .

Table2: performance of Searching Techniques used in AI towards problem solving

Parameters	**BFA**	**DFS**	**UCS**			**Best First Search**	**A***	**AO***	**Hill Climbing**
Completeness	Yes	No	Yes			No	Yes	No	No
optimal	Yes	No	Yes			No	Yes	Yes	No
Heuristic	No	No	No			Yes	Yes	Yes	Yes
Time Complexity	O(b^s)	$O(b^d)$	O(b^(1 + C*/ε))			O(b^m)	O(b^d)	O(b^d)	O(b^d)
Space Complexity	O(b^s)	$O(bm)$	O(b^(1 + C*/ε))			O(b^m)	O(b^d)	O(bm)	O(b^d)

Table 3: Different heuristic Functions and its properties

Heuristic Function	**Properties of heuristic function**	**strength**	**Limitation**	**Application**
$f(n)=g(n)+h(n)$	Admissible	$h(n)\le g(n)$	$h_1(n)<h_2(n)$	8 Puzzle problem
	Combining heuristics		$h(s) \le h^*(s)$	
	Precomputing			