Research Review

Planning and serach are one of the core topic in artifical intellgence. In this article, we will try to go through three different searching method, which are The breadth-first search algorithm, The depth-First Search and A* search.

The breadth-first search starts from the root node, explores the neighboring nodes first and moves towards the next level neighbors. It generates one tree at a time until the solution is found. It can be implemented using FIFO queue data structure. This method provides shortest path to the solution.

The development of the breadth-first search algorithm help us to solve many problems in graph theory, such as finding the shortest path between two nodes u and v, with path length measured by number of edge.

After that, the depth-First Search is implemented in recursion with LIFO stack data structure. It creates the same set of nodes as Breadth-First method, only in the different order.
As the nodes on the single path are stored in each iteration from root to leaf node, the space requirement to store nodes is linear. With branching factor b and depth as m, the storage space is bm.

The development of the depth-First Search is being used to lots of algorithms for building block , such as Solving puzzles with only one solution, such as mazes or generating words in order to plot the Limit Set of a Group.

Finally, A* search is best-known form of Best First search. It avoids expanding paths that are already expensive, but expands most promising paths first.

The development of the A* search is being used to lots for the common pathfinding problem and graph traversal in applications such as using it in gaming.

Reference:

The breadth-first search -
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A* -
(http://web.mit.edu/eranki/www/tutorials/search/)