

Human - Information processing machine

Hobby :- History of words

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AI

## can Machines Think?

- Reasoning
- Learning
- Problem solving
- Perception

### History of AI:-

1941:- Need to do many connections even to run a single program.

1943- AI Neurons.

1950- Alan Turing → If a human is notable to determine whether he is talking to a machine or human? Questioner

1956- John McCarthy (AI name approved)

1966- 1st Chatbot - Eliza.

1972- 1st Intelligent Robot.

1997- Chess competition. (AI win)

### Forms of AI:-

Weak AI :- Solve a particular problem.  
Ex:- AI used to play chess.

Strong AI :- Difficult to create. It is general purpose AI that can demonstrate human abilities such as learning from experience, reasoning etc.

DSF JSP  
JUN

DSA, Basic Reasoning, Planning & Representations  
DBMS, Networking

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Agent :-

Agent

Percept  
(Sensors)

Environment

Effectors  
(Actuators Actions)

P → Performance

E → Environment

A → Actions

S → Sensors

(Pertinent types in best of  
this notebook.)

State-space representation:-

No. of states in which  
a problem can go. (from initial to  
final sol<sup>n</sup>)

S : { start, intermediate, goal }.

Uninformed search

- Search without information
- No knowledge
- Time consuming
- More complexity (Time & space)
- ex: DFS, BFS etc.
- ~~Optimal sol<sup>n</sup>~~

Informed search:

- Search with information.
- Use knowledge to find sol<sup>n</sup>.
- Quick sol<sup>n</sup>
- less complexity.
- ex: A\*, Heuristic DAs,  
Best first search.
- NO guarantee for optimal  
sol<sup>n</sup>.

guarantees

7.8K -  
SK + Harinder  
7.8K -

Random search.

SF  
Letters  
PQRS  
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Algorithm :-

- Step 1:- current node  $x$  = initial node.
- 2: If  $x$  = target node, stop with success.
- 3: Expand  $x$ , & get a set  $S$  of child nodes.
- 4: Select a node  $x'$  from  $S$  at random.
- 5:  $x = x'$  & return to step 2.

Q: Why random search is not good?

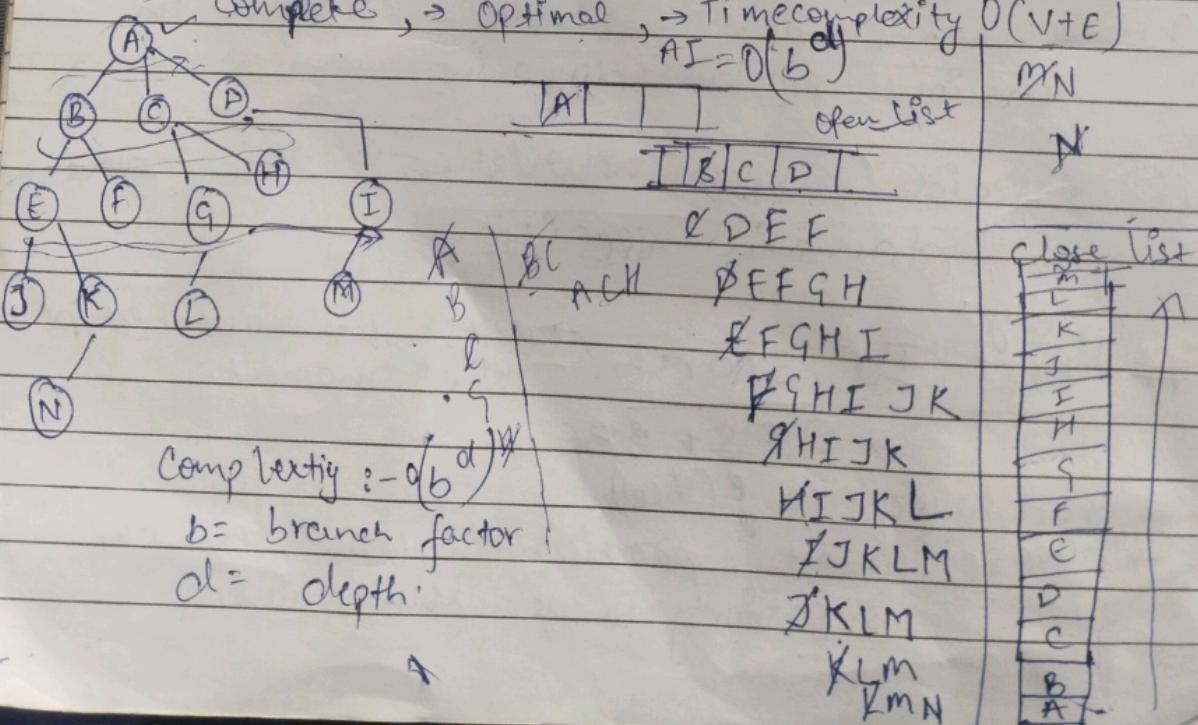
- At each step, next node is determined at random.
- ~~the~~ cannot guarantee to reach the target node; or even if we can reach the target, the path so obtained is very redundant (extremely long).

# BFS (Breadth First search):- (Not memory efficient)

→ (uninformed search technique)

→ Queue (FIFO),  $\rightarrow$  shallowest node.

→ Complete,  $\rightarrow$  Optimal,  $\rightarrow$  Time complexity  $O(V+E)$   
 $AI = O(b^d)$  DS.



## Open & close lists:-

BFS:-

Open list:- contains those states that are to be expanded. It is maintained as a queue.

Close list:- contains those states that have already expanded. It is maintained as a stack.

Heuristic search:- Informed search.

which is most effective way to achieve the good sol<sup>n</sup> in reasonable time.  
→ No guarantee to find best sol<sup>n</sup> but almost always finds a very good sol<sup>n</sup>.

2 Types:-

- ① General purpose heuristic - useful in various problem domains
- ② Special purpose heuristic - these are domain specific.

# Greedy Best Fit search: - selects which seems best at that moment.

→ PFS + BFS

→ use heuristic fn  $f(h_n)$ .

→ choose most promising node at each step.

Priority Queue = LIFO Queue.

AI.

OJSK

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Environment  $\Rightarrow$  In AI, it is the surrounding of the agent. The agent takes input from the environment through sensors & delivers output to environment through actuators.