Tutorial - 2

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Subject:- AI

DOP	DOS	mark	Sign

Aim: To understanding State space based problem formulation of AI problem so that problem Solving Agent can be applied

Theory:- first we understand the problem Solving agent program for problem solving agent. Agent first formulation goal and problem, then determine or rather Search an action sequence, after which it return the next action to be executed in sequence manner

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function Simple-Problem-Solving AGENT (percept) return an
                                                    action
Static: seq an action sequence initially empty
    state, some description of the current world state
    goal, a goal, initially null
    problem, a problem formulation
state ← UPDATE-STATE (state, percept)
  if seq is empty then do
    goal ← FORMULATE-GOAL (state)
    problem ← FORMULATE-PROBLEM (state, goal)
     seq ← SEARCH (problem)
     action ← FIRST (seq)
     seq ← REST (seq)
     return action
```

fig. Problem Solving Agent Architecture

Defining the problem is referred to as problem formulation
It involve defining following five thing:

Initial State:- It is the starting that the problem is in.

Action:- It define all possible action available to the agent given it is some state s currently. It is function Action(s) that return list of all possible action.

Transition model:- also know sucessor function which define state/s the system end to move to when a particular action is excute by the agent. Sucessive application of transition model gives rise to what is know as state space.

Goal Test:- This act as stopping condition when state passed to this function is goal state it will return true and searching would stop

path cost:- It is accumulated cost of performing certain sequence of action. This can help in determining weather the action sequence under consideration is optimal.

Working :-
Based on understanding of problem formulation Student need to formulate following problem. They will clearly show space up to depth level 3 or till node which ever is shallowest.

1) Navigate to KSCE workshop from HoD IT cabin with minimum number of moves, moves can be climbing or alighting staircase, turning left, right, walking through a corridor

2) 8 puzzle problem

3) The missionaries and cannibal problem. There are three missionaries and three cannibal who must cross river using a boat which can carray at most two people, under the constraint that, for both bank, if there are missionaries present on the bank, they cannot be outnumbered by cannibal if they The boat cannot cross river by itself with no people on board.

4) N queen problem, Arrange N queen on a N cross N Chess board where No two queen attack each other

5) Two room vacuum cleaner world

6) water jug problem