Tutorial No: 2

⇒ Tutorial No: 2 :- To understand State Space problem formulation

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⇒ Tutorial 2:- To understand State Space problem formulation

* Aim :- To understand State Space based problem formulation of AI problem so that problem solving Agent can be applied.

* Theory :- First we understand the problem solving agent Algorithm show in fig agent problem for problem solving agent. Agent first formulates goal & problem then determines or, gathers searches on the action sequence, after which it returns the next action to be executed in a sequential manner.

* Function :- SIMPLE-PROBLEM-SOLVING-AGENT (Percept) returns an Actions

* State :- Seq, an action sequence, initially empty State. Some description of the current word State goal, a goal initally null problem, a problem formulation

State ← Update-State (State, percept)
if Seq is empty then do
goal ← Formulate-Goal (State)

problem ← Formulate_problems (state, goal)
Seq ← Search (problem)
action ← First (Seq)
Seq ← Rest (Seq)
return ← action

Defining the problem is referred to as a problem formulation. It involves defining following five things:

⇒ Initial State :- It is the starting state the problem is in.

⇒ Actions :- It defines all possible actions available to the agent, given it is in some state currently. It is a function Action (s) that returns list of all poss actions.

⇒ Transition Model :- Also known as Succes function which define which state is the system tend to move to when a particular acto executed by the agent. Successive application of transition model gives rise to what is known as State Space.

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

⇒ Path Test :- This is accumulated cost of performing certain sequence of actions. This can help in determining weather the action sequence under consideration is optimal.

* Thus a problem can formally specified by identifying initial state, action, transition model, goal test and path cost. In term of problem solving agent solution is the path form initial state to a goal state optimal solution is the lowest path cost of all solutions process of finding a solution is called search.

* Working :- Based on understanding of problem formulation students need to formulate following problems. They will clearly show state space upto depth level 3 or till goal node which ever is shallowest.

1. Navigate to KGCE Workshop MOD IT Cabin with minimum number of moves, moves can be Climbing or alighting Staircase turning left, right, walking through Corridor.

2 8 puzzle problem.

3 The Mission aries and Cannibals problem There are Missionaries and three cannibals who must cross a river using a boat which can carry most two people and the constraint that, for both of banks, if there are Missionaries present on the bank they cannot be out numbered by cannibas if they were, the cannibals would eat the missionaries, The boat cannot cross the river by itself with no people onboard

4. N Queens problem, Array N Queens N cross N chess board.

5 Two doors Vaccum Cleaner world.

6. Water jug problem

Resources :- refer to Second Chapter from Artificial Intelligence. A Modern Approach.