Aim :- To understand state space. based problem Formation oF AI problems so that problem solving Agent can be applied.

Name :- Rutija Kamlakar Sawant

class :- BE/IT   Sem :- VII

Roll no :- 57   Batch :- I-3

Sub :- IS Lab.

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Aim :- To understand state space based problem formation of AI problems so that problem solving Agent can be applied.

Theory :- First we understand the problem solving agent Algorithm show in figure · shows agent program for problem solving agent. Agent first formulates goal & problem, then determines or rather searches an action sequence, after which it returns the next action to be executed in a sequential manner.

Function SIMPLE-PROBLEM-SOLVING-AGENT (Perecept) 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, Precept)
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.

Figure; Problem solving Agent Architecture.

Defining the Problem is refered to as problem formulation. It involves defining following five things:-

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

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

Transition Model :- Also known as successor function which define which state is the system tend to move to when a particular action is executed by the agent successive application of transaction model gives rise to what is known as state space.

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

Path Cost :- It 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, actions (operators), transition model (sucessor function) goal test & path cost. In term of problem solving agent solution is the lowest path cost of all solutions. Process of finding a so is called search.

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

1) Navigate to KGCE workshop from HOD IT cabin with minimum number of moves. Can be climbing or alighting staircase, turning left, right, walking throug a corridor.

2. 8 PUZZLE Problem.

3. The missionaries and cannibals problem. There are three missionaries and three cannibals who must cross a river using a boat which can carry at most two people. under the constraint that, for both banks, if there are missionaries present on the bank, they cannot be authnumbered by cannibals if they were, the cannibals would eat the missionaries, The bout cannot cross the river by itself with no people on board.

4. N. Queen's problem Arrange N queen on N cross N chess board where no two queens attack each other.

5. Two room vacuum cleaner World

6. Water Jug Problem.

Resources :- Refer to second chapter from Artifical Intelligence; A modern Approach.