Tutorial No 2

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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: They first understood the problem solving agent Algorithm shown in fig. & shows agent. Agent first formulate Goal & problem, then determine or rather searches an action sequences after which it return the next action to be executed in sequential manner.

Defining the problem is referred to as problem formulation it includes defining following five things.

Initial state it is the starting state that the problem is in.

Action is defining all possible action available, to agent Given it is in some state currently It is a function Action (s) that returns list of all possible actions.

Transition model also known as successor function,

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 formula here.
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.

Problem Solving Agent Algorithm

which define which states the system, tend to move to when a particular action is executed by the agent successive appln of transition 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 & searching would stop.

Path cost it is a accumulated cost of performing certain action sequence under consider action is optimal.

Thus a problem can formally specified by identifying initial state action transition model (successor function) Goal test & path cost in term of problem solving agent soln is the path from initial state to a Goal state. optimal soln is lowest path cost of all solution process of finding a solution is called search.

working! Based on understanding of problem formulation student need to formulate following problem. They will clearly show state space up to depth level 3 or till Goal node which ever is shallower.

1. Navigate to NGCE workshop from HOD IT cabin with min. no. of moves. can be climbing or alighting staircase turning left right, walking through a corridor.

2. 8 Puzzle problem

3. The missionaries & cannibals problem. There are the 3 missionaries & 3 cannibals who must cross a river using a boat which can carry at most 2 people. under constraint that for both banks. if there are missionaries present on the bank they cannot be outnumbered by cannibals. If they were, the cannibals would eat the missionaris. The boat cannot cross the river by itself with no people on Board.

4. N. Queen's problem Arrange N queens on a cross N chess board where no two queens attack same row column.

5. Two room vacuum cleaner world

6. Water jug problem.

Resources Refer to second chapter from Artificial Intelligence A modern Approach.