

Artificial Intelligence

Assignment-1 (tutorial)

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Abstract: In this report, I have briefed the problem related to finding and simulating path from source to destination in a grid using environment and agent class.

I. INTRODUCTION¹

An environment is everything in the world which surrounds the agent, but it is not a part of an agent itself. An environment can be described as a situation in which an agent is present.

An agent is anything that can be viewed as : perceiving its environment through sensors and acting upon that environment through actuators.

II. DESCRIPTION

A. Environment class

This class is responsible for creating environment pertaining to given set of values. Its attributes are, namely- grid, row, column.

For part-B (sound as source): new attribute goal position is added as hidden.

B. Agent class

This class is responsible for creating agent pertaining to given set of values, which can collect useful information from environment facilitating correct direction of movement. Its attributes are, namely-- current position. Functions-- moveup, movedown, moveleft, moveright.

For part-B (sound as source): new function calcDistance is added which takes current environment object and return distance from goal to current position.

C. Main

Its plays role in intiatiailizing classes with user input and simulate the path. It takes help from sensors of agent object in determining the movement direction.

III. ALGORITHM DESIGN

part A. ***source and goal are known:***

```
while currentPosX != goalX
    if currentPosX > goalX
        moveleft()
    if currentPosX < goalX
        moveright()
```

```
while currentPosY != goalY
    if currentPosY > goalY
        movedown()
    if currentPosY < goalY
        moveup()
```

part B. ***Agent return distance from goal***

```
while calcDistance() != 0
    moveup()
    if dist > currentDist
        dist ← currentDist
        move = up
    movedown()
    movedown()
    if dist > currentDist
        dist ← currentDist
        move = down
```

```

moveup()
moveleft()
if dist > currentDist
    dist ← currentDist
    move = left
moveright()
moveright()
if dist > currentDist
    dist ← currentDist
    move = right
moveleft()

if(move == up) -> moveup()
if(move == down) -> movedown()
if(move == left) -> moveleft()
if(move == right) -> moveright()

```

IV. EXPLANATION

(A) **Goal is known**

First, updating current X position until it becomes equal to goal's x-coordinate.

Then, updating current Y position until it becomes equal to goal's y-coordinate.

It will reach to goal in minimum steps possible.

(B) **Distance from goal is known**

At current position distance is calculated.

Now visiting each position (x+1,y), (x-1,y), (x,y+1), (x,y-1) and finding minimum position with next minimum distance.

Update current position to that position.

IV. CONCLUSION

It can be concluded that one can find path and reach from source to goal in a grid using both by knowing end points and also via distance from goal as parameters.