2.9) Reflex Agent Vacuum

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Made with:

Python 3.5

Requires: modules:

OS
Numpy
Collections

AI assumptions:

The performance measure awards one point for each clean square at each time step,over a "lifetime" of 1000 time steps.

The "geography" of the environment is known a priori (Figure 2.2) but the dirt distribution and the initial location of the agent are not. Clean squares stay clean and sucking cleans the current square. The Left and Right actions move the agent left and right except when this would take the agent outside the environment, in which case the agent remains where it is

The only available actions are Left, Right, and Suck

The agent correctly perceives its location and whether that location contains dirt

How this program works:

This program runs by navigating to the Vacuum AI folder and running the command:

"python ./Main.py"

If done correctly, the program should ask for a valid Environment CSV file:

The CSV file acts like the environment for the AI where:

empty blocks are walls
blocks with 0 are clean rooms
blocks with a number greater than 0 are dirty rooms

The program then asks for a starting X & Y position (0 indexed) for the vacuum.

The program will then run for 1000 steps or until the AI believes it has cleaned all that is can.

Remember: The AI can only move left and right

On termination the AI will print the environment state and it's performance score.

EXAMPLES:

Bored State: [1,1]

Initial position 0:

Location 0 is Dirty.
Location 0 has been Cleaned.
CANNOT MOVE LEFT, DOING NOTHING.
Moved Right
Location 1 is Dirty.
Location 1 has been Cleaned.
CANNOT MOVE RIGHT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: 1

initial position 1:

Location 1 is Dirty.
Location 1 has been Cleaned.
Moved Left
Location 0 is Dirty.
Location 0 has been Cleaned.
Moved Right
CANNOT MOVE RIGHT, DOING NOTHING.
Moved Left
CANNOT MOVE LEFT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: -1

Bored State: [1,0]

Initial position 0:

Location 0 is Dirty.
Location 0 has been Cleaned.
CANNOT MOVE LEFT, DOING NOTHING.
Moved Right
CANNOT MOVE RIGHT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: 0

initial position 1:

CANNOT MOVE RIGHT, DOING NOTHING.
Moved Left
Location 0 is Dirty.
Location 0 has been Cleaned.
CANNOT MOVE LEFT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: 0

Bored State: [0,1]

Initial position 0:

Moved Right
Location 1 is Dirty.
Location 1 has been Cleaned.
Moved Left
CANNOT MOVE LEFT, DOING NOTHING.
Moved Right
CANNOT MOVE RIGHT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: -2

initial position 1:

Location 1 is Dirty.
Location 1 has been Cleaned.
Moved Left
Moved Right
CANNOT MOVE RIGHT, DOING NOTHING.
Moved Left
CANNOT MOVE LEFT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: -2

Bored State: [0,0]

Initial position 0:

Moved Right
Moved Left
CANNOT MOVE LEFT, DOING NOTHING.
Moved Right
CANNOT MOVE RIGHT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: -3

initial position 1:

CANNOT MOVE RIGHT, DOING NOTHING.
Moved Left
CANNOT MOVE LEFT, DOING NOTHING.
Everything Should Be Clean
[0. 0.]
Performance Measurement: -1

Performance Average: -1