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CPTS 440

Artificial Intelligence

11-21-2019

Homework 11

1.

A)

U[2,2\*] = +1000, U[2,1,\*] = -1000, Goforward = 1, Turnleft & Turnright = 0.8

γ = 0.9.

Other States = -1

Equation: Reward+γ[(P(Turnleft))(Utility) + (P(DoNothing))(Utility) + (P(GoForward)(Utility))

Or Reward+γ[(P(DoNothing))(Utility) + (P(TurnRight))(Utility) + (P(GoForward)(Utility))

Utilities after 1 run through

|  |  |  |  |
| --- | --- | --- | --- |
| **State** | **Action** | **Equation** | **Utility** |
| [1,1,Right] | TurnLeft | -1 + (0.9) [(0.8)(0) + (0.2)(0) + (0)(-1000)] | -1 |
| [1,1,Up] | GoForward | -1 + (0.9) [(0)(0) + (0)(-1) + (1)(0)] | -1 |
| [1,1,Left] | TurnRight | -1 + (0.9) [(0.2)(0) + (0.8)(-1) + (0)(0)] | -1.72 |
| [1,1,Down] | TurnRight | -1 + (0.9) [(0.2)(-1) + (0.8)(-1.72) + (0)(0)] | -2.42 |
| [1,2,Right] | GoForward | -1 + (0.9) [(0)(0) + (0)(0) + (1)(1000)] | 899 |
| [1,2,Up] | TurnRight | -1 + (0.9) [(0.2)(0) + (0.8)(899) + (0)(0)] | 646.28 |
| [1,2,Left] | TurnRight | -1 + (0.9) [(0.2)(0) + (0.8)(646.28) + (0)(0)] | 464.32 |
| [1,2,Down] | TurnLeft | -1 + (0.9) [(0.8)(899) + (0.2)(464.32) + (0)(-2.42)] | 729.86 |

B)

Q([1,1,Right],TurnLeft) = -1, Q([1,1,Up],GoForward) = -1, Q([1,2,Up],TurnRight) = 646.28, Q([1,2,Right],GoForward) = 899, Q([2,2,Right],\*) = 1000

2. W = “the agent are the Wumpus”

W= [“the”, “agent”, “ate”, “the”, “wumpus”]

P(W1:4) =

3.

A)

S

NP

VP

NP

PP

VP

NP

preposition

article

noun

adjective

verb

digit

digit

smelly

is

3

1

in

Wumpus

the

B)

S

VP

PP

VP

NP

NP

VP

article

digit

digit

noun

Verb

adjective

preposition

the

Wumpus

is

smelly

in

2

3

C) No Parse

4.

C1,C3,C4,C6

P(phone|sequence)

•Onset, Onset, Mid, End

(0.5)\*[(0.3)(0.3)]\*[(0.7)(0.7)]\*[(0.1)(0.5)]\*(0.6) = **6.62 \* 10-4**

•Onset, Mid, Mid, End

(0.5)\*[(0.7)(0.2)]\*[(0.9)(0.7)]\*[(0.1)(0.5)]\*(0.6) = **1.32 \* 10-3**

•Onset, Mid, End, End

(0.5)\*[(0.7)(0.2)]\*[(0.1)(0.1)]\*[(0.4)(0.5)]\*(0.6) = **8.4 \* 10-5**

•Onset, Onset, End, End

Skips Middle Can’t Be Calculated