Elijah Andrushenko

CPTS 440

Artificial Intelligence

10-24-2019

Homework 8

1.

A)

Breeze = {¬$b_{1,1}$, ¬$b_{2,1}$, ¬$b_{3,1}$, ¬$b_{3,2}$, $b_{3,3}$}

Known = {¬$p_{1,1}$, ¬$p_{2,1}$, ¬$p_{3,1}$, ¬$p_{3,2}$, ¬$p_{3,3}$}

Frontier = {$p_{2,3}$, $p_{4,3}$}

Query = {$p_{3,4}$}

Other = {the other 8 spots}

B)

P(Pit3,4 | breeze, known)

P(Pit3,4 ^ breeze ^ known)

aP(Pit3,4 ^ breeze ^ known ^ unknown)

a$\sum_{unknown}$ P(Pit3,4 ^ breeze ^ known)

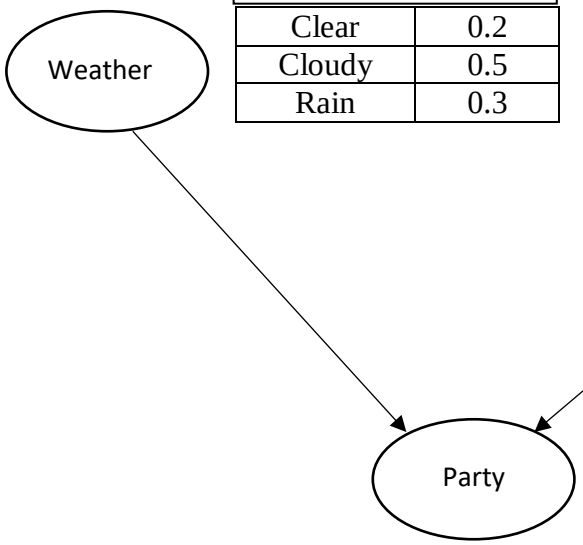
a$\sum_{frontier}(\sum_{other}$ P(Pit3,4 ^ breeze ^ known)

a$\sum_{frontier}(\sum_{other}$ P(breeze|Pit3,4 known frontier)$P(Pit3,4,known,frontier,other)$

a$\sum_{frontier}(\sum_{other}$ P(breeze|Pit3,4 known frontier)$P(Pit3,4,known,frontier,other)$

after plug and chug we get P(Pit3,4) = 0.31

2.



P(Weather)	
Clear	0.2
Cloudy	0.5
Rain	0.3

P(Costume)	
Yes	0.6
No	0.4

		P(MakeFriends|Party)	
Weather	Costume	Yes	No
Clear	Yes	0.7	0.3
Clear	No	0.4	0.6
Cloudy	Yes	0.6	0.4
Cloudy	No	0.3	0.7
Rain	Yes	0.5	0.5
Rain	No	0.2	0.8

3.

A) P(AIDone = true, Costume = false, Party = true, HaveFun = true, MakeFriends = true) =

(0.4) (0.7) (0.5) (0.6) (0.7) = **0.0588**

B) P(HaveFun = true | AIDone = false, Costume = true) =

P(Costume = true) * (P(Party) * P(HaveFun|Party) + P(!Party) * P(Fun|!Party)) =

0.3 * (0.4 * 0.6 + 0.6 * 0.2) = **0.108**

C) P(AIDone = true | HaveFun = true, MakeFriends = true) =

P(A|B) = (P(A) ^ P(B)) / P(B)

P(AIDone=true) * P(Party = true|AIDone = true) * P(HaveFun=true|Party=true)) * P(MakeFriends=true|Party=true) +

P(AIDone=true) * P(Party =false|AIDone = true) * P(HaveFun=true|Party=false)) * P(MakeFriends=true|Party=false)

= (0.4 * (0.9 * 0.3) * 0.6 * 0.7) + (0.4 * (0.1 * 0.3) * 0.2 * 0.4) = **0.04632**