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CS 440

HW 10

1.

a. P (BuyJersey = yes) = 7/11 = 0.63, P (BuyJersey = No) = 1 – P(BuyJersey) = 1 – 0.63 = 0.37

b. P(Weather = clear) = 4/11, P(Weather = cloudy) = 3/11, P (Weather = rainy) = 4/11
P(Weather = clear | BuyJersey = yes) = 3/7
P(Weather = clear | BuyJersey = no) = ¼
P(Weather = cloudy | BuyJersey = yes) = 2/7
P (Weather = cloudy | BuyJersey = No) = ¼
P (Weather = rainy | BuyJersey = Yes) = 2/7
P (Weather = rainy | Buyjersey = No) = 2/4

c. P(Uniform = Crimson | BuyJersey = Yes) = 6/7
P(Uniform = Crimson | BuyJersey = No) = 0/4
P (Unifrom = Gray | BuyJersey = Yes) = 1/7
P (Unifrom = Gray | BuyJersey = No) = 4/4

d. P(Win = yes | BuyJersey = Yes) = 4/7
P (Win = Yes | BuyJersey = No) = ¾
P(Win = No | BuyJersey = Yes) = 3/7
P(Win = No | BuyJersey = No) = 3/4

e. P (BuyJersey = yes | Weather = cloudy, Uniform = gray, Win = yes) = 0 = 1/2
P (BuyJersey = no | Weather = cloudy, Uniform = gray, Win = yes) = 0 = 1/2

f. Since both P (BuyJersey = yes | Weather = cloudy, Uniform = gray, Win = yes) and P (BuyJersey = no | Weather = cloudy, Uniform = gray, Win = yes) is 50%, both BuyJersey = yes and BuyJersey = no class are possible to be chosen.

2.

a.

Weather	Uniform	Win	BuyJersey
0	0	1	1
0	0	0	1
0	1	1	1
0	1	0	0
1	0	1	1
1	0	0	1
1	1	0	0
2	0	1	1
2	0	0	1
2	1	1	0
2	1	0	0

b. New instance: <Weather = 1, Uniform = 1, Win = 1>

Perceptron: $X_0W_0 + X_1W_1 + X_2W_2 + X_3W_3 = 1 + 1 + 1 + 1 = 4 \geq 0$. It would identify the new instance as YES.

c. J

Instance	Correct	W_0	W_1	W_2	W_3
0	NAN	1	1	1	1
1	True	1	1	1	1
2	True	1	1	1	1
3	True	1	1	1	1
4	False	1-0.5=0.5	1+0 = 1	1-0.5=0.5	1
5	True	0.5	1	0.5	1
6	True	0.5	1	0.5	1
7	False	0.5-0.5=0	1-0.5=0.5	0.5-0.5=0	1
8	True	0	0.5	0	1
9	True	0	0.5	0	1
10	False	-0.5	-0.5	-0.5	0.5
11	True	-0.5	-0.5	-0.5	0.5

d. New perceptron: -0.5*1-0.5*1-0.5*1-0.5*1-0.5*1 < 0
New perceptron would identify this new instanced as No