540 Artificial Intelligence

Homework 7

Jinyang Ruan

011696096

1. P (Win = true, Uniform = crimson, Weather = clear) = 0.18
2. P (Weather = clear) = 0.18 + 0.08 + 0.06 + 0.08 = 0.40
3. P (Uniform = crimson) = 0.18 + 0.08 + 0.05 + 0.06 +0.07 + 0.08 = 0.52
4. P (Win = true | Weather = clear) = P (Win = true, Weather = clear) / P (Weather = clear) = (0.18 + 0.08) / (0.4) = 0.65
5. P (Win = true | Weather = cloudy ∨ Weather = rainy)

= P (Win = true ∧ (Weather = cloudy ∨ Weather = rainy)) / P (Weather = cloudy ∨ Weather = rainy)

= (0.18 + 0.14) / (0.34 + 0.26)

= 0.32/0.60 0.53

1. Bayes rule and normalization:

**P** (Win | Practice = true ∧ Healthy = true)

= **P** (Practice = true ∧ Healthy = true | Win) \* **P** (Win) / P (Practice = true ∧ Healthy = true)

= \* **P** (Practice = true ∧ Healthy = true | Win) \* **P** (Win)

= < P (Practice = true ∧ Healthy = true | Win = true) \* P (Win = true), P (Practice = true ∧ Healthy = true | Win = false) \* P (Win = false) >

= <0.8\*0.7, 0.4\*0.3>

= <0.56, 0.12>

= 1 / (0.56+0.12) 1.47

**P** (Win | Practice = true ∧ Healthy = true) = <0.82, 0.18>



=

= **P** ()

=

=

Since *breeze* is independent of *other* given , *known*, and *frontier*:

=

=

Since , *known*, *frontier*, *other* are independent of each other:

=

=

Letting , and since :

=

=

Since ,

= +

+

+

+

+

+

=

=

2.78

1. If we know that there is a breeze in (3,3), then the *frontier* set is {}

=

Since

= +

+

+

+

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Thus, it will not change the probability of a pit in (2,2).