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CS 383

Professor Rattigan

Homework 6 Primer

1. a.

Leaf 1 = P(eat = yes | days < 7) = 2 / 3

Leaf 2 = P(eat = yes | days >= 7, moldy = no) = 3 / 4

Leaf 3 = P(eat = no | days >= 7, moldy = yes, tasty = no) = 1 / 1

Leaf 4 = P(eat = yes | days >= 7, moldy = yes, tasty = yes) = 2 / 2

b.

   A. Days = 13 >= 7, tasty = no, moldy = yes, eat = no

   B. Days = 3 < 7, tasty = no, moldy = yes, eat = yes

   C. Days = 147 >= 7, tasty = yes, moldy = yes, eat = yes

c.

Naive bayes classifier

P(class | attributes) = P(attributes | class) P(class) / P(attributes)

P(tasty = yes) = 5 /10

P(moldy = yes) = 5 / 10

P(eat = yes) = 7 / 10

meal = (days = 42, tasty = no, moldy = no)

P(yes | eat) = P(days >= 7 | eat = yes) P(tasty = no| eat = yes) P(moldy = no | eat = yes)

P(eat = yes) / P(eat)

= (5 / 10) * (2 / 10) * (4 / 10) * (7 / 10)

= ½ * ⅕ * ⅖ * 7/10

= 14 / 500 = 7 / 250 = 0.028

P(no | eat) = P(days >= 7 | eat = no) P(tasty = no| eat =no) P(moldy = no | eat =no)

P(eat = no) / P(eat)

= (2 / 10) * (3 / 10) * (1 / 10) * (3 / 10)

= ⅕ * 3/10 * 1/10 * 3/10

= 9 / 5000 = 0.0018

P(yes | eat) = 0.028 / (0.028 + 0.0018) = 0.939

P(no | eat) = 0.0018 / (0.028 + 0.0018) = 0.0604

P(yes | eat) > P(no | eat)

Prediction will be eat = yes