336551072 יבגני גאיסינסקי

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A screenshot of a computer

Description automatically generated with medium confidenceQ1.

|  |  |  |  |
| --- | --- | --- | --- |
| Value<= | 0 | 1 | Total |
| 1 | 1 | 0 | 1 |
| 1.5 | 2 | 1 | 3 |
| 1.7 | 2 | 2 | 4 |
| 2.1 | 2 | 3 | 5 |

|  |  |  |  |
| --- | --- | --- | --- |
| Value> | 0 | 1 | Total |
| 1 | 1 | 3 | 4 |
| 1.5 | 0 | 2 | 2 |
| 1.7 | 0 | 1 | 1 |
| 2.1 | 0 | 0 | 0 |

|  |  |  |  |
| --- | --- | --- | --- |
| Value<= | 0 | 1 | Total |
| 1 | 1 | 0 | 1 |
| 1.5 | 0.67 | 0.33 | 3 |
| 1.7 | 0.5 | 0.5 | 4 |
| 2.1 | 0.4 | 0.6 | 5 |

|  |  |  |  |
| --- | --- | --- | --- |
| Value> | 0 | 1 | Total |
| 1 | 0.25 | 0.75 | 4 |
| 1.5 | 0 | 1 | 2 |
| 1.7 | 0 | 1 | 1 |
| 2.1 | 0 | 0 | 0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Value<= | -plogp ->0 | -plogp ->1 | Total | |s1|/|s| |
| 1 | 0 |  | 0 | 0.2 |
| 1.5 | 0.39 | 0.53 | 0.92 | 0.6 |
| 1.7 | 0.5 | 0.5 | 1 | 0.8 |
| 2.1 | 0.53 | 0.44 | 0.97 | 1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Value> | -plogp ->0 | -plogp ->1 | Total | |s2|/|s| |
| 1 | 0.5 | 0.31 | 0.81 | 0.8 |
| 1.5 |  | 0 | 0 | 0.4 |
| 1.7 |  | 0 | 0 | 0.2 |
| 2.1 |  |  |  | 0 |

|  |  |  |
| --- | --- | --- |
| Value | E(A,T:S) | Info Gain |
| 1 | 0.2\*0+0.8\*0.81=0.648 | 0.97-0.648=0.322 |
| 1.5 | 0.6\*0.92+0.4\*0=0.552 | 0.448 |
| 1.7 | 0.8 | 0.17 |
| 2.1 | 0.97 | 0 |

Interval1: <=1.5 Interval2:>1.5

Q2.

Text, letter

Description automatically generatedText

Description automatically generated with low confidence

Diagram

Description automatically generated

A picture containing text

Description automatically generated

Not prune

Table

Description automatically generatedTable

Description automatically generatedQ3.

P(bought=’yes’)=9/15=0.6

P(bought=’no’)=6/15=0.4

Data to be classified:X=(income=high,season=Autumn,District=Suburban,House\_Type=Detached,Num of floors=2)

Compute P(X|Ci) for each class:

P(income=high |bought=’yes’)=3/9=0.33

P(income=high |bought=’no’)=5/6=0.83

P(season=Autumn |bought=’yes’)=3/9=0.33

P(season=Autumn |bought=’no’)=2/6=0.33

P(District=Suburban |bought=’yes’)=2/9=0.22

P(District=Suburban |bought=’no’)=3/6=0.5

P(House\_Type=Detached |bought=’yes’)=2/9=0.22

P(House\_Type=Detached |bought=’no’)=2/6=0.33

P(Num of floors=2|bought=’yes’)=3/9=0.33

P(Num of floors=2|bought=’no’)=3/6=0.5

**P(X|Ci)**:

P(X|bought=’yes’)=0.33\*0.33\*0.22\*0.22\*0.33=0.0017

P(X|bought=’no’)= 0.83\*0.33\*0.5\*0.33\*0.5=0.0226

**P(X|Ci)\*P(Ci):**

P(X|bought=’yes’)\* P(bought=’yes’)=0.0017\*0.6=0.00102

P(X|bought=’no’)\* P(bought=’no’)=0.0226\*0.4= 0.00904

**Therefore, X belongs to class (“bought= no”)**

Table

Description automatically generatedTable

Description automatically generated

Data to be classified:X=(income=high,season=Spring,District=Rural,House\_Type=Detached,Num of floors=2)

Compute P(X|Ci) for each class:

P(income=high |bought=’yes’)=3/9=0.33

P(income=high |bought=’no’)=5/6=0.83

P(season=Spring |bought=’yes’)=4/9=0.44

P(season=Spring |bought=’no’)=2/6=0.33

P(District=Rural |bought=’yes’)=4/9=0.22

P(District=Rural |bought=’no’)=0/6=0

P(House\_Type=Detached |bought=’yes’)=2/9=0.22

P(House\_Type=Detached |bought=’no’)=2/6=0.33

P(Num of floors=2|bought=’yes’)=3/9=0.33

P(Num of floors=2|bought=’no’)=3/6=0.5

**P(X|Ci)**:

P(X|bought=’yes’)=0.33\*0.44\*0.22\*0.22\*0.33=0.0023

P(X|bought=’no’)= Laplacian estimate=0.0013

**P(X|Ci)\*P(Ci):**

P(X|bought=’yes’)\* P(bought=’yes’)=0.0023\*0.6=0.00138

P(X|bought=’no’)\* P(bought=’no’)=0.0013\*0.4= 0.00052

**Therefore, X belongs to class (“bought= yes”)**

Table

Description automatically generated

Table

Description automatically generated

Data to be classified:X=(income=Low,season=Spring,District=Rural,House\_Type=Semi-Detached,Num of floors=1)

Compute P(X|Ci) for each class:

P(income=Low |bought=’yes’)=6/9=0.67

P(income=Low |bought=’no’)=1/6=0.17

P(season=Spring |bought=’yes’)=4/9=0.44

P(season=Spring |bought=’no’)=2/6=0.33

P(District=Rural |bought=’yes’)=4/9=0.22

P(District=Rural |bought=’no’)=0/6=0

P(House\_Type=Semi-Detached |bought=’yes’)=4/9=0.44

P(House\_Type=Semi-Detached |bought=’no’)=1/6=0.17

P(Num of floors=1|bought=’yes’)=6/9=0.67

P(Num of floors=1|bought=’no’)=3/6=0.5

**P(X|Ci)**:

P(X|bought=’yes’)=0.67\*0.44\*0.22\*0.44\*0.67=0.0191

P(X|bought=’no’)= Laplacian estimate=0.00298

**P(X|Ci)\*P(Ci):**

P(X|bought=’yes’)\* P(bought=’yes’)=0.0191\*0.6=0.01146

P(X|bought=’no’)\* P(bought=’no’)=0.00298\*0.4= 0.0.001192

**Therefore, X belongs to class (“bought= yes”)**