Input Data Set is:

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

1 sunny hot high Strong no

2 overcast hot high weak yes

3 rain mild high weak yes

4 rain cool normal weak yes

5 rain cool normal Strong no

6 overcast cool normal Strong yes

7 sunny mild high weak no

8 sunny cool normal weak yes

9 rain mild normal weak yes

10 sunny mild normal Strong yes

11 overcast mild high Strong yes

12 overcast hot normal weak yes

Target Attribute is: Target

Predicting Attributes: ['Outlook', 'Temperature', 'Humidity', 'Wind']

-----Information Gain Calculation of Outlook --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

2 overcast hot high weak yes

6 overcast cool normal Strong yes

11 overcast mild high Strong yes

12 overcast hot normal weak yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

3 rain mild high weak yes

4 rain cool normal weak yes

5 rain cool normal Strong no

9 rain mild normal weak yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

1 sunny hot high Strong no

7 sunny mild high weak no

8 sunny cool normal weak yes

10 sunny mild normal Strong yes

Target attribute class count(Yes/No)= {'yes': 4}

Total no of instances/records associated with overcast is: 4

Probability of Class yes is: 1.0000

Probability of Class yes is: 1.0000

Target attribute class count(Yes/No)= {'yes': 3, 'no': 1}

Total no of instances/records associated with rain is: 4

Probability of Class no is: 0.2500

Probability of Class yes is: 0.7500

Target attribute class count(Yes/No)= {'no': 3, 'yes': 2}

Total no of instances/records associated with sunny is: 5

Probability of Class no is: 0.4000

Probability of Class yes is: 0.6000

Target attribute class count(Yes/No)= {'no': 4, 'yes': 9}

Total no of instances/records associated with S is: 13

Probability of Class no is: 0.3077

Probability of Class yes is: 0.6923

Information gain of Outlook is : 0.2674250655956548

-----Information Gain Calculation of Temperature --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

4 rain cool normal weak yes

5 rain cool normal Strong no

6 overcast cool normal Strong yes

8 sunny cool normal weak yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

1 sunny hot high Strong no

2 overcast hot high weak yes

12 overcast hot normal weak yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

3 rain mild high weak yes

7 sunny mild high weak no

9 rain mild normal weak yes

10 sunny mild normal Strong yes

11 overcast mild high Strong yes

Target attribute class count(Yes/No)= {'yes': 3, 'no': 1}

Total no of instances/records associated with cool is: 4

Probability of Class no is: 0.2500

Probability of Class yes is: 0.7500

Target attribute class count(Yes/No)= {'no': 2, 'yes': 2}

Total no of instances/records associated with hot is: 4

Probability of Class no is: 0.5000

Probability of Class yes is: 0.5000

Target attribute class count(Yes/No)= {'yes': 4, 'no': 1}

Total no of instances/records associated with mild is: 5

Probability of Class no is: 0.2000

Probability of Class yes is: 0.8000

Target attribute class count(Yes/No)= {'no': 4, 'yes': 9}

Total no of instances/records associated with S is: 13

Probability of Class no is: 0.3077

Probability of Class yes is: 0.6923

Information gain of Temperature is : 0.05551064235231107

-----Information Gain Calculation of Humidity --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

1 sunny hot high Strong no

2 overcast hot high weak yes

3 rain mild high weak yes

7 sunny mild high weak no

11 overcast mild high Strong yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

4 rain cool normal weak yes

5 rain cool normal Strong no

6 overcast cool normal Strong yes

8 sunny cool normal weak yes

9 rain mild normal weak yes

10 sunny mild normal Strong yes

12 overcast hot normal weak yes

Target attribute class count(Yes/No)= {'no': 3, 'yes': 3}

Total no of instances/records associated with high is: 6

Probability of Class no is: 0.5000

Probability of Class yes is: 0.5000

Target attribute class count(Yes/No)= {'yes': 6, 'no': 1}

Total no of instances/records associated with normal is: 7

Probability of Class no is: 0.1429

Probability of Class yes is: 0.8571

Target attribute class count(Yes/No)= {'no': 4, 'yes': 9}

Total no of instances/records associated with S is: 13

Probability of Class no is: 0.3077

Probability of Class yes is: 0.6923

Information gain of Humidity is : 0.11036014405977657

-----Information Gain Calculation of Wind --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

1 sunny hot high Strong no

5 rain cool normal Strong no

6 overcast cool normal Strong yes

10 sunny mild normal Strong yes

11 overcast mild high Strong yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

2 overcast hot high weak yes

3 rain mild high weak yes

4 rain cool normal weak yes

7 sunny mild high weak no

8 sunny cool normal weak yes

9 rain mild normal weak yes

12 overcast hot normal weak yes

Target attribute class count(Yes/No)= {'no': 2, 'yes': 3}

Total no of instances/records associated with Strong is: 5

Probability of Class no is: 0.4000

Probability of Class yes is: 0.6000

Target attribute class count(Yes/No)= {'no': 2, 'yes': 6}

Total no of instances/records associated with weak is: 8

Probability of Class no is: 0.2500

Probability of Class yes is: 0.7500

Target attribute class count(Yes/No)= {'no': 4, 'yes': 9}

Total no of instances/records associated with S is: 13

Probability of Class no is: 0.3077

Probability of Class yes is: 0.6923

Information gain of Wind is : 0.01780102730053701

Attribute with the maximum gain is: Outlook

-----Information Gain Calculation of Temperature --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

4 rain cool normal weak yes

5 rain cool normal Strong no

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

3 rain mild high weak yes

9 rain mild normal weak yes

Target attribute class count(Yes/No)= {'yes': 1, 'no': 1}

Total no of instances/records associated with cool is: 2

Probability of Class no is: 0.5000

Probability of Class yes is: 0.5000

Target attribute class count(Yes/No)= {'yes': 2}

Total no of instances/records associated with mild is: 2

Probability of Class yes is: 1.0000

Probability of Class yes is: 1.0000

Target attribute class count(Yes/No)= {'yes': 3, 'no': 1}

Total no of instances/records associated with S- rain is: 4

Probability of Class no is: 0.2500

Probability of Class yes is: 0.7500

Information gain of Temperature is : 0.31127812445913283

-----Information Gain Calculation of Humidity --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

3 rain mild high weak yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

4 rain cool normal weak yes

5 rain cool normal Strong no

9 rain mild normal weak yes

Target attribute class count(Yes/No)= {'yes': 1}

Total no of instances/records associated with high is: 1

Probability of Class yes is: 1.0000

Probability of Class yes is: 1.0000

Target attribute class count(Yes/No)= {'yes': 2, 'no': 1}

Total no of instances/records associated with normal is: 3

Probability of Class no is: 0.3333

Probability of Class yes is: 0.6667

Target attribute class count(Yes/No)= {'yes': 3, 'no': 1}

Total no of instances/records associated with S- rain is: 4

Probability of Class no is: 0.2500

Probability of Class yes is: 0.7500

Information gain of Humidity is : 0.12255624891826566

-----Information Gain Calculation of Wind --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

5 rain cool normal Strong no

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

3 rain mild high weak yes

4 rain cool normal weak yes

9 rain mild normal weak yes

Target attribute class count(Yes/No)= {'no': 1}

Total no of instances/records associated with Strong is: 1

Probability of Class no is: 1.0000

Probability of Class no is: 1.0000

Target attribute class count(Yes/No)= {'yes': 3}

Total no of instances/records associated with weak is: 3

Probability of Class yes is: 1.0000

Probability of Class yes is: 1.0000

Target attribute class count(Yes/No)= {'yes': 3, 'no': 1}

Total no of instances/records associated with S- rain is: 4

Probability of Class no is: 0.2500

Probability of Class yes is: 0.7500

Information gain of Wind is : 0.8112781244591328

Attribute with the maximum gain is: Wind

-----Information Gain Calculation of Temperature --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

8 sunny cool normal weak yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

1 sunny hot high Strong no

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

7 sunny mild high weak no

10 sunny mild normal Strong yes

Target attribute class count(Yes/No)= {'yes': 1}

Total no of instances/records associated with cool is: 1

Probability of Class yes is: 1.0000

Probability of Class yes is: 1.0000

Target attribute class count(Yes/No)= {'no': 2}

Total no of instances/records associated with hot is: 2

Probability of Class no is: 1.0000

Probability of Class no is: 1.0000

Target attribute class count(Yes/No)= {'no': 1, 'yes': 1}

Total no of instances/records associated with mild is: 2

Probability of Class no is: 0.5000

Probability of Class yes is: 0.5000

Target attribute class count(Yes/No)= {'no': 3, 'yes': 2}

Total no of instances/records associated with S- sunny is: 5

Probability of Class no is: 0.4000

Probability of Class yes is: 0.6000

Information gain of Temperature is : 0.5709505944546686

-----Information Gain Calculation of Humidity --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

1 sunny hot high Strong no

7 sunny mild high weak no

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

8 sunny cool normal weak yes

10 sunny mild normal Strong yes

Target attribute class count(Yes/No)= {'no': 3}

Total no of instances/records associated with high is: 3

Probability of Class no is: 1.0000

Probability of Class no is: 1.0000

Target attribute class count(Yes/No)= {'yes': 2}

Total no of instances/records associated with normal is: 2

Probability of Class yes is: 1.0000

Probability of Class yes is: 1.0000

Target attribute class count(Yes/No)= {'no': 3, 'yes': 2}

Total no of instances/records associated with S- sunny is: 5

Probability of Class no is: 0.4000

Probability of Class yes is: 0.6000

Information gain of Humidity is : 0.9709505944546686

-----Information Gain Calculation of Wind --------

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

1 sunny hot high Strong no

10 sunny mild normal Strong yes

Grouped Attribute Values

Outlook Temperature Humidity Wind Target

0 sunny hot high weak no

7 sunny mild high weak no

8 sunny cool normal weak yes

Target attribute class count(Yes/No)= {'no': 1, 'yes': 1}

Total no of instances/records associated with Strong is: 2

Probability of Class no is: 0.5000

Probability of Class yes is: 0.5000

Target attribute class count(Yes/No)= {'no': 2, 'yes': 1}

Total no of instances/records associated with weak is: 3

Probability of Class no is: 0.3333

Probability of Class yes is: 0.6667

Target attribute class count(Yes/No)= {'no': 3, 'yes': 2}

Total no of instances/records associated with S- sunny is: 5

Probability of Class no is: 0.4000

Probability of Class yes is: 0.6000

Information gain of Wind is : 0.01997309402197489

Attribute with the maximum gain is: Humidity

The Resultant Decision Tree is:

{'Outlook': {' overcast': 'yes', ' rain': {'Wind': {'Strong': 'no', 'weak': 'yes'}}, ' sunny': {'Humidity': {'high': 'no', 'normal': 'yes'}}}}