

Assignment 1
Machine Learning



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I have selected 3 features from the image of bird, Input is represented as a set of three attributes:

1. **Wings** <Yes , No>
2. **Eye size** <Small, Medium, Large>
3. **Beak** <Presence, Absence>

Output is:

1. **Bird**: <True, False> means bird or not.

Instance Space:

In bird identification problem:

- Three attributes, Wings, Eye size and Beak.
- Wings has 2 possible values, Eye size has 3 possible values, Beak has 2 possible values.
- Size of instance space, $|X| = 2 \times 3 \times 2 = 12$

X	Eye size	Wings	Beak	Output
X1	Small	Yes	Presence	-
X2	Small	Yes	Absence	-
X3	Medium	Yes	Presence	-
X4	Medium	Yes	Absence	-
X5	Large	Yes	Presence	-
X6	Large	Yes	Absence	-
X7	Small	No	Presence	-
X8	Small	No	Absence	-
X9	Medium	No	Presence	-
X10	Medium	No	Absence	-
X11	Large	No	Presence	-
X12	Large	No	Absence	-

Concept Space:

In bird identification problem

- $|C| = 2^{|X|} = 2^{12} = 4096$

X	Eye size	Wings	Beak	Output
X1	Small	Yes	Presence	C(X1)
X2	Small	Yes	Absence	C(X2)
X3	Medium	Yes	Presence	C(X3)
X4	Medium	Yes	Absence	C(X4)
X5	Large	Yes	Presence	C(X5)
X6	Large	Yes	Absence	C(X6)
X7	Small	No	Presence	C(X7)
X8	Small	No	Absence	C(X8)
X9	Medium	No	Presence	C(X19)
X10	Medium	No	Absence	C(X10)
X11	Large	No	Presence	C(X11)
X12	Large	No	Absence	C(X12)
.....
X4096				C(X4096)

Matrix:

- $2^{12} = 4096$ unique combinations

0	0	0
0	0	0
0	0	0
0	0	0

C1

1	0	0
0	0	0
0	0	0
0	0	0

C2

0	0	0
1	0	0
0	0	0
0	0	0

C3

.....

1	1	1
1	1	1
1	1	1
1	1	1

C4096