Data Science & Artificial Intelligence

Machine Learning

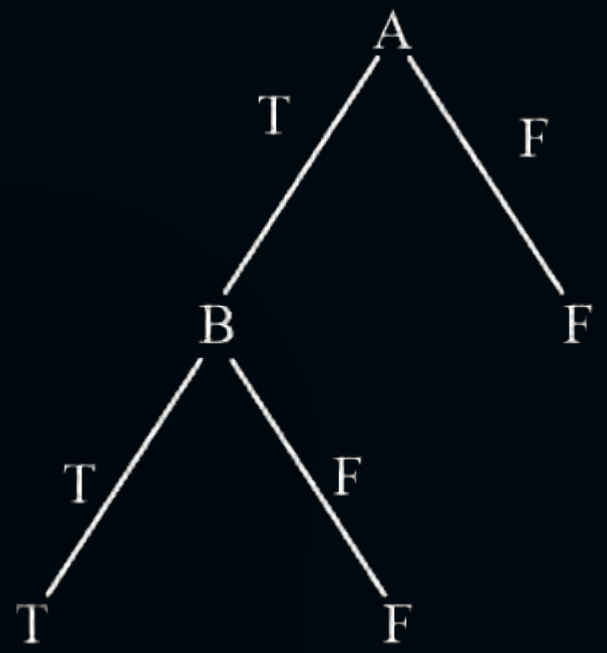
Decision Tree
Discussion Notes

DPP.- 1

By- Astha Ma'am

[MCQ]

#Q. What does the following figure represent?



A	B	A & B
F	F	F
F	T	F
T	T	T
T	F	= F

A Decision tree for OR

B Decision tree for AND

C Decision tree for XOR

D Decision tree for XNOR

[MCQ]

#Q. Consider the dataset given below where T and F represent True and False respectively. What is the entropy H (Rain)?

Temperature	Cloud	Rain
Low	T	T
Low	T	T
Medium	T	F
Medium	T	T
High	T	F
High	F	F

Entropy H(Rain) = ?

Rain (T) = 3 times
Rain (F) = 3 times

$$H(Rain) = \sum_{i=1}^{n} P(x_i) \log_2 P(x_i)$$

Probability →

$T = \frac{3}{6} = 0.5$ $\quad F = \frac{3}{6} = 0.5$

$H(Rain) = -(0.5 \log_2 0.5 + 0.5 \log_2 0.5)$

$\log_2 0.5 = -1$

A 1

B 0.5

C 0.2

D 0.6

[MCQ]

#Q. Given the entropy for a split, Esplit = 0.39 and the entropy before the split, Ebefore = 1. What is the Information Gain for the split?

(IG) — Measure Reduction in entropy

A 1

B 0.39

C 0.61

D 2.56

IG = Ebefore − Esplit

Ebefore = 1

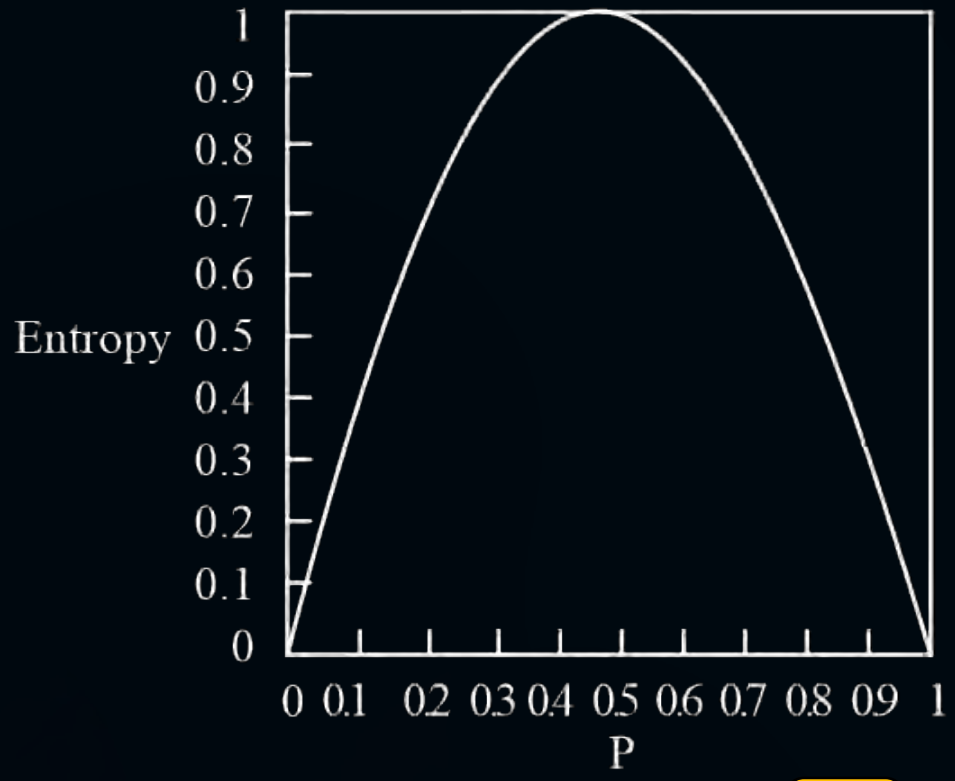
Esplit = 0.39

IG

1 − 0.39 = 0.61

[MCQ]

#Q. What is the entropy at P = 0.5 from the given figure?



$E = -p \log_2 p - q \log_2 q$

$p = 0.5$

$q = 1 - p = 1 - 0.5 = 0.5$

$p = 0.5$ $q = 0.5$

Entropy = $(-0.5 \times \log_2 0.5) - (0.5 * \log_2 0.5)$

$= 0.5 + 0.5$

$= 1$

A 0.5

B −0.5

C 1

D −1

[MCQ]

#Q. Given entropy of parent = 1, weights average = $\left(\frac{3}{4}, \frac{1}{4}\right)$ and entropy of children = (0.9, 0). What is the information gain?

A 0.675

B 0.75

C 0.325

D 0.1

IG = Entropy(Parent) − Σ(weight-average × entropy(child) Infⁿ

⇒ 1 − (1 − ($\frac{3}{4}$ × 0.9 + $\frac{1}{4}$ × 0))

= 0.325

[MCQ]

#Q. Which of the following statements is not true about the Decision tree?

Data Mining application

A. A Decision tree is also known as a classification tree

B. Each element of the domain of the classification in decision tree is called a class

C. It is a tree in which each internal node is labeled with an input feature

D. It cannot be used in data mining applications as it only classifies but not predicts anything

THANK - YOU