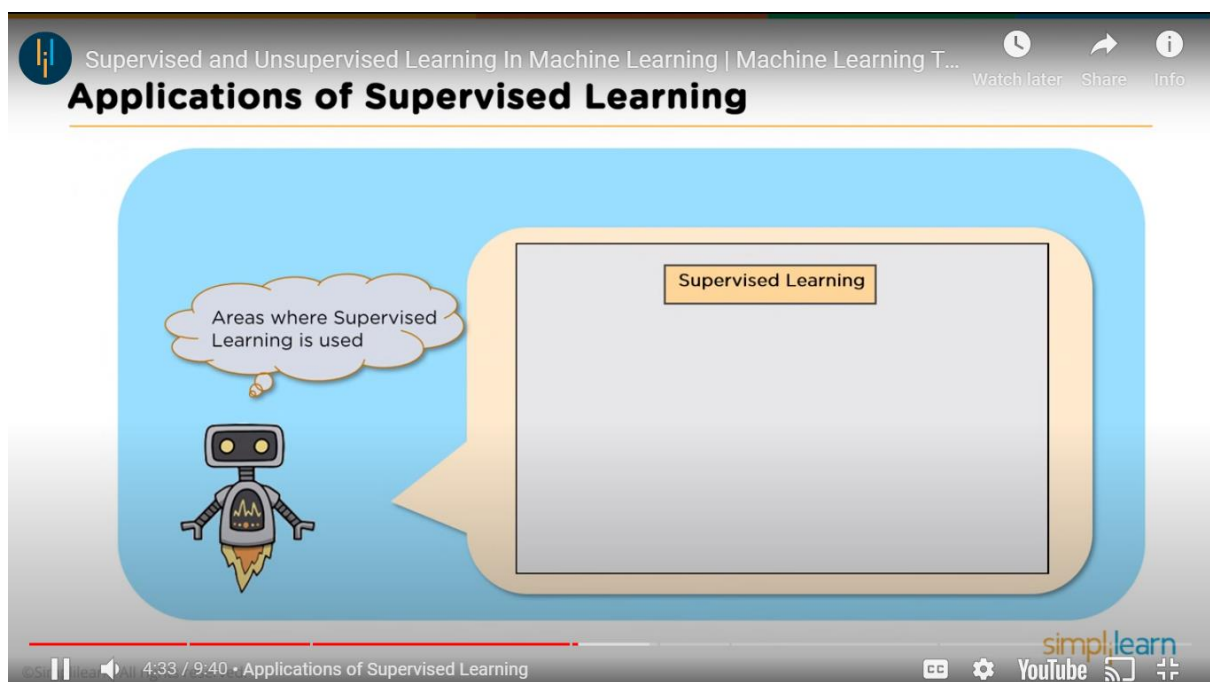
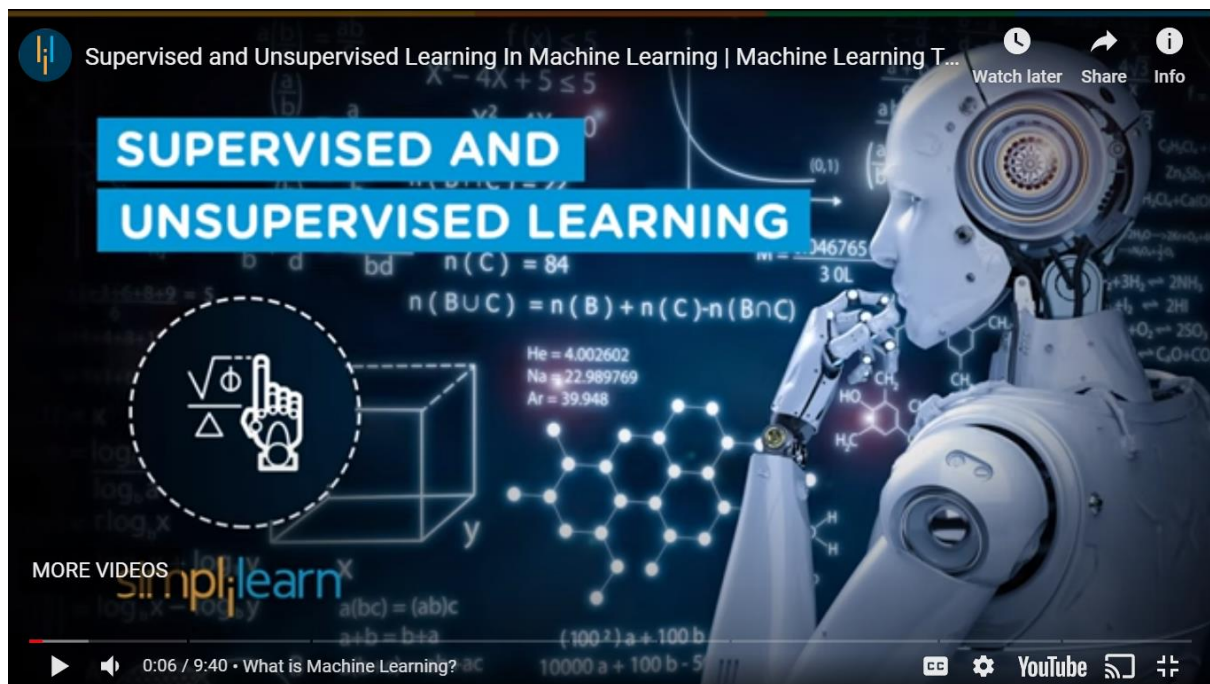


Developing a Flight Delay Prediction Model using Machine Learning

Team ID-PNT2022TMID27775

Prior Knowledge:

Supervised and unsupervised learning:



Regression Classification and Clustering:



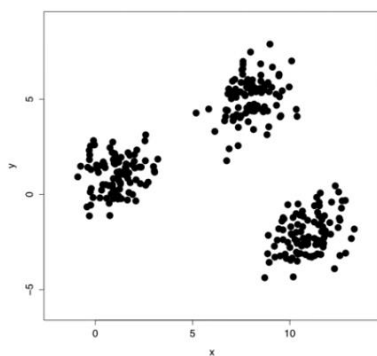
INTRODUCTION TO MACHINE LEARNING

Classification Regression Clustering



k-Means

Cluster data in **k** clusters!



Flask:

A banner for a Flask tutorial. It features a blue background with a faint image of a man coding. On the right, there's a large monitor displaying the Python logo and the Flask logo. Several small figures are interacting with the monitor. The text 'Flask Tutorial for Beginners' is prominently displayed in white. Below it, the URL 'www.edureka.co/python' is shown. The 'edureka!' logo is in the bottom left, and a 'SUBSCRIBE' button is in the bottom right.

Flask Tutorial for Beginners

edureka!

www.edureka.co/python

SUBSCRIBE

Flask – Redirect & Errors



Standardized status codes

Prototype



Flask.abort(code)

| Sl.no | Status Code |
|-------|----------------------------|
| 1 | HTTP_300_MULTIPLE_CHOICES |
| 2 | HTTP_301_MOVED_PERMANENTLY |
| 3 | HTTP_302_FOUND |
| 4 | HTTP_303_SEE_OTHER |
| 5 | HTTP_304_NOT_MODIFIED |
| 6 | HTTP_305_USE_PROXY |
| 7 | HTTP_306_RESERVED |

| Sl.no | Code | Description |
|-------|------|------------------------|
| 1 | 400 | Bad Request |
| 2 | 401 | Unauthenticated |
| 3 | 403 | Forbidden |
| 4 | 404 | Not Found |
| 5 | 406 | Not Acceptable |
| 6 | 415 | Unsupported Media Type |
| 7 | 429 | Too Many Requests |

edureka!

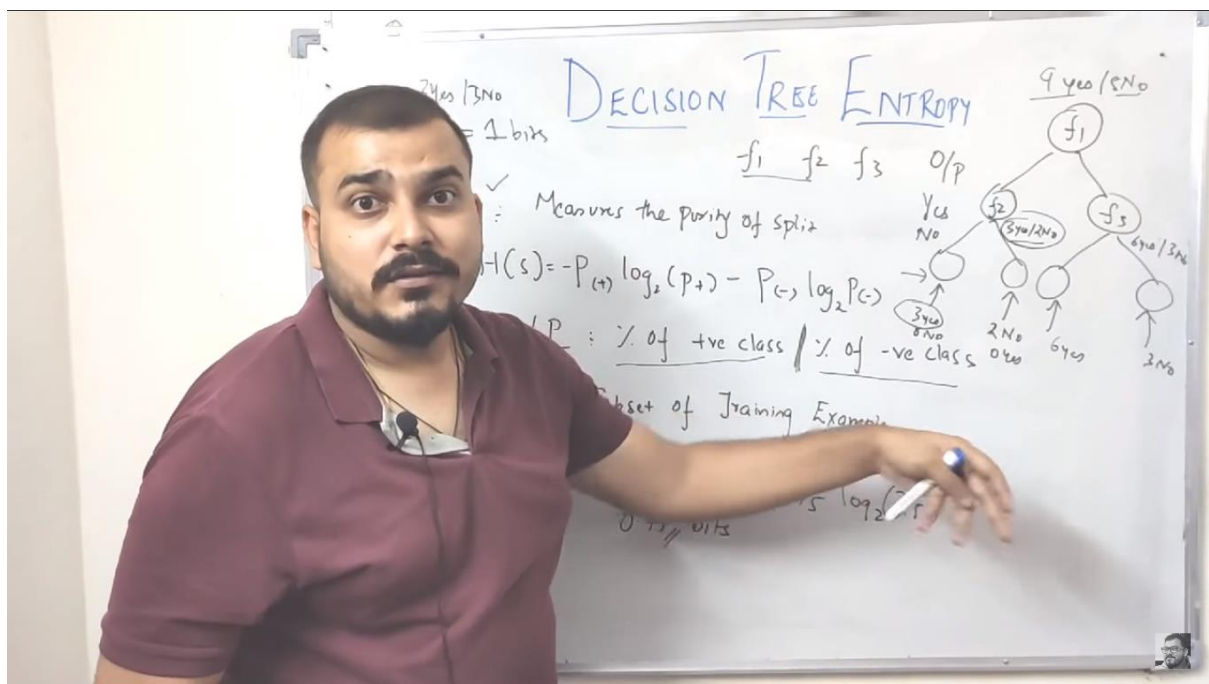
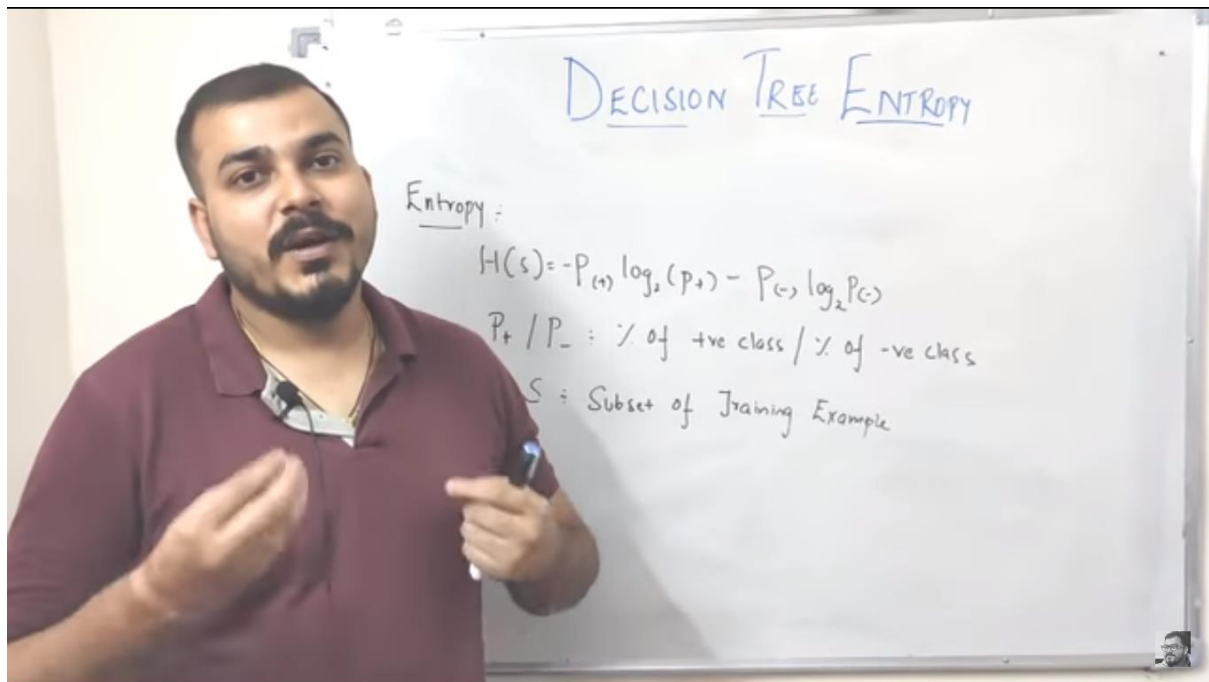
Python Certification Training

www.edureka.co/python



Decision Tree:

Entropy in Decision Tree Intuition:



Decision Tree information gain

DECISION TREE INFORMATION GAIN

① ENTROPY

0 to 1 bit

Formula: $H(S) = -P_1 \log_2 P_1 - P_2 \log_2 P_2 - \dots - P_n \log_2 P_n$

Example: $H(S) = -\frac{6}{8} \log_2 \frac{6}{8} - \frac{2}{8} \log_2 \frac{2}{8} = 0.81$

② Information Gain

Formula: $\text{Gain}(S, A) = H(S) - \sum_{v \in \text{VALUE}(A)} \frac{|S_v|}{|S|} H(S_v)$

Example: $H(f_1) = 0.94$

Tree structure for f_1 :

```

graph TD
    f1((f1)) -- 94/15N --> f2((f2))
    f1 -- 34/13N --> f3((f3))
    f2 -- 64/12N --> f1_1((f1))
    f2 -- 24/10N --> f2_1((f2))
    f3 -- 34/13N --> f3_1((f3))
    
```

Entropy values: $H(f_2) = 0.81$, $H(f_3) = 1$

Calculation: $\text{Gain}(S, f_1) = H(S) - \frac{8}{14} H(f_2) - \frac{6}{14} H(f_3) = 0.91 - \frac{8}{14} \times 0.81 - \frac{6}{14} \times 1 = 0.049$

DECISION TREE INFORMATION GAIN

① ENTROPY

0 to 1 bit

Formula: $H(S) = -P_1 \log_2 P_1 - P_2 \log_2 P_2 - \dots - P_n \log_2 P_n$

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Gini Impurity intuition in depth in Decision Tree:

Tutorial 39- Gini Impurity Intuition In Depth In Decision Tree

GINI IMPURITY DT

| f_1 | f_2 | f_3 | %p |
|-------|-------|-------|-----|
| C_1 | D_1 | | Yes |
| C_2 | D_2 | | Yes |
| | | | No |
| | | | No |
| | | | Yes |
| | | | ... |

① Entropy

$$H(S) = -P_+ \log_2 P_+ - P_- \log_2 P_-$$

② GINI IMPURITY

$$GI = 1 - \sum_{i=1}^n (P_i)^2$$

$$= 1 - [(P_+)^2 + (P_-)^2]$$

0:38 / 11:13

GINI IMPURITY DT

| f_1 | f_2 | f_3 | %p |
|-------|-------|-------|-----|
| C_1 | D_1 | | Yes |
| C_2 | D_2 | | Yes |
| | | | No |
| | | | No |
| | | | Yes |
| | | | ... |

① Entropy

② GINI IMPURITY

$$GI = 1 - \sum_{i=1}^n (P_i)^2$$

$$= 1 - [(P_+)^2 + (P_-)^2]$$

$$= 1 - [(3/6)^2 + (3/6)^2]$$

$$= 1 - [0.25 + 0.25]$$

$$= 0.5$$

③ Decision Tree Example

Root Node: f_1

Left Branch: C_1 (3Y/3N) → Leaf Node

Right Branch: C_2 (3Y/3N) → Leaf Node

Entropy at Root: $H(S) = -\frac{3}{6} \log_2 \frac{3}{6} - \frac{3}{6} \log_2 \frac{3}{6} = 1$

Entropy at Leaf Nodes: $H(S) = 0$