

PRIOR KNOWLEDGE

Project Name	Developing a flight delay prediction model using machine learning.
Team id	PNT2022TMID00047

Supervised and unsupervised learning:

Supervised and Unsupervised Learning In Machine Learning | Machine Learning Tutorial | Simpli...

What is Machine Learning?

Machine Learning is the science of making computers learn and act like humans by feeding data and information without being explicitly programmed!

05:53 / 9:39 • What is Machine Learning?

simplilearn YouTube

Supervised and Unsupervised Learning In Machine Learning | Machine Learning Tutorial | Simpli...

Applications of Unsupervised Learning

Areas where Unsupervised Learning is used

```
graph TD; UL[Unsupervised Learning] --- MBA[Market Basket Analysis]; UL --- DSO[Delivery Store Optimization]; UL --- SC[Semantic Clustering]; UL --- IAPA[Identifying Accident Prone Areas];
```

8:24 / 9:39 • Applications of Unsupervised Learning

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Regression Classification and Clustering :

 DataCamp

Machine Learning in R - Classification, Regression and Clustering Problems


Introduction to Machine Learning  [Watch Later](#) [Share](#)

Common ML Problems


- **Classification**
- **Regression**
- **Clustering**



  0:26 / 6:40 • Introduction 

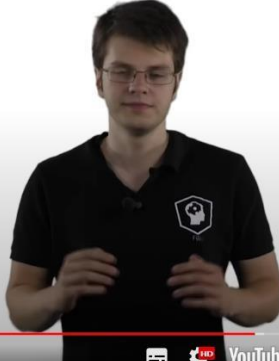
 DataCamp




Machine Learning in R - Classification, Regression and Clustering Problems

Introduction to Machine Learning  [Watch Later](#) [Share](#)

Clustering

- **Clustering:** grouping objects in clusters
 - *Similar* within cluster
 - *Dissimilar* between clusters
- **Example:** Grouping similar animal photos
 - No labels
 - No **right** or **wrong**
 - Plenty possible clusterings



  6:10 / 6:40 • Applications of Regression 

Flask:

Python Flask Tutorial For Beginners | Flask Web Development Tutorial | Python Training | Edureka

Introduction to Flask

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The diagram shows the Python logo at the top left. Below it, a central flow shows 'Libraries' and 'Modules' leading to a 'Web Developer' (represented by a person at a computer). This leads to an 'APPLICATION' (represented by a paint roller icon). Below this, a comparison is shown: 'Life without Flask!' (a person looking frustrated at a computer) versus 'Using Flask!' (a person smiling at a computer), with a green arrow pointing from the former to the latter.

What is a Web Framework?

Libraries Modules Web Developer APPLICATION

Life without Flask! Using Flask!

Python Certification Training

www.edureka.com YouTube

Python Flask Tutorial For Beginners | Flask Web Development Tutorial | Python Training | Edureka

Flask – Extensions

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The diagram starts with the Python logo. Below it, a box states 'Flask is a micro framework'. This leads to 'Large number of extensions'. Four boxes branch out: 'Flask Mail', 'Flask WTF', 'Flask SQLAlchemy', and 'Flask Sijax'. Each box has a description below it: 'Provides SMTP interface to Flask application', 'Adds rendering & validation of WTForms', 'Adds SQLAlchemy support to Flask Application', and 'Interface for Sijax – Python/jQuery library that makes AJAX easy to use'. All four descriptions lead to a final box at the bottom: 'Extensive Documentation'.

Flask is a micro framework

Large number of extensions

Flask Mail Flask WTF Flask SQLAlchemy Flask Sijax

Provides SMTP interface to Flask application Adds rendering & validation of WTForms Adds SQLAlchemy support to Flask Application Interface for Sijax – Python/jQuery library that makes AJAX easy to use

Extensive Documentation

Python Certification Training

www.edureka.com YouTube

Decision Tree:

Entropy in Decision Tree Intuition:

Tutorial 37: Entropy In Decision Tree Intuition

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Entropy:

$$H(s) = -P(+)\log_2 P(+)$$

+ve class / % of -ve

Example

0:24 / 8:58

YouTube

Tutorial 37: Entropy In Decision Tree Intuition

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DECISION TREE ENTROPY

f_1 f_2 f_3 o/p

Yes No

3Yes/3No = 1 bits

Entropy: Measures the purity of split

$$H(s) = -P(+)\log_2 P(+)$$

P_+ / P_- : % of +ve class / % of -ve class

S : Subset of Training Example

$$= -\frac{3}{5}\log_2\left(\frac{3}{5}\right) - \left(\frac{2}{5}\log_2\left(\frac{2}{5}\right)\right)$$

0.79 bits

9 Yes / 5 No

3Yes/3No

2No/0Yes

6Yes/3No

2No

0

1

8:07 / 8:58

YouTube

Decision Tree information gain:

Tutorial 38- Decision Tree Information Gain

DECISION TREE INFORMATION GAIN

ENTROPY

② Information Gain

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

$H(f_1) = 0.94$

$H(f_2) = 0.81$

$H(f_3) = 1$

$$\text{Gain}(S, f_1) = H(S) - \frac{8}{14} H(f_2) - \frac{6}{14} H(f_3)$$

$$= 0.91 - \frac{8}{14} \times 0.81 - \frac{6}{14} \times 1$$

$$= \boxed{0.049}$$

0:34 / 12:39

Tutorial 38- Decision Tree Information Gain

DECISION TREE INFORMATION GAIN

ENTROPY

② Information Gain

0 to 1 bit

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

$H(f_1) = 0.94$

$H(f_2) = 0.81$

$H(f_3) = 1$

$$\text{Gain}(S, f_1) = H(S) - \frac{8}{14} H(f_2) - \frac{6}{14} H(f_3)$$

$$= 0.91 - \frac{8}{14} \times 0.81 - \frac{6}{14} \times 1$$

$$= \boxed{0.049}$$

11:36 / 12:39

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	
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

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

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

0:37 / 11:12

Tutorial 39- Gini Impurity Intuition In Depth In Decision Tree

GINI IMPURITY DT

f_1	f_2	f_3	
C_1	D_1		Yes
C_2	D_2		Yes
			No
			No
			Yes
			...

① Entropy

② GINI IMPURITY

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

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

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

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

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

$$= 0.5$$

① ✓

10:23 / 11:12