Machine Learning using Python

per person / $ Fr

Machine Learning using Python

Teacher
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Category
Core Courses

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Course Name : Machine Learning using Python

Code(Credit) : CUTM1019(1-2-1)

Course Objectives

- Understand the meaning, purpose, scope, stages, applications, and effects of ML.
- Explore important packages of python, such as numpy, scipy, OpenCV and scikit-learn.

Learning Outcomes

Course Syllabus

Module 1 – Application and Environmental-setup (12 hrs)

- Applications of Machine Learning In different fields (Medical science, Agriculture, Automobile, mining and many more).
- Supervised vs Unsupervised Learning based on problem Definition.
- Understanding the problem and its possible solutions using IRIS datasets.
- Python libraries suitable for Machine Learning(numpy, scipy, scikit-learn, opencv)
- Environmental setup and Installation of important libraries.

Module 2 - Regression (8 hrs)

- Linear Regression
- Non-linear Regression
- Model Evaluation in Regression
- Evaluation Metrics in Regression Models
- Multiple Linear Regression
- Feature Reduction using PCA
- Implementation of regression model on IRIS datasets.

Module 3 - Classification (24 hrs)

- Defining Classification Problem with IRIS datasets.
- Mathematical formulation of K-Nearest Neighbour Algorithm for binary classification.
- Implementation of K-Nearest Neighbour Algorithm using sci-kit learn.
- Classification using Decision tree.
- Construction of decision trees based on entropy.
- Implementation of Decision Trees for Iris datasets .
- Classification using Support Vector Machines.
- SVM for Binary classification
- Regulating different functional parameters of SVM using sci-kit learn.

- SVM for multi class classification.
- Implementation of SVM using Iris datasets .
- Implementation of Model Evaluation Metrics using sci-kit learn and IRIS datasets.

Module 4 - Unsupervised Learning (12 hrs)

- Defining clustering and its application in ML .
- Mathematical formulation of K-Means Clustering.
- Defining K value and its importance in K-Means Clustering.
- Finding appropriate K value using elbow technique for a particular problem.
- Implementation of K-Means clustering for IRIS datasets

Projects

- To be defined based on respective study area of student.

References:

Text Book:

1. Ethem Alpaydin, Introduction to Machine Learning, Second Edition, http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=12012.

Web Resource:

1. https://towardsdatascience.com/beginners-guide-to-machine-learning-with-python-b9ff35bc9c51

practical

Practical 1: Introduction to Numpy module

Practical 2: Introduction to Pandas module

Practical 3: Simple Linear regression: Predict the sepal length (cm) of the iris flowers

Practical 4: Implementation of Non Linear regression using IRIS

Practical 5: Implementation of Multiple linear regression using IRIS

Practical 6: Comparison between Linear and Non linear regression

Practical 7: Implementation of PCA for feature reduction

Practical 8: Implementation of k-Nearest Neighbour algorithm using IRIS

Practical 9: Implementation of Tree construction using Decision tree Classifier using IRIS

Practical 10: Implementation of Finding Accuracy using Decision tree using IRIS

Practical 11: Implementation of SVM Classification using Binary class

Practical 12: Implementation of SVM Classification using multiclass using IRIS

Practical 13: Implementation of Evaluation metrics

Practical 14: Implementation of KMeans

Session Plan

Session-1

Applications of Machine Learning
https://www.youtube.com/watch?v=ahRcGObyEZo

https://www.slideshare.net/makabee/applications-of-machine-learning

Session-2,3

Supervised vs Unsupervised Learning based on problem Definition
https://www.youtube.com/watch?v=cfj6yaYE86U

https://www.slideshare.net/SlideTeam1/supervised-machine-learning-with-types-and-techniques-236199994?qid=02a2fa9b-9594-495f-9bf6-f9e666396401&v=&b=&from_search=7

Session-4,5

Understanding the problem and its possible solutions using IRIS datasets.
https://www.youtube.com/watch?v=FLuqwQgSBDw

Session-6,7

Mathmatical library in Python numpy and its functions
https://www.youtube.com/watch?v=EkYrfV7M1ks
https://www.slideshare.net/EdurekaIN/python-numpy-tutorial-numpy-array-edureka?qid=7e8a738e-8a96-4c14-9663-30622451a797&v=&b=&from_search=4

Session-8,9

Science library in Python scipy and its functions
https://www.youtube.com/watch?v=k8s-R3csOt0
https://www.slideshare.net/RalfGommers/scipy-10-and-beyond-a-story-of-community-and-code?qid=a60ab988-de51-4c44-9932-9e0de4176ad1&v=&b=&from_search=5

session-10,11

ML library in Python scikit-learn and its functions.
https://www.youtube.com/watch?v=bwZ3Qiuj3i8
https://scikit-learn.org/stable/tutorial/basic/tutorial.html

Session-12

Defining student specific Project

Session-13

Linear Regression
https://www.youtube.com/watch?v=E5RjzSK0fvY
https://www.slideshare.net/EdurekaIN/linear-regression-algorithm-linear-regression-in-python-machine-learning-algorithm-edureka?qid=4ee8827ec-4ff8-8f7e-cbb227d26bfb&v=&b=&from_search=10

Session-14

Non-linear Regression
https://www.youtube.com/watch?v=sKrDYxQ9vTU

Session-15

Model Evaluation
https://www.youtube.com/watch?v=c68JLu1Nfkw

Session-16

Evaluation Metrics in Regression Models
https://www.youtube.com/watch?v=iLfgZfRGisE

Session-17,18

Session-19

Feature Reduction using PCA
https://www.youtube.com/watch?v=FgakZw6K1QQ
https://www.slideshare.net/AbhishekKumar4995/principal-component-analysis-pca-and-lda-ppt-slides?qid=8b19d7a4-30c9-4a2b-85a8-c311ec0a663c&v=&b=&from_search=6

Session-20

Implementation of regression model on IRIS datasets.
https://www.youtube.com/watch?v=hd1W4CyPX58

Session-21

Defining Classification Problem with IRIS datasets.
https://www.youtube.com/watch?v=Y17Y_8RK6pc

Session-22,23

Create the train/test set using scikit-learn using scikit-learn
https://scikit-learn.org/stable/modules/generated/sklearn.model_selection.train_test_split.html

Session-24,25

Confussion Matrix, Accuraccy, Sensitivity, specificity
https://scikit-learn.org/stable/modules/generated/sklearn.metrics.confusion_matrix.html

Session-26

Mathematical formulation of K-Nearest Neighbour Algorithm for binary classification.
https://www.youtube.com/watch?v=4HKqjENq9OU

Session-27,28

Implementation of K-Nearest Neighbour Algorithm using sci-kit learn.
https://www.youtube.com/watch?v=6kZ-OPLNcgE

Session-29,30

Classification using Decision tree.
https://www.youtube.com/watch?v=7VeUPuFGJHk

Session-31,32

Construction of decision trees based on entropy.
https://www.youtube.com/watch?v=7VeUPuFGJHk

Session-33,34

Implementation of Decision Tree using sci-kit learn
https://www.youtube.com/watch?v=PHxYNGo8NcI

Session-35,36

https://www.youtube.com/watch?v=Y6RRHW9uN90

Session-37,38

SVM for Binary classification
https://www.youtube.com/watch?v=T5zJHhTO1FA

https://www.slideshare.net/Simplilearn/support-vector-machine-how-support-vector-machine-works-svm-in-machine-learning-simplilearn?qid=2b5b3f60-7ed5-4542-90b1-1a807a456563&v=&b=&from_search=4

Session-39,40

Regulating different functional parameters of SVM using sci-kit learn.
https://www.youtube.com/watch?v=93AjE1YY5II

Session-41,42

SVM for multi class classification.
https://www.youtube.com/watch?v=kH6T_XL10-A

Session-43,44

Implementation of Support Vector Machines.
https://www.youtube.com/watch?v=zEabrO9l1vg

Session-45,46

Defining clustering and its application in ML
https://www.youtube.com/watch?v=V-8E0KhNrI8

Session-47,48

Mathematical formulation of K-Means Clustering.
https://www.youtube.com/watch?v=YWgcKSa_2ag

https://www.slideshare.net/Simplilearn/k-means-clustering-algorithm-k-means-clustering-example-machine-learning-algorithms-simplilearn?qid=100ac021-2fb4-4b1f-b3ce-b9b561cf3176&v=&b=&from_search=3

Session-49,50

Defining K value and its importance in K-Means Clustering.
https://www.youtube.com/watch?v=4b5d3muPQmA

Session-51,52

Implementation of K-Means Clustering in Scikit-learn
https://www.youtube.com/watch?v=asW8tp1qiFQ

https://www.slideshare.net/SarahGuido/kmeans-clustering-with-scikitlearn?qid=100ac021-2fb4-4b1f-b3ce-b9b561cf3176&v=&b=&from_sear

Session-53,54

Finding appropriate K value using elbow technique for a particular problem.
https://www.youtube.com/watch?v=IEBsrUQ4eMc

Session-55,56

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