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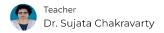
TEACHERS | ACADEMIC SCHE

# Machine Learning using Python



 ${\sf Home} \quad {\gt} \quad {\sf Courses} \quad {\gt} \quad {\sf Machine \ Learning \ using \ Python}$ 

# Machine Learning using Python





Description

Teachers

Attendees

Comments

Reviews

**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, opency)
- 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.

- SVIMI TOR MUITI CIASS CIASSITICATION.
- 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-9bf6-495f-9bf9-495f-9

f9e666396401&v=&b=&from\_search=7

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

## Session-6,7

Mathmatical library in Python numpy and its functions

https://www.youtube.com/watch?v=EkYrfV7M1ks

https://www.slideshare.net/EdurekalN/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=a60 ab 988-de 51-4c44-9932-de 51-4c44-9932-de 51-4c44-de 51-4c44-de

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/EdurekalN/linear-regression-algorithm-linear-regression-in-python-machine-learning-algorithm-edureka?qid=4ee88

27ec-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

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#### 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=PHxYNGo8Ncl

#### Session-35,36

nttps://www.youtupe.com/watcn?v=YbKKHw9uN90

#### 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-8E0KhNrl8

## Session-47,48

Mathematical formulation of K-Means Clustering.

https://www.youtube.com/watch?v=YWgcKSa\_2ag

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

## 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

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

#### Session-53,54

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

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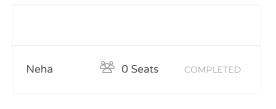




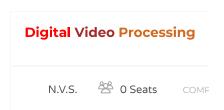




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