

Online Course
on
Introduction to Machine Learning for Physics and Electronics
SLC_04

Duration: 01 August 2020 to 15 August 2020

Number of Hours: 30

List of Participants who successfully completed the course.

Students of B. Sc. (H) Physics

1. Ananya Dangur
2. Jishant Talwar
3. Yash Yadav
4. Vidhi Goel
5. Vanshika
6. Sunandan Malviya
7. Shreya Garg
8. Sarvesh
9. Sachin
10. Parul Jain
11. Narender
12. Avdhesh
13. Chanchal Sharma

Students of B. Sc. (H) Electronics

1. Naveen Vashishtha
2. Rohan Dutta
3. Vivek

Summary of the Course

The aim of this Online Course on 'Introduction to Machine Learning for Physics and Electronics' was to empower the students of Physics and Electronics with machine learning techniques for data analysis skills.

There is an astronomical amount of data generated through the various physical processes that gives us unfathomable opportunities to learn and find correlation about various phenomena involving matter, energy, and signal processing, to name a few. The patterns in any form, that are hidden, can be uncovered and can help to reveal many hitherto un-understood mysteries and propel further exploration of potential areas of Physics and Electronics.

This course was a judicious utilisation of time and knowledge for the students. The course structure covered case studies that the students can relate to. This course was planned in a manner so as to benefit the students academically as well as from the industry point of view.

The topics covered in this course have been mentioned below.

1. Python Environment Setup
2. Jupyter Notebook and Spyder Setup
3. Python Basics:
 - a. Data types: Number string list dictionary tuple set
 - b. Comparison, conditions, loops, functions
4. NumPy Library
5. Pandas for Data Analysis
6. Data Visualization: Matplotlib and Seaborn
7. Pandas for Data Visualization
8. Introduction to Machine Learning:
 - a. Supervised vs. Unsupervised
 - b. Classification vs. Regression
 - c. Evaluation strategies
 - d. Train and test data
 - e. Performance metrics
 - f. Confusion Matrix
 - g. Data pre-processing
9. Linear Regression
 - a. Basics of Linear Regression
 - b. Univariate and multivariate linear regression
 - c. Linear Regression with Scikit-Learn
10. K-Nearest Neighbours
 - a. Basics of K-Nearest Neighbours Classifier
 - b. K-Nearest Neighbours with Scikit-Learn
11. K-Means Clustering
 - a. Basics of K-Means Clustering
 - b. K-Means Clustering with Scikit-Learn