**30 Days of Machine Learning |Syllabus**

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**Part: 1**

**Day: 1 Introduction & Type of ML**

**Link:** [**https://www.youtube.com/live/8uDZjeXVa\_4?si=v7rgw8HAWABjEPFa**](https://www.youtube.com/live/8uDZjeXVa_4?si=v7rgw8HAWABjEPFa)

* What is Machine Learning
* How has Machine Learning evolved? The History of ML
* ML vs DL vs AI
* Data Science Vs Data Analytics Vs ML/AI/DL
* Types of machine learning

**Day:2 Batch | Model | Instance Based ML**

**Link:** [**https://youtu.be/cgmgR7ELjcQ?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba**](https://youtu.be/cgmgR7ELjcQ?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba)

* What is Batch / Offline Machine Learning?
* What is Online Machine Learning?
* Difference Between Online Vs Offline Machine Learning?
* Instance Based Machine Learning.
* Model Based Machine Learning.
* Instance Based Vs Model Based Machine Learning.
* Challenges in Machine Learning.
* Application of Machine Learning.
* Machine Learning Development Life Cycle.

**Day:3 MLDLC | CSV / JSON / SQL Data Gathering**

**Link:** [**https://www.youtube.com/live/zT-gIdeF5Ks?si=Ctpz6673FHpwqnr5**](https://www.youtube.com/live/zT-gIdeF5Ks?si=Ctpz6673FHpwqnr5)

* Machine Learning Development Life Cycle (MLDLC/MLDC):
* Data science life cycle (DSLC):
* Tools used in Machine Learning? Installing: Anaconda | Jupiter Notebook (IDEs)
* Optional Tools: Spyder | PyCharm | Noteable | Google Colab | Kaggle Notebooks | Microsoft Azure Notebooks | Apache Zeplin | Count.co and Many More
* How to import dataset and download data files?
* How we create virtual environment
* Data Gathering
* Working with CSV Files
* Working with JSON/SQL

**Day:4 Framing ML Problem | Fetching Data from an API**

**Link:** [**https://youtu.be/Kev-JHvEd40?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba**](https://youtu.be/Kev-JHvEd40?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba)

* Framing a Machine Learning Problem
* Data Gathering
  + Fetching data from an API
  + Fetching data using web scraping

**Day: 5 Web Scraping for Data Gathering**

**Link:** [**https://youtu.be/DaGrAC0jTOk?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba**](https://youtu.be/DaGrAC0jTOk?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba)

* Fetching data using web scraping

**Part: 2**

**Day: 6 EDA: Type of EDA | Univariate EDA**

**Link:** [**https://youtu.be/E0B6IrzBxHM?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba**](https://youtu.be/E0B6IrzBxHM?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba)

* Types of Exploratory Data Analysis:
* Univariate Analysis
* Bivariate Analysis
* Multivariate Analysis
* How We Understand the Data?

**Day: 7 EDA: Bivariate | Multivariate**

**Link:** [**https://youtu.be/pqqt3BXdVFo?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba**](https://youtu.be/pqqt3BXdVFo?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba)

* EDA Bivariate Analysis
* EDA Multivariate Analysis

**Day: 8 Panda Profiling | Type of Feature Engineering**

**Link:** [**https://www.youtube.com/live/JArbcZpvWuQ?si=lPVb9hhcD19RDuQ9**](https://www.youtube.com/live/JArbcZpvWuQ?si=lPVb9hhcD19RDuQ9)

* How do we use the pandas profiling tool?
* Feature Engineering
* Feature Transformation
* Feature Construction
* Feature Selection
* Feature Selection

**Day: 9 Categorical Variables | One Hot Encoding | Ordinal & Label Encoading**

**Link :** [**https://youtu.be/aG6rEJvQkEc?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba**](https://youtu.be/aG6rEJvQkEc?list=PLxzTa0VPR9rzus4Egb-aOmCWier5XiOba)

* **How to Encode “Categorical Variables”?**
* What is categorical data?
* **Type of categorical data?**
* What is Ordinal Data?
* Ordinal Encoding
* Label Encoding
* What is Nominal Data?
* One Hot Encoding

**Day: 10 Handling Missing Data | Missing completely at random (MCAR) | Complete Case Analysis (CCA)**

**Link :** [**https://youtu.be/RTIf0kfOuUI?si=fJLVKQAgBxHJaL-c**](https://youtu.be/RTIf0kfOuUI?si=fJLVKQAgBxHJaL-c)

* Handling Missing Data
* What are the problems with missing data?
* Remove Missing Values
* What is a missing completely at random (MCAR)?
* Pro and Corns Complete Case Analysis (CCA)?
* When we use CCA?

**Part: 3**

**Day: 11 Univariate Imputation: Mean | Median | Arbitrary & Random Value**

**Link:** [**https://www.youtube.com/live/UVy\_6qtxTbg?si=z-SJdyzkuLS8y\_sn**](https://www.youtube.com/live/UVy_6qtxTbg?si=z-SJdyzkuLS8y_sn)

* Univariate Imputation in Numerical Data
* Difference between univariate imputation and multivariate imputation
* Mean or Median Imputation
* Arbitrary Value Imputation
* End of Distribution
* Random value Imputation

**Day: 12 Categorical Data Imputation: Mode | Most Frequent | Missing Value**

**Link:** [**https://www.youtube.com/live/IvaFsrAh8Wo?si=KYGjaqXEVhsFvl2n**](https://www.youtube.com/live/IvaFsrAh8Wo?si=KYGjaqXEVhsFvl2n)

* + What is the purpose of using “Mode”?
  + What is most frequent imputation?
  + Which variables can be imputed with most frequent / mode Imputation?
  + When to use mode / most frequent category imputation?
  + Missing value imputation?

**Day: 13 Random Sampling Imputation: Numerical Data | Categorical Data**

**Link:** [**https://www.youtube.com/live/MSfemrUmQFM?si=W\_gEPkV9n7lzd5\_Q**](https://www.youtube.com/live/MSfemrUmQFM?si=W_gEPkV9n7lzd5_Q)

* What is random sampling imputation?
* Advantages in random sampling imputation.
* Disadvantage in random sampling imputation.
* Random Imputation in Univariate Imputation.
* Random sampling imputation for Numerical Data.
* Random sampling imputation for Categorical Data.

**Day: 14 Missing Indicator | Automatic Select Value | 2D/3D Calculation For KNN**

**Link:** [**https://www.youtube.com/live/aDdie\_Qo7rI?si=23F\_YaWXk\_LIHZQT**](https://www.youtube.com/live/aDdie_Qo7rI?si=23F_YaWXk_LIHZQT)

* Missing Indicator in Univariate Imputation
* Automatic select value for Imputer parameter
* Coordinate Geometric for KNN Imputer
* Calculation in 2D and 3D Distance

**Day: 15 KNN Imputer | Find Euclidean Distance | Impute KNN Value**

**Link:** [**https://www.youtube.com/live/Qyu5QXgyQPE?si=PK-f7kYtO5B\_O2Zi**](https://www.youtube.com/live/Qyu5QXgyQPE?si=PK-f7kYtO5B_O2Zi)

* KNN Imputer
* K-Nearest Neighbour Calculation Method
* What is Euclidean Distance in Machine Learning?
* How to find K nearest neighbour?
* Find missing imputation value?

**Day: 16 Iterative Imputer | MICE | MCAR | MAR | MNAR**

**Link:** [**https://www.youtube.com/live/Qyu5QXgyQPE?si=PK-f7kYtO5B\_O2Zi**](https://www.youtube.com/live/Qyu5QXgyQPE?si=PK-f7kYtO5B_O2Zi)

* Iterative Imputer
* MICE- Multiple Imputation by Chained Equations
* Missing Completely at Random (MCAR)
* Missing at Random (MAR)
* Missing Not at Random (MNAR)
* Find Predictive Value for Iterative Imputer Technique

**Part: 4**

**Day: 17 Outliers | How to Treat & Detect | Advantage & Disadvantages**

**Link:** [**https://www.youtube.com/live/uqGnieXQGbs?si=X\_7urrGEPncW\_Hzg**](https://www.youtube.com/live/uqGnieXQGbs?si=X_7urrGEPncW_Hzg)

* What are the outliers in machine learning?
* When is Outlier Unsafe?
* What role play anomaly detection algorithms in outliers?
* Effect of Outliers on ML Algorithms
* How to treat Outliers?
* How to detect Outliers?
* Techniques to detect & remove Outliers

**Day: 18 Z Score Technique in outliers | Apply SND Method & Z Score Calculation**

**Link:** [**https://www.youtube.com/live/DHqwc4zz33s?si=iCJ9GOm1hCD-GWLe**](https://www.youtube.com/live/DHqwc4zz33s?si=iCJ9GOm1hCD-GWLe)

* Outliers removal using Z score treatment
* Z Score is applicable for normal distribution
* What is Standard deviation?
* Standard Normal Distribution (SND)
* Why are Z-Scores Important?
* How to Calculate “Z-Score”?
* What is 68 - 95- 99 Rule?
* Practice Problems for Z-Scores Calculation

**Day: 19 IQR (Interquartile Range) Technique in Outliers**

**Link:** [**https://www.youtube.com/live/yEz6c1fcylE?si=6eYNWRq\_kzCuGur7**](https://www.youtube.com/live/yEz6c1fcylE?si=6eYNWRq_kzCuGur7)

* What is Boxplot Distribution?
* What are the first quartile and third quartile in the box plot?
* What is the five-number summary in the box plot?
* What is Interquartile Range IQR?
* IQR Technique used for skewed distribution?
* IQR Percentile Rule.

**Day: 20 Percentile method technique & Winsorization in Outliers**

**Link:** [**https://www.youtube.com/live/yEz6c1fcylE?si=6eYNWRq\_kzCuGur7**](https://www.youtube.com/live/yEz6c1fcylE?si=6eYNWRq_kzCuGur7)

* What is a percentile method?
* Outliers example with percentile
* Trimming with percentile outlier’s method
* What is the Winsorization in outliers?
* Capping with percentile outlier’s method
* What is the difference between trimming and winsorizing outliers?

**Day: 21 Feature Construction & Feature Splitting**

**Link:** [**https://www.youtube.com/live/GCsK6SWeZVg?si=G5u39mrrTCLxuMVY**](https://www.youtube.com/live/GCsK6SWeZVg?si=G5u39mrrTCLxuMVY)

* What is feature construction in machine learning?
* What is feature splitting in machine learning?
* What is a purpose of feature construction and splitting?
* Technique used for feature construction & feature splitting?
* Uses and advantages for construction and splitting?
* What result shown in the output?

**Day: 22 Feature Selection | Feature Extraction | Curse of Dimensionality**

**Link:** [**https://www.youtube.com/live/0CfgGwaugo8?si=S5KoFMslCF39et7\_**](https://www.youtube.com/live/0CfgGwaugo8?si=S5KoFMslCF39et7_)

* What is “Feature Selection” in machine learning?
* Why “Feature Selection” is Important?
* Type of Feature Selection Models.
* What is “Feature Extraction” in machine learning?
* Discuss about “Curse of Dimensionality” concept.

**Part: 5**

**Day: 23 Linear Regression Concepts and Types**

**Link:** [**https://www.youtube.com/watch?v=WsNQaMHcErs&t=9s**](https://www.youtube.com/watch?v=WsNQaMHcErs&t=9s)

* What Is Linear Regression?
* Key Benefits of Linear Regression
* Type of Linear Regression
* Simple Linear Regression
* Multiple Linear Regression
* Polynomial Linear Regression

**Day: 24 OLS method and calculation in linear regression**

**Link:** [**https://www.youtube.com/watch?v=WsNQaMHcErs&t=9s**](https://www.youtube.com/watch?v=WsNQaMHcErs&t=9s)

* Concept of Simple Linear Regression
* For “m & b” closed form solution
* OLS: Ordinary Least Squares regression method
* Find the Total Error and Average Error
* Calculation concept for “b”
* Calculation concept for “m”
* Use SK learn library and find “m & b” value

**Day: 25 Regression Metrics: MAE | MSE | RMSE | R2 Score**

**Link:** [**https://www.youtube.com/watch?v=JcwxlqfM5CM**](https://www.youtube.com/watch?v=JcwxlqfM5CM)

* MAE: Mean Absolute Error
* MSE: Mean Squared Error
* RMSE: Root Mean Squared Error
* R Squared Score R2 (R^2)
* Adjusted R Squared (R^2) Score

**Day: 26 Multiple Linear Regression**

**Link:** [**https://youtu.be/RN7FLvrPODA**](https://youtu.be/RN7FLvrPODA)

* Multiple Linear Regression
* Equation 3D Plane
* Equation 4D Hyperplane
* Difference between LR and MLR

 

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