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

- 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

- 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

- 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

- 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

- Fetching data using web scraping

Part: 2

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

- EDA Bivariate Analysis
- EDA Multivariate Analysis

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

- **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

- 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

- 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

- 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

- 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

- 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

- 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

- 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

- 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

- 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

- 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

- 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

- 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_

- 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

- 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

- 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

- 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

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

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