**Best resource for Machine learning**

Machine Learning is a subset of artificial intelligence which enables the systems to learn from data and make predictions or decisions without explicit programming. The main goal is to create algorithms that identify patterns, make decisions, and improve over time.

Prerequisites for Machine Learning

1. Mathematics and Statistics

* Linear Algebra: Vectors, matrices, eigenvalues, and eigenvectors (e.g., used in PCA).
* Calculus: Derivatives and gradients for optimization techniques like gradient descent.
* Probability & Statistics: Includes probability distributions, hypothesis testing, and statistical inference.

2. Programming Skills

* Python: Popular for its libraries like NumPy, pandas, and Scikit-learn.
* R: Great for statistical analysis and visualization.
* SQL: Used for querying and managing databases.

3. Data Handling Basics

* Data Collection: Use APIs, web scraping, and databases to gather data in formats like CSV, JSON, SQL, or Excel.
* Data Cleaning: Handle missing values, remove duplicates, and standardize formats.

Machine Learning Roadmap

Beginner Level

1. Supervised Learning:
   * Regression: Linear regression, polynomial regression.
   * Classification: Logistic regression, decision trees, random forests, SVMs.
2. Unsupervised Learning:
   * Clustering: K-means, hierarchical clustering.
   * Dimensionality Reduction: PCA, t-SNE.
   * Anomaly Detection: Identify outliers.
3. Reinforcement Learning:
   * Learn through trial and error (e.g., Q-learning, DQN).

Intermediate Level

1. Model Selection:
   * Match models to problem type (regression, classification, clustering).
2. Model Evaluation & Tuning:
   * Use cross-validation and train-test splits.
   * Optimize hyperparameters with Grid Search or Random Search.
3. Evaluation Metrics:
   * Precision, recall, F1-score, ROC-AUC.

Advanced Level

1. Deep Learning:
   * Neural Networks: Backpropagation, activation functions.
   * CNNs: For image data.
   * RNNs: For sequential data (e.g., LSTM, GRU).
2. Natural Language Processing (NLP):
   * Tokenization, embeddings (Word2Vec, BERT).
3. Computer Vision:
   * Image preprocessing, object detection, segmentation.

Here is the yourtube resources link 🡪

https://www.youtube.com/watch?v=uZtZ15uFzto&list=PLKdU0fuY4OFfWY36nDJDlI26jXwInSm8f

https://www.youtube.com/watch?v=jGwO\_UgTS7I&list=PLoROMvodv4rMiGQp3WXShtMGgzqpfVfbU