

Machine Learning Roadmap (6 Months)

Overview

This roadmap is designed to help you master Machine Learning (ML) from the basics to advanced levels in six months. It includes learning resources, practical exercises, and projects to solidify your understanding.

Phase 1: Foundations (Weeks 1-6)

1. Learn Python (2 weeks)

- Basics of Python: YouTube Playlist**
- Object-Oriented Programming (OOP) in Python**
- Advanced Topics: File Handling, Exception Handling, Regular Expressions, Functional Programming, Flask basics.**
- Practice Problems**

2. Learn Numpy & Pandas (1 week)

- Numpy: Playlist**
- Pandas: Playlist**
- Practice: Numpy-100 Problems | Pandas Problems**

3. Data Visualization & Statistics (2 weeks)

- Matplotlib & Seaborn: Matplotlib | Seaborn**
- Statistics**

4. Exploratory Data Analysis (EDA) (1 week)

- Hands-on Projects: Titanic dataset, Heart disease dataset, IPL dataset.**

5. Machine Learning Basics (1 week)

- **Concepts: What is ML, AI vs ML vs DL, Types of ML, Challenges in ML.**
- **Lifecycle: Machine Learning Development Process.**
- **End-to-End Project**

Phase 2: Core ML Concepts (Weeks 7-12)

1. Advanced Mathematics (2 weeks)

- **Linear Algebra, Probability & Statistics, Calculus**

2. Machine Learning Algorithms (4 weeks)

- **Supervised Learning: Linear Regression, Logistic Regression, SVM, Decision Trees, Random Forest, Naive Bayes.**
- **Unsupervised Learning: K-Means Clustering, PCA, Hierarchical Clustering, DBSCAN.**
- **Boosting Techniques: XGBoost, Gradient Boosting, Adaboost.**
- **Hands-on: Implement ML models on Kaggle datasets.**

Phase 3: Practical Implementation (Weeks 13-18)

1. Data Engineering (3 weeks)

- **Feature Engineering, Outliers Detection, Cross-validation**

2. Model Deployment (2 weeks)

- **Saving Models, Deployment Platforms, Project: Deploy a ML model as an API.**

3. Working with Large Datasets (1 week)

- **Out-of-Core ML, Project: NYC Cab Fare Prediction**

Phase 4: Specializations (Weeks 19-24)

1. Deep Learning & NLP (3 weeks)

- Neural Networks, NLP, Sentiment Analysis, Chatbot Development**

2. Time Series & Computer Vision (3 weeks)

- Time Series Analysis, Computer Vision**

Final Phase: Project-Based Learning (Weeks 25-30)

1. Portfolio Projects (4 weeks)

- Beginner: Titanic Survivor Prediction, Loan Status Prediction.**
- Intermediate: Diabetes Prediction, Fake News Detection, House Price Prediction.**
- Advanced: Custom NLP chatbot, Computer Vision project.**

2. Participate in Competitions (2 weeks)

- Kaggle, Hackathons**

Conclusion

By following this structured roadmap, you will build a strong foundation in Machine Learning, gain hands-on experience with real-world datasets, and develop a portfolio of projects that showcase your skills. Keep learning, experimenting, and contributing to open-source projects to stay ahead in the ML landscape!