

■ Machine Learning Roadmap

Tailored for intermediate Python users with NumPy, Pandas, and basic NLP knowledge.

1. Introduction & Usage

This roadmap covers the journey from core mathematics and classical machine learning algorithms to deep learning and real-world projects. Designed for learners who already have intermediate Python skills and basic data analysis experience.

Phase	Duration	Goal
Phase 1 — Core Math & Stats	1–2 weeks	Learn linear algebra, calculus, probability, statistics
Phase 2 — ML Basics	2–3 weeks	Understand ML workflow, metrics, and basic models
Phase 3 — Core ML Algorithms	4–5 weeks	Learn regression, classification, clustering algorithms
Phase 4 — Feature Engineering & Tuning	2 weeks	Improve model performance and generalization
Phase 5 — Neural Networks & Deep Learning	3–4 weeks	Learn NN fundamentals, CNNs, RNNs
Phase 6 — Real-World Projects	3–4 weeks	Apply ML to real datasets and problems

2. Daily Structure

- 1 hr — Theory & concept learning - 1 hr — Implementing algorithms with scikit-learn - 30 min — Reading blogs/research papers - 30 min — Revisiting & debugging code

3. Project Milestones

- Project 1 (End of Phase 2): Linear regression for house price prediction - Project 2 (Mid Phase 3): Decision tree classifier for spam detection - Project 3 (End of Phase 4): Customer segmentation with clustering - Project 4 (End of Phase 5): Image classifier with CNN (PyTorch) - Capstone (Phase 6): Choice of fraud detection, recommendation system, or resume skill extractor

■ Tips for Success

- Start simple — master classical ML before jumping into deep learning. - Practice on Kaggle datasets to build intuition. - Track your experiments and results. - Share your projects on GitHub or personal portfolio.