



AI LEARNING ROADMAP

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1. PYTHON BASICS

- ☐ Variables & Data Types 
- ☐ Conditional Statements
- ☐ Loops 
- ☐ Functions 
- ☐ Classes 
- ☐ Python libraries:
 - ☐ Pandas 
 - ☐ Numpy 

2. DATA SCIENCE

- ☐ Jupyter 
- ☐ Plotting Graphs:
 - ☐ Pandas plots 
 - ☐ Matplotlib
- ☐ Pre-processing:
 - ☐ Handle Missing Values
 - ☐ Handle Anomalies
 - ☐ Normalization

3. MATH BASICS

- ☐ Probabilities
- ☐ Matrices
- ☐ Binary Numbers 
- ☐ Predicate Logic

4. MACHINE LEARNING

- ☐ **THEORY & MATH:**
 - ☐ Linear Regression 
 - ☐ K Nearest Neighbours
 - ☐ Binary Trees
 - ☐ Gradient Boosting
- ☐ **DATA SCIENCE:**
 - ☐ Feature Engineering 
 - ☐ Train/Test Split
 - ☐ Evaluation Metrics:
 - ☐ Accuracy
 - ☐ MSE
 - ☐ Baseline
 - ☐ Libraries:
 - ☐ Scikit-Learn 
 - ☐ XGBoost
- ☐ **FINAL PRACTICE:**
 - ☐ Train + Test Pipelines:
 - ☐ California Housing Dataset 
 - ☐ Iris Dataset
 - ☐ Digits Dataset

5. DEEP LEARNING

- ☐ **BASIC OVERVIEW:**
 - ☐ Intro to Neural Networks 
 - ☐ Natural Language Processing
 - ☐ Computer Vision
 - ☐ Generative AI
 - ☐ Autonomous Systems
 - ☐ Recommendation Systems
- ☐ **THEORY & MATH:**
 - ☐ Training Paradigms: 
 - ☐ Supervised Learning
 - ☐ Self-Supervised Learning
 - ☐ Unsupervised Learning
 - ☐ Reinforcement Learning
 - ☐ Problems:
 - ☐ Classification
 - ☐ Regression
 - ☐ Clustering
- ☐ Perceptron 

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5. DEEP LEARNING

☐ MORE THEORY & MATH:

- ☐ Loss Functions:
 - ☐ Cross-Entropy Loss 
 - ☐ Mean Squared Error
- ☐ Backpropagation
- ☐ Gradient Descent 
- ☐ Validation:
 - ☐ Hold-out Validation
 - ☐ K-fold Validation
- ☐ Activation Functions
 - ☐ Sigmoid
 - ☐ SoftMax
 - ☐ ReLU
- ☐ Regularization:
 - ☐ Dropout
 - ☐ Lasso (L1)
 - ☐ Weight Decay (L2)
- ☐ Hyperparameters:
 - ☐ Learning Rate
 - ☐ Hidden Layers
 - ☐ Optimizer
 - ☐ Momentum

☐ DATA SCIENCE:

- ☐ SQL
- ☐ Polars 
- ☐ Evaluation Metrics:
 - ☐ Precision
 - ☐ Recall
 - ☐ F1
 - ☐ MAE
 - ☐ Confusion Matrix

☐ CODING:

- ☐ Tensorflow
- ☐ Pytorch
- ☐ Transformers
 - ☐ Perplexity (metric)
 - ☐ Fine-Tuning 
 - ☐ LoRA
 - ☐ Quantization
 - ☐ RAG
 - ☐ Ollama
 - ☐ LangChain
 - ☐ Model Context Protocol 
- ☐ CUDA 
- ☐ cuDF 
- ☐ cuPyNumeric
- ☐ cuML
- ☐ cuGraph
- ☐ TensorRT 
- ☐ API 

☐ ADVANCED SUGGESTIONS:

- ☐ Vector Databases
- ☐ Multimodal Transformers
- ☐ Distributed Training
- ☐ Dask
- ☐ Docker 
- ☐ Triton Inference Server
- ☐ ONNX Runtime
- ☐ Kubernetes
- ☐ Q-Learning

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6. PRACTICE

☐ COMPUTER VISION DATASETS:

- ☐ MNIST 
- ☐ CIFAR 
- ☐ Pascal VOC
- ☐ Kinetics
- ☐ ImageNet

☐ TIME SERIES DATASETS:

- ☐ S&P 500 
- ☐ Simulated Transactions 
- ☐ Airbnb
- ☐ NYC Yellow Cab (Kaggle)

☐ NLP DATASETS:

- ☐ Brown Corpus
- ☐ Project Gutenberg
- ☐ IMDB Reviews
- ☐ Sentiment140 

☐ PROJECTS:

- ☐ Spam Detection
- ☐ Sentiment Analysis 
- ☐ Image Classification 
- ☐ Image Generation 
- ☐ Object Detection
- ☐ ChatBot App 
- ☐ Text Summarization
- ☐ Style Transfer
- ☐ Face Detection
- ☐ Topic Modeling
- ☐ Image Captioning
- ☐ Fraud Detection
- ☐ Stock Price Prediction 
- ☐ Make Your Own Dataset 

☐ MORE PROJECTS:

- ☐ Recommendation System
- ☐ Weather Forecasting
- ☐ Story Generator
- ☐ LangChain Agent
- ☐ Multimodal AI
- ☐ Anomaly Detection

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