Guide2Code - AI & Machine Learning Roadmap

Beginner Level - Getting Started with AI & ML

📌 Required Programming Languages:

- Python (Primary language for AI & ML)
- R (For statistical computing and data visualization)
- SQL (For data manipulation and storage)

🛠️ Required Skills:

- Basic Mathematics & Statistics 📊
- Data Preprocessing & Cleaning
- Fundamentals of Machine Learning Algorithms
- Understanding of Neural Networks
- Data Visualization & Analysis

Learn the Fundamentals:

- **Introduction to AI & ML**: Understanding AI, ML, and Deep Learning differences.
- **Mathematical Foundations**: Linear Algebra, Probability, and Statistics.
- **Data Preprocessing**: Handling missing values, normalization, and feature engineering.
- **Supervised vs. Unsupervised Learning**: Basics of classification, regression, and clustering.
- **Python for ML**: Learning NumPy, Pandas, Matplotlib, and Scikit-learn.
- **Model Evaluation**: Understanding accuracy, precision, recall, and confusion matrices.

📝 Beginner Projects:

1. **Spam Email Classifier** – Build a model to detect spam emails using Naïve Bayes.
2. **House Price Prediction** – Predict house prices based on features like location and size.
3. **Movie Recommendation System** – Create a simple recommendation engine using collaborative filtering.
4. **Handwritten Digit Recognition** – Develop a digit classifier using MNIST dataset.

Intermediate Level - Expanding AI & ML Skills

📌 Required Programming Languages:

- Python (Advanced)
- SQL (For large-scale data handling)
- Java (For production-level AI applications)

🛠️ Required Skills:

- Feature Engineering & Selection 🔍
- Model Deployment & Optimization
- Natural Language Processing (NLP)
- Computer Vision Fundamentals
- Deep Learning with TensorFlow & PyTorch

Expanding Your Knowledge:

- **Advanced ML Algorithms**: Decision Trees, Random Forest, SVM, Gradient Boosting (XGBoost, LightGBM).
- **Neural Networks**: Understanding feedforward and convolutional neural networks (CNNs).
- **NLP Basics**: Tokenization, stemming, lemmatization, and sentiment analysis.
- **Computer Vision**: Image classification, object detection, and facial recognition.
- **Model Deployment**: Using Flask, FastAPI, and cloud services for deploying models.

📝 Intermediate Projects:

1. **Stock Price Prediction** – Build a predictive model for stock market trends.
2. **Chatbot with NLP** – Develop a chatbot using deep learning-based NLP models.
3. **Fake News Detector** – Classify news articles as real or fake using NLP.
4. **Object Detection in Images** – Implement an image detection model using OpenCV and TensorFlow.
5. **Speech-to-Text Converter** – Convert speech into text using deep learning models.

Advanced Level - Mastering AI & ML

📌 Required Programming Languages:

- Python (Advanced AI/ML Development)
- Julia (For high-performance AI applications)
- Scala (For Big Data & ML pipelines)

🛠️ Required Skills:

- Reinforcement Learning 😈
- Generative AI & GANs
- AI Ethics & Bias Handling
- Large-Scale Data Processing (Big Data & Cloud AI)
- Advanced Deep Learning Architectures (Transformers, LSTMs)

Deep Dive Into Advanced Topics:

- **Reinforcement Learning**: Implementing Q-Learning and Deep Q-Networks.
- **Generative AI**: Creating AI-generated content using GANs and VAEs.
- **Ethical AI**: Bias mitigation, explainable AI (XAI), and fairness in ML.
- **Big Data AI**: Handling massive datasets using Apache Spark, Hadoop, and Google Cloud AI.

📝 Advanced Projects:

1. **Autonomous AI Agent** – Develop an AI that learns from its environment using reinforcement learning.
2. **AI-Powered Image Generator** – Train a GAN to generate realistic images.
3. **AI-Driven Healthcare Diagnosis** – Build a model to detect diseases from medical images.
4. **Self-Learning Chatbot** – Develop an AI assistant that improves through interactions.
5. **Deepfake Detection System** – Identify manipulated media using AI-based detection.

Thank You for Visiting Guide2Code! 🚀

"Build intelligent, data-driven applications with AI & Machine Learning!"