Roadmap For AIML

Programming

- Python
- Libraries: NumPy, Pandas, Matplotlib, Seaborn, SciPy

Data Preprocessing

- Data Cleaning
- Data Transformation
- Feature Engineering
- Data Normalization and Standardization

Machine Learning Fundamentals

- Supervised Learning
    - Regression: Linear, Polynomial
    - Classification: Logistic Regression, k-NN, Decision Trees, Random Forest, SVM
- Unsupervised Learning
    - Clustering: k-Means, Hierarchical, DBSCAN
    - Dimensionality Reduction: PCA, t-SNE

Model Evaluation

- Train-Test Split
- Cross-Validation
- Evaluation Metrics: Accuracy, Precision, Recall, F1-Score, ROC-AUC

Advanced Machine Learning

- Ensemble Methods: Bagging, Boosting, Stacking
- Feature Selection
- Hyperparameter Tuning: Grid Search, Random Search

Deep Learning

- Neural Networks
- Activation Functions
- Loss Functions
- Backpropagation
- Optimization Algorithms: SGD, Adam
- Regularization: Dropout, Batch Normalization

Deep Learning Frameworks

- TensorFlow
- Keras
- PyTorch

Computer Vision

- Convolutional Neural Networks (CNNs)
- Image Classification
- Object Detection
- Image Segmentation

Natural Language Processing (NLP)

- Text Preprocessing
- Word Embeddings: Word2Vec, GloVe
- Recurrent Neural Networks (RNNs)
- Long Short-Term Memory Networks (LSTMs)
- Transformers and BERT

Time Series Analysis

- ARIMA
- Seasonal Decomposition
- LSTM for Time Series

Reinforcement Learning

- Markov Decision Processes (MDP)
- Q-Learning
- Deep Q-Networks (DQN)
- Policy Gradient Methods

Deployment and Production

- Model Serialization
- REST APIs for ML Models
- Model Monitoring and Maintenance

Ethics and Bias in AI

- Fairness
- Transparency

- Accountability

Latest Trends and Research

- GANs (Generative Adversarial Networks)
- AutoML
- Meta-Learning
- Explainable AI (XAI)

Projects:

Predict Housing Prices

Sentiment Analysis on Social Media Data

Handwritten Digit Recognition using MNIST Dataset

Spam Email Detection

Image Classification using CNNs

Stock Price Prediction

Movie Recommendation System

Customer Segmentation using Clustering

Fake News Detection

Time Series Forecasting for Weather Data

Links:

https://youtube.com/playlist?list=PLoROMvodv4rMiGQp3WXShtMGgzqpfVfbU&si=_W45zHPEqN3XQ_YT

https://youtube.com/playlist?list=PLRqwX-V7Uu6YPSwT06y_AEYTqIwbeam3y&si=4iWdHTy6Fw20gqoM