

1st Diary

Week 1

Introduction to AI

- Studied AI history, types (Narrow, General, Super AI)
- Explored AI fields: ML, DL, NLP, computer vision, robotics
- Examined real-world AI applications across industries
- Learned key AI terminology and relationships between AI, ML, DL

Python for AI Development

- Basic Python syntax and programming concepts
- Focused extensively on AI-specific libraries:
 - NumPy: Implemented array operations and mathematical functions
 - Pandas: Performed data manipulation and analysis on structured datasets
 - Matplotlib/Seaborn: Created data visualizations and statistical graphics
 - scikit-learn: Utilized machine learning algorithms and evaluation tools
 - NLTK: Explored natural language processing capabilities

Week 2

Statistics for AI

- Applied descriptive statistics: min/max, variance, deviation
- Studied distributions, skewness, kurtosis concepts
- Implemented probability theory and hypothesis testing

Data Preprocessing

- Classified data types and terminology (features, target variables)
- Performed data cleaning: missing values, duplicates, outliers
- Applied feature engineering: categorical encoding, numerical scaling
- Conducted EDA using histograms, boxplots, scatterplots

2nd Diary

Week 1

Natural Language Processing Fundamentals

- Studied word embeddings theory (Word2Vec, GloVe) for vector representation of text
- Implemented sentiment analysis classifier for customer feedback categorization
- Applied Named Entity Recognition to extract people, locations from sample texts

NLP Projects

- Semantic Similarity Analyzer: Trained Word2Vec model to find top 5 words related to "food" in restaurant reviews
- Restaurant Review Classifier: Built system to categorize reviews by service, food, and ambiance aspects

Week 2

Machine Learning Foundations

- Explored supervised learning techniques: Linear/Logistic Regression, Decision Trees
- Studied unsupervised methods: K-Means Clustering and Principal Component Analysis
- Practiced with scikit-learn, Matplotlib, and related data science libraries

ML Projects

- Housing Price Predictor: Implemented Linear Regression model on Boston Housing Dataset
- Email Spam Filter: Created Logistic Regression classifier with 92% accuracy
- Loan Approval System: Developed Decision Tree model to predict approval likelihood
- Customer Segmentation Tool: Applied K-Means to identify distinct e-commerce customer groups
- Dimensionality Reduction: Visualized MNIST dataset in 2D using PCA techniques

3rd Diary

Week 1

Introduction to Deep Learning

- Learned Deep Learning vs. Machine Learning differences.
- Studied applications in image recognition, NLP, autonomous vehicles.
- Mastered key terms: neural networks, epochs, batch size, learning rate.

Neural Network Fundamentals

- Explored network layers: input, hidden, output.
- Implemented MLP on MNIST dataset (97% accuracy).
- Studied activation functions: ReLU, Sigmoid, Tanh.

Optimization Techniques

- Examined loss functions: MSE, Cross-Entropy.
- Tested optimizers: SGD, Adam, RMSProp.
- Analyzed learning rate effects on model training.

Projects

- Built digit classifier using MLP on MNIST dataset.
- Compared performance of different optimizers on CIFAR-10.

Week 2

Convolutional Neural Networks

- Learned CNN architecture: convolution, pooling layers.
- Studied VGG and ResNet models.
- Applied transfer learning with VGG16 for image classification.

Recurrent Neural Networks

- Explored RNNs, LSTM, GRU for sequential data.
- Built text generator with Shakespeare's works.
- Generated Shakespearean-style text sequences.

Transformers

- Studied attention mechanisms.
- Explored encoder-decoder structure.
- Implemented BERT for sentiment analysis.

Projects

- Built text generation system with RNN/LSTM architecture.
- Implemented sentiment analysis on IMDB reviews using BERT.
- Generated synthetic fashion items using DCGAN on Fashion-MNIST.