3-Month Internship Program

(12 Weeks): AI & ML Training

Week 1: Introduction to AI and Machine Learning

- **Topics:**
  - **Fundamentals of AI and ML.**
  - **Types of ML: Supervised, unsupervised, and reinforcement learning.**
  - **Overview of ML workflow: Data collection, preprocessing, model building, and evaluation.**
- **Assignment: Research and present real-world applications of AI and ML.**

Week 2: Python for AI and ML

- **Topics:**
  - **Python libraries for AI/ML: NumPy, Pandas, and Matplotlib.**
  - **Data manipulation and visualization.**
- **Assignment: Analyze and visualize a dataset to identify patterns and trends.**

Week 3: Data Preprocessing

- **Topics:**
  - **Handling missing data, outliers, and categorical variables.**
  - **Feature scaling: Normalization and standardization.**
  - **Splitting datasets for training and testing.**
- **Assignment: Preprocess a raw dataset for use in an ML model.**

Week 4: Introduction to Machine Learning Models

- **Topics:**
  - **Linear regression for predictive modeling.**
  - **Logistic regression for classification tasks.**
  - **Model evaluation metrics: RMSE, accuracy, precision, and recall.**
- **Assignment: Build a regression model to predict house prices.**

Week 5: Supervised Learning Algorithms

- **Topics:**
  - **Decision trees and random forests.**
  - **Support Vector Machines (SVM).**
- **Assignment: Implement and compare supervised learning models on a classification dataset.**

Week 6: Unsupervised Learning Algorithms

- **Topics:**
  - **Clustering algorithms: K-means and hierarchical clustering.**
  - **Dimensionality reduction using PCA.**
- **Assignment: Perform customer segmentation using clustering techniques.**

Week 7: Neural Networks and Deep Learning

- **Topics:**
  - **Basics of neural networks: Perceptron, activation functions, and backpropagation.**
  - **Introduction to TensorFlow and Keras.**
- **Assignment: Build a simple neural network for handwritten digit recognition using the MNIST dataset.**

Week 8: Natural Language Processing (NLP)

- **Topics:**
  - **Text preprocessing: Tokenization, stemming, and lemmatization.**
  - **Bag-of-words and TF-IDF models.**
  - **Sentiment analysis with ML models.**
- **Assignment: Build an ML model to analyze the sentiment of social media posts.**

Week 9: Computer Vision

- **Topics:**
  - **Image preprocessing techniques: Resizing, normalization, and augmentation.**
  - **Convolutional Neural Networks (CNNs) for image recognition.**
- **Assignment: Develop a CNN to classify images from a dataset (e.g., CIFAR-10).**

Week 10: Model Optimization and Hyperparameter Tuning

- **Topics:**
  - **Grid search and random search.**
  - **Regularization techniques: L1, L2, and dropout.**
- **Assignment: Optimize a previously built ML model using hyperparameter tuning.**

Week 11: AI/ML Deployment

- **Topics:**
  - **Saving and loading models using pickle or joblib.**
  - **Deploying ML models using Flask or FastAPI.**
  - **Hosting ML applications on cloud platforms.**
- **Assignment: Deploy an ML model as a RESTful API.**

Week 12: Final Project

- **Topics:**
  - **Consolidation of concepts learned throughout the program.**
  - **Guidance and mentorship on project implementation.**
- **Assignment: Build a comprehensive AI/ML project (e.g., chatbot, recommender system, or predictive analytics model) and present it.**

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