3-Month Internship Program

(12 Weeks): Data Science Training

Week 1: Introduction to Data Science

- **Topics:**
  - **Overview of data science and its applications.**
  - **Introduction to Python for data analysis.**
  - **Key libraries: NumPy, Pandas, and Matplotlib.**
- **Assignment:**
  - **Analyze and visualize a small dataset using Python libraries.**

Week 2: Data Collection and Preprocessing

- **Topics:**
  - **Collecting data from various sources: APIs, web scraping, and databases.**
  - **Handling missing data and outliers.**
  - **Feature scaling and encoding categorical variables.**
- **Assignment:**
  - **Preprocess a raw dataset for analysis and modeling.**

Week 3: Exploratory Data Analysis (EDA)

- **Topics:**
  - **Understanding data distribution and relationships.**
  - **Statistical measures: Mean, median, mode, variance, and standard deviation.**
  - **Data visualization with Seaborn and Matplotlib.**
- **Assignment:**
  - **Perform EDA on a dataset and present findings with visualizations.**

Week 4: Introduction to Machine Learning

- **Topics:**
  - **Basics of machine learning: Supervised and unsupervised learning.**
  - **Linear regression for predictive modeling.**
  - **Model evaluation metrics: RMSE and R-squared.**
- **Assignment:**
  - **Build a regression model to predict a numerical outcome.**

Week 5: Supervised Learning Algorithms

- **Topics:**
  - **Classification models: Logistic regression and decision trees.**
  - **Model evaluation metrics: Accuracy, precision, recall, and F1-score.**
- **Assignment:**
  - **Create a classification model to predict outcomes from a dataset.**

Week 6: Unsupervised Learning and Clustering

- **Topics:**
  - **Introduction to clustering algorithms: K-means and hierarchical clustering.**
  - **Dimensionality reduction with PCA.**
- **Assignment:**
  - **Segment customers into groups using clustering techniques.**

Week 7: Data Visualization and Storytelling

- **Topics:**
  - **Creating dashboards with Tableau or Power BI.**
  - **Effective data storytelling techniques.**
- **Assignment:**
  - **Design a dashboard to present insights from a dataset.**

Week 8: Introduction to Big Data

- **Topics:**
  - **Basics of big data and distributed computing.**
  - **Introduction to tools like Hadoop and Spark.**
- **Assignment:**
  - **Process and analyze a large dataset using PySpark or an equivalent tool.**

Week 9: Time Series Analysis

- **Topics:**
  - **Basics of time series data.**
  - **Decomposing time series: Trend, seasonality, and residuals.**
  - **Forecasting models: ARIMA and exponential smoothing.**
- **Assignment:**
  - **Analyze and forecast trends using time series data.**

Week 10: Data Science with Deep Learning

- **Topics:**
  - **Introduction to neural networks.**
  - **Basics of TensorFlow and Keras.**
  - **Building a simple neural network for prediction.**
- **Assignment:**
  - **Create a neural network model for a dataset (e.g., classification or regression).**

Week 11: Deployment and Version Control

- **Topics:**
  - **Introduction to Git and version control for data science projects.**
  - **Deploying models using Flask or Streamlit.**
- **Assignment:**
  - **Deploy a data science project and present results through an interactive web app.**

Week 12: Final Project

- **Topics:**
  - **Consolidation of all concepts learned.**
  - **Guidance and mentorship on implementing a comprehensive project.**
- **Assignment:**
  - **Develop a data science project (e.g., sales forecasting, fraud detection, or customer segmentation) and prepare a final presentation.**

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