SYNTHLINX
Where Ideas Converge

PG Certificate in Generative AI Prompt Engineering & Co-Pilot

Duration- 7 Days

Syllabus

Day 1 & 2 : Data Science Foundations & Copilot Setup

Key Concepts:

- Environment Setup
  - Installing Visual Studio 2022 and GitHub Copilot
  - Setting up Python/C environments
- Data Science using Copilot
  - Data science lifecycle
  - Data types - structured, un structured, semi structured, Data type conversion
  - Importing datasets (CSV, Excel, SQL)
  - Data exploration (head, tail, info, describe)
  - Basic statistics (mean, median, mode, std, variance)
  - Data visualization (histogram, scatter, boxplot)
  - Data cleaning (missing values, duplicates, outliers)
  - Encoding categorical variables
  - Normalization and scaling
  - Aggregation and grouping
  - Outlier detection
  - Correlation analysis
  - Visualizing relationships (pairplot, heatmap)
- Feature engineering basics
  - Using Copilot for code suggestions
  - Copilot Chat for code explanations
- EDA & Profiling using Pandas Profiling and Co Point
  - Data profiling with Copilot
  - Automating EDA reports

Hands-on Session:

- Set up VS2022 and Copilot, load a sample dataset, perform exploration, cleaning, and basic visualization using Copilot's code completions and chat for guidance.

Case Study (1 of below):

- *Retail Sales Data Cleaning*:
  - Clean and explore a messy sales dataset, automate repetitive tasks with Copilot, and Visualize - analyse Data
- *Customer Churn Analysis*: Perform EDA on a churn dataset, identify key patterns, and automate insight generation with Copilot.

Syllabus

Day 3 & 4 :Machine Learning using Copilot

Key Concepts:

- ML Foundation
  - ML workflow overview
  - Supervised vs. unsupervised learning
  - Classification, Regression & Clustering
  - ML - Applications - Real world
- Algorithm Bries
  - Linear regression
  - Logistic regression
  - Decision trees
  - KNN
  - Random Forest
- Model Building
  - Data splitting (train/test/validation)
  - Cross-validation
  - Feature selection methods
  - Feature importance
  - Handling imbalanced data
  - Data augmentation basics
  - Model selection
- Model Evaluation & Performance
  - Evaluation metrics (accuracy, precision, recall, F1)
  - Confusion matrix
  - ROC, AUC, PR curves
  - Bias-variance trade-off
  - Detecting model bias
  - Model training with Copilot
  - Hyperparameter tuning
  - Model comparison
  - Saving/loading models
  - Copilot Chat for troubleshooting
  - Visualizing model performance
  - Model explainability (SHAP, LIME basics)

Hands-on Session:

- Build and evaluate ML models using Copilot for code generation and explanation.

Case Study:

- *Loan Default Prediction*: Use Copilot to build, evaluate, and explain a classification model for loan default.
- *Healthcare Readmission*: Engineer features for predicting patient readmission, automate with Copilot, and validate data quality.

Syllabus

Day 5: Deep Learning - using Copilot

Key Concepts:

- DL Foundation
  - Neural network basics
  - Layers and activation functions
  - Forward/backward propagation
  - Training neural networks
  - Introduction toTensorFlow
- CNN Foundation
  - CNN Introduction , architecture and use cases
  - Image preprocessing/augmentation
  - Building CNNs with Copilot
  - Model evaluation/tuning
  - Overfitting/regularization
  - Visualizing training
  - Saving/loading models
- Copilot Chat for debugging

Hands-on Session (1 of hands on):

- Build and train a neural network for digit recognition with Copilot's assistance.
- Build a CNN for image classification and an RNN for text sequences using Copilot.

Case Study (1 Of Case Study):

- *Digit Recognition*: Use Copilot to build and evaluate a neural network for MNIST digit classification.
- Build a CNN for image classification and an RNN for text sequences using Copilot.

Syllabus

Day 6:Generative AI & LLM

Key Concepts:

- Generative AI overview (GANs, VAEs, Transformers)
- LLMs in practice
- Prompt engineering
- Ethics/risks,Data privacy in GenAI
- Generating synthetic data
- Usage of Several AI Tools - Image, Video, Text etc.
- Copilot for GenAI code
- Copilot Chat for GenAI

Hands-on Session:

- Use Copilot to generate synthetic data and simple text/image outputs.

Case Study (1 of Below):

- *Synthetic Data & Text Generation*: Create synthetic patient data and text summaries using Copilot.
- Build Customer Support Conversation Bot using GROQ & LLMA

Syllabus

Day 7: Capstone Project & Communication - Assignment

Key Concepts:

- How to approach Problem solution using AIML
- Project scoping/planning
- Data acquisition/cleaning
- EDA/feature engineering
- Model building/evaluation
- Deep learning/GenAI integration
- Copilot throughout the workflow
- Copilot Chat for troubleshooting
- Visualizations/dashboards
- Automated reporting
- Executive summaries
- Presenting results
- Portfolio best practices

Hands-on Session:

- Complete an end-to-end project, leveraging Copilot for every stage, from data to deployment.

Case Study:

End-to-End Solution: Solve a business problem (e.g., customer churn, fraud detection, or content automation), using Copilot to code, document, and

SYNTHLINX
Where Ideas Converge

Visit us at:

Synthlinx LLC
3185 Pond Mist Way, Herndon, VA 20171, USA

Synthlinx Private Limited
#2105 Ground Floor, 4th Main, 5th Cross, 8th Phase, Royal County, JP Nagar,
Bengaluru - 560078, India

https://synthlinxglobal.com// Info@synthlinx.com // Ph No-+91 9538150299

Thank you