Data Programming with GenAI Bootcamp
生成式人工智能 (GenAI) 資料程式設計訓練營

課程需求：
◆ 為配合課程實作，請自備筆記型電腦（Windows 或 MacOS，不支援平板或其他行動裝置）
◆ 基本程式設計能力（任一程式語言）為宜。

➢ 第 1 天：Building Web-Based Projects and Interactive Dashboards with R

時間	課程內容
09:00-10:30	**Creating a Quarto Website and Deploying on GitHub Pages** 課程主題： • Overview of **Quarto** and **RStudio** for creating web-based projects. • Introduction to **GitHub** and **GitHub Pages** for deploying and hosting Quarto websites. • Hands-on: Set up and deploy a Quarto website using R, GitHub, and GitHub Pages, including basic markdown, navigation, and layout. **學習成果：** 學員將成功建立並於 GitHub Pages 上架設一個 Quarto 網站。
10:45-12:15	**Interactive Data Visualization with ggplot2 and Plotly** 課程主題： • Basics of **ggplot2** for data visualization and **Plotly** for adding interactivity to charts. • Hands-on: Create static visualizations with ggplot2, then add interactivity using Plotly within a Quarto document. **學習成果：** 學員將能使用 R 在 Quarto 文件中嵌入互動式資料視覺化圖表。
13:15 - 14:45	**Data Collection with APIs and Web Scraping** 課程主題： • Introduction to data collection through **APIs** using packages like **httr** and **jsonlite**. • Basics of **web scraping** with **rvest** for gathering data from websites. • Hands-on: Retrieve data from a public API and scrape a website to collect and prepare a dataset for analysis. **學習成果：** 學員將能夠使用 API 和網頁爬蟲收集資料以供後續分析使用。
15:00-16:30	**Introduction to Shiny for Interactive Web Applications** 課程主題： • Basics of **Shiny** for developing interactive web applications in R. • Introduction to reactive inputs, outputs, and building a dynamic UI with Shiny. • Hands-on: Develop a simple Shiny app that includes interactive input and output elements. **學習成果：** 學員將學會基礎 Shiny 應用程式，以增強資料視覺化和輸出的互動性。

➢ 第 2 天：Data Management, Analytics, and Advanced Modeling

時間	課程內容
09:00-10:30	**Advanced Shiny – Embedding Apps in Quarto** **課程主題:** • Advanced Shiny: Embedding Shiny apps into **Quarto** for interactive website deployment. • Customizing Shiny apps for seamless integration into a Quarto site. • Hands-on: Integrate a Shiny app within a Quarto website, using GitHub Pages for deployment. **學習成果**：學員將能將完整運作的 Shiny 應用程式整合至其 Quarto 網站中。
10:45-12:15	**Data Management and Exploratory Data Analysis (EDA)** **課程主題:** • **Data cleaning** with **dplyr** and **tidyr**: Handling missing values, data reshaping, and filtering. • **Exploratory Data Analysis (EDA)**: Summary statistics, data visualization, and feature engineering. • Hands-on: Perform data cleaning and EDA on a dataset collected during Day 1. **學習成果**：學員將具備資料清理及探索性分析的能力。
13:15 - 14:45	**Introduction to Machine Learning Models in R** **課程主題:** • Basics of **machine learning** models in R, focusing on regression and classification models. • Using R packages such as **caret** or **tidymodels** for training simple models. • Hands-on: Build a basic predictive model, evaluate its performance, and interpret the results. **學習成果**：學員將理解機器學習模型的基本原理，並能使用 R 語言建立自己的模型。
15:00-16:30	**Leveraging GenAI for Data Science and Programming in R** **課程主題:** • **Introduction to GenAI Tools**: ▪ Overview of **Generative AI** tools for data science: **GitHub Copilot**, **ChatGPT**, and R-based AI libraries. ▪ Using AI for code generation, debugging, and workflow automation. • **Using GenAI for Coding Efficiency**: ▪ Demonstration of **GitHub Copilot** to assist in writing R code, generate data analysis pipelines, and suggest improvements. ▪ Practical example: Use Copilot to build a Shiny app, automate API calls, or visualize data more efficiently.