組別 Team ID：202409
專題屬性 Catlegory：多功能網站系統（Website System Design）
專題名稱 Project：智能化的顧客銷售數據分析管理系統（Intelligent Customer Sales Data Analysis and Management System）

一、指導老師 Advistor：柯秀佳老師（Hsiu-Chia Ko）

二、 組員 Team members：黃紹庭（11014020）、林資函（11014155）、李采軒（11014158）、沈妤蓁（11014065）、陳立杰（11014134）、王翊真（11014140）

三、 系統環境 System environment：
（一）軟體 Software：
作業系統 Operating System: windows 11
語言 Programing language: Python、php、html、css
開發工具 Toolkits: Visual Studio Code、Spyder、PhpStorm
（二）硬體 Hardware：
CPU: Intel(R) Core(TM)i5-10210U CPU @ 1.6GHz 或更高規格；硬碟:475G；記憶體:8G RAM；顯示器:17 以上。

四、 簡介：
（一）系統簡述（系統的主要功能）
　　本系統為產學合作專題，主要的目的在於依合作廠商的需求量身訂製一套智能化的顧客銷售數據分析系統，包含五大模組，分別是資料匯入模組、AI 顧客價值分析模組、客戶商機管理模組、客戶及業務員關鍵價值指標分析模組、及基本資料維護模組。首先，資料匯入模組讓公司僅需上傳單一銷售資料表，系統即自動匯入客戶、產品、銷售、及員工資料。系統提供自動化數據匯入的同時，亦保留資料維護的彈性與靈活性。其次，AI 顧客價值分析模組提供兩個 AI 模式，包括：(1)依 FRM 進行客戶價值分群及自動貼標籤，與(2)流失客戶預測。此兩個功能讓公司能有效進行客戶分級，並掌握最有價值及高流失風險的客戶，以進一步提供客製化服務。第三、客戶商機管理模組包含 AI 購物籃分析及回購預測。回購預測讓業務員可以主動接觸客戶，購物籃分析則能讓業務員主動推薦潛在產品，兩者相輔相成，提升銷售業績並強化客戶關係管理。管理者亦可藉此分析接觸成本，進行較佳的資源配置。第四、客戶關鍵價值指標分析模組，透過直觀的儀表板讓公司或部門管理者掌握客戶貢獻與經營成本，發掘對獲利最有價值的客戶。第五、基本資料維護模組，包含所有基本資料的彈性設定與管理，為公司未來需求的變動預留增加更多 AI 模組、客戶標籤、及商機接觸階段的擴展性。

（二）特色（系統的亮點）
● 智能化的流失客戶辨識：AI 自動辨識流失客戶，降低客戶流失率。
● 自動化的顧客標籤分級:RFM 模型自動分級客戶,精準標籤識別最有價值的客戶。
● 智慧化的購物籃關聯分析：AI 購物籃分析挖掘潛在產品，提升交叉銷售的機會。
● 精準化的商品回購週期預測：協助業務精確掌握客戶回購商品的時間點，提升顧客忠誠度。
● 彈性化的商機階段管理:依不同客戶關係經營特性與需求,客製專屬的商機階段。
● 靈活且安全的系統權限管理：依角色設定系統使用權限，確保系統安全。
● 直觀簡易的操作介面：友善易上手的操作介面，提升系統的易用性。
● 一鍵式的資料匯入：簡易對接公司銷售資料，一鍵完成匯入，提升數據整合效率。
● 易維護的 MVC 系統開發架構：提升系統的維護、擴展、及開發靈活性。

五、 Introduction：

(1) System Overview (Main System Functions)

This system, developed as an industry-academia collaboration project, is designed to provide a customized intelligent customer sales data analysis solution tailored to meet the needs of our partnering companies. It comprises five main modules: Data Import Module, AI Customer Value Analysis Module, Customer Opportunity Management Module, Customer and Sales Representative Key Performance Indicator Analysis Module, and Basic Data Maintenance Module.

First, the Data Import Module allows the company to simply upload a single sales data set, from which the system automatically imports customer, product, sales, and employee data. This module provides automated data import while retaining flexibility for data maintenance.

Second, the AI Customer Value Analysis Module offers two AI-driven functions: customer segmentation and automatic labeling based on the RFM mode, and churn prediction. These tools enable effective customer tiering, helping the company identify high-value and high-risk customers for tailored services.

Third, the Customer Opportunity Management Module includes AI-based market basket analysis and repurchase prediction. The repurchase prediction function allows sales representatives to proactively engage with customers, while the market basket analysis helps them recommend potential products, boosting sales performance and enhancing customer relationship management. Managers can also use this module to analyze engagement costs for optimized resource allocation.

Fourth, the Customer Key Performance Indicator Analysis Module provides an intuitive dashboard that allows company or department managers to monitor customer contribution and operational costs, identifying the most valuable customers for profitability.

Fifth, the Basic Data Maintenance Module provides flexible setup and management of basic data, reserving space for future needs such as adding more AI modules, customer labels, and stages for opportunity engagement.

(2) Key Features (System Highlights)

- Intelligent Customer Churn Identification: AI automatically identifies at-risk customers, reducing churn rates.
- Automated Customer Segmentation and Labeling: RFM modeling automatically segments customers, accurately identifying the most valuable ones.
- Smart Market Basket Analysis: AI-driven market basket analysis uncovers potential products, increasing cross-selling opportunities.
- Precise Repurchase Cycle Prediction: Helps sales teams accurately anticipate customer repurchase timing, enhancing customer loyalty.
- Flexible Opportunity Stage Management: Customizable opportunity stages tailored to diverse customer relationship needs and characteristics.
- Flexible and Secure Access Control: Role-based access settings ensure system security.
- User-Friendly Interface: An intuitive and easy-to-use interface, enhancing system usability.
- One-Click Data Import: Seamless integration of company sales data with one-click import, improving data consolidation efficiency.
- Maintainable MVC Architecture: A flexible MVC framework that supports easy system maintenance, expansion, and development.