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Prompt Engineering & Analytics

Transforming Data into Actionable Insights with Code, ML, and Visualization Tools

FA-0369 · 2 days

Agentic & Generative AI · Data & Analytics · Automation, RPA & Power Platform

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Introduction

Duration: 2 days

With the rise of **Large Language Models (LLMs)**, industries are shifting towards more automated, intelligent ways to generate insights and code efficiently. In the highly competitive semiconductor industry, engineers need to stay ahead by leveraging these advanced models not only for analytics but also for prompt-based code generation. This two-day intensive course bridges **prompt engineering, coding, machine learning (ML), deep learning (DL)**, and **data visualization** to help engineers unlock the full potential of their log files and CSV datasets.

The course is specially tailored for **engineering professionals**, focusing on building skills for **automated code generation**, **data manipulation**, and **analytics-driven decision-making**. Participants will also explore how to use **LLMs** to automate tasks and develop predictive models, all while working with practical datasets, such as **logs and CSV files**. This is not just an academic course—your instructor, with over **30 years of industry experience**, will guide you through **real-world scenarios** and practical applications, helping you implement cutting-edge solutions at work.

Learning outcomes

By the end of this course, participants will:

- Understand how to design effective prompts to generate code, analytics, and insights.
- Utilize LLMs for analytics, including text extraction, data transformation, and predictive modeling.
- Learn techniques to extract insights from log files and CSV data.

- Automate analytics workflows using code generated through LLMs.
- Gain a basic understanding of **Machine Learning (ML)** and **Deep Learning (DL)** models relevant to analytics.
- Create compelling visualizations to present analytical results effectively.
- Build practical solutions that automate insights and data-driven decision-making processes.

Prerequisites

- Familiarity with Python (basic coding experience)
- Basic knowledge of analytics concepts (e.g., working with data)
- Understanding of CSV files and structured data formats
- Some experience working with **log files** for troubleshooting is beneficial

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Training outline

1. 1. Introduction to Prompt Engineering for Code and Analytics

- What is Prompt Engineering?
- How LLMs interpret and respond to prompts

  Designing prompts for:

  - Code generation (Python examples)
  - Data extraction and analysis
- **Hands-on Practice**: Writing prompts to generate Python scripts for log file parsing and CSV manipulation.

2. 2. Working with Data Sources: Logs and CSV Files

- Structure and challenges of semiconductor **log files**
- Using **CSV files** for data analysis and visualization
- Common analytics tasks: filtering, grouping, and aggregating data
- **Exercise**: Parsing and cleaning log files & CSVs using LLM-generated Python scripts

3. 3. Leveraging LLMs for Analytics Workflows

- Automating **log data extraction** and **error detection** using LLMs
- Generating Python code for data manipulation and exploratory data analysis (EDA)

- Techniques for **prompt-based code refinement** and error handling in generated code
- Case Study: **Extracting patterns from logs to predict production anomalies**

4. 4. Integrating Machine Learning (ML) and Deep Learning (DL) in Analytics

Introduction to ML and DL concepts relevant to **semiconductor data**

- Supervised vs. Unsupervised Learning
- Neural Networks and Deep Learning basics

- **Use Cases in Analytics**: Predictive maintenance and yield improvement

Prompt Engineering for:

- Generating ML code (scikit-learn example)
- Building neural network models (TensorFlow/Keras)

- **Hands-on**: Using LLMs to generate, modify, and execute ML models

5. 5. Visualizing Data and Analytical Results

- Overview of data visualization tools (Matplotlib, Seaborn, Plotly)
- Prompt-driven code generation for custom visualizations

Best practices for visualizing:

- Time-series log data
- CSV data trends and outliers

- **Exercise**: Generate Python code for visualizations and tweak them using prompts

6. 6. End-to-End Workflow Automation

- Combining prompts for multi-step analytics (data cleaning → ML modeling → visualization)
- Automating error handling and code optimizations through **iterative prompts**
- **Scenario**: End-to-end project involving data ingestion, analytics, and reporting.

This training provides engineers with actionable knowledge to **automate workflows**, **accelerate analytics**, and **enhance their coding abilities** using the latest tools and techniques in prompt engineering and LLMs. Whether it's detecting hidden insights from log data, creating predictive models, or visualizing key trends, this course will equip participants with the skills needed to thrive in a data-driven future.

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