Data Analytics and Fraud Detection for Auditors

Overview

Title: Hands-on Data Analytics and Fraud Detection for Auditors
Duration: 10 Days (Full-time)
Tools: Python, Power BI, Scikit-learn, Pandas, Jupyter, OpenAI/AI models

Objectives:

1. Apply data analytics and AI to enhance audit effectiveness.
2. Use Python for data cleaning, analysis, and visualization.
3. Build fraud detection dashboards using Power BI.
4. Develop and evaluate machine learning models for fraud detection.
5. Identify anomalies using unsupervised learning techniques.
6. Automate audit tasks with AI and LLM tools.
7. Analyze real-world fraud scenarios using data-driven methods.
8. Present audit findings through visual and narrative reporting.
9. Ensure ethical application of analytics in auditing.
10. Create reusable audit analytics workflows.

Day 1: Introduction to Data Analytics in Auditing
- Role of data analytics in modern auditing and fraud detection
- Types of fraud schemes detectable via analytics
- Overview of tools: Python, Power BI, and AI
- Installing Jupyter, Power BI, and Python libraries (pandas, numpy, matplotlib)
- Hands-on: Setting up the environment, Importing and cleaning sample audit datasets

Day 2: Python for Auditors – Basics to Analysis
- Python data types and structures
- Reading financial and transactional data (CSV, Excel)
- Data manipulation using Pandas
- Visualizations using Matplotlib & Seaborn
- Hands-on: Analyze journal entries and transactions using Python

Day 3: Power BI Essentials for Auditors
- Connecting Power BI to data sources (Excel, SQL, APIs)
- Creating dashboards and visualizations

- Using filters, slicers, and drill-through for audit testing
- DAX basics for audit KPIs
- Hands-on: Build a fraud risk dashboard from sample GL/transaction data

Day 4: Audit-Focused Exploratory Data Analysis (EDA)
- Identifying anomalies in data using visual techniques
- Correlation, outliers, and patterns
- Audit-specific EDA: duplicate invoices, round amounts, weekend transactions
- Hands-on: Analyze procurement and payroll data for red flags

Day 5: Introduction to Machine Learning for Fraud Detection
- Overview of supervised vs unsupervised learning
- Classification problems in fraud detection
- Preprocessing data: encoding, scaling, dealing with imbalance
- Hands-on: Build a logistic regression model to classify fraud vs non-fraud transactions

Day 6: Advanced Machine Learning Models
- Decision Trees, Random Forests, XGBoost
- Model evaluation: confusion matrix, precision, recall, F1
- Feature selection and importance in audit scenarios
- Hands-on: Build and evaluate models to detect fraudulent expense claims

Day 7: Unsupervised Learning for Anomaly Detection
- Clustering (K-means, DBSCAN) for transaction profiling
- Autoencoders and Isolation Forests
- Unsupervised techniques when no labeled fraud data is available
- Hands-on: Apply anomaly detection on bank transaction or GL data

Day 8: AI Tools in Auditing (LLMs and Automation)
- Using GPT/LLM APIs for narrative analysis (e.g., reading audit reports/emails)
- Automating audit procedures using AI
- Introduction to RPA + AI for repetitive audit tasks
- Hands-on: Build a script to summarize suspicious patterns using AI

Day 9: Fraud Scenario Simulations and Case Studies
- End-to-end fraud investigation simulation
- Red flag identification
- Linking analytics with audit evidence
- How to write audit findings supported by analytics
- Hands-on: Group case study: Use Power BI + Python to present a fraud detection project

Day 10: Audit Reporting, Ethics, and Final Presentations
- Ethical use of analytics and AI in auditing

- How to document analytics workpapers
- Final team presentations of fraud detection dashboards
- Certification and feedback session
- Hands-on: Build a final audit analytics report using Power BI and Python output

Training Materials Included

- Audit datasets: procurement, payroll, journal entries, bank transfers
- Jupyter notebooks with templates
- Power BI dashboard templates
- Python code snippets for fraud detection models
- Pre-built AI audit assistant prompt examples