Digital Egyptian Pioneer Initiatives :
Microsoft Machine Learning
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Fraud detection in Financial Transactions

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Project Plan :

Week 1: Data Collection and Preprocessing

Tasks :

Data Collection: Obtain financial transaction data, including labeled fraudulent and non-fraudulent transactions.

Data Preprocessing: Clean and preprocess the data, addressing missing values and normalizing features.

Tools: Python (Pandas, NumPy).

- **Deliverables:**
  - o Cleaned and preprocessed dataset.
  - o Data preprocessing notebook.

Week 2: Statistical Analysis and Machine Learning

Tasks :

Statistical Analysis: Perform statistical analysis to understand the distribution of fraud-related features.

Machine Learning: Develop and evaluate classification models for fraud detection (e.g., Logistic Regression, Random Forest).

Tools: Python (Scikit-learn, Statsmodels).

- **Deliverables:**
  - o Statistical analysis report.
  - o Fraud detection models and performance metrics.

Week 3: Advanced Techniques and Azure Integration

Tasks :

NLP for Transaction Notes: Apply NLP techniques to analyze transaction descriptions or notes.

Azure AI Fundamentals: Deploy the fraud detection model using Azure Machine Learning or Azure Synapse.

Tools: Azure Machine Learning, Python (NLTK, SpaCy).

- **Deliverables:**
  - o Enhanced fraud detection model with NLP integration.
  - o Deployment setup on Azure.

Week 4: MLOps, GANs, and Final Presentation

Tasks :

MLOps: Use MLflow to manage and track fraud detection models.

o GANs for Synthetic Data: Implement a GAN to generate synthetic fraud transaction data for training and validation.

o Final Report and Presentation: Document the project including data analysis, model development, and deployment.

Tools: MLflow, Python (TensorFlow/PyTorch for GANs), Azure services.

• **Deliverables:**

o Deployed fraud detection model with synthetic data.

o Final report and presentation.