Internship Task 2 Report - AI/ML Domain

Project Title: Credit Card Fraud Detection System

This project was completed as Task 2 under the AI/ML internship offered by Brainwave Matrix Solutions. The main goal was to identify fraudulent credit card transactions using machine learning models while handling data imbalance.

Objective

With the increase in digital payments, the risk of credit card fraud has significantly increased. This project aims to detect fraudulent transactions using supervised machine learning techniques with imbalanced datasets.

Tools & Technologies Used

- Python
- Pandas & NumPy
- Scikit-learn
- imbalanced-learn (SMOTE)
- Random Forest & Logistic Regression
- StandardScaler
- Joblib

Methodology

1. Loaded the credit card transaction dataset.
2. Preprocessed the data using feature scaling (StandardScaler).
3. Handled class imbalance using SMOTE (Synthetic Minority Oversampling Technique).
4. Trained and evaluated two models: Logistic Regression and Random Forest.
5. Evaluated the models using metrics: Confusion Matrix, Accuracy, Precision, Recall, F1-Score, ROC-AUC.
6. Exported the best-performing model and scaler for future use.

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Sample Evaluation Output

Confusion Matrix:

[[85231 2]

[5 850]]

Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	85233
1	1.00	0.99	1.00	855

Accuracy: 1.00

ROC AUC: 0.998

Artifacts Delivered

- Python script: ai_ml_intern_fraud_task.py
- Trained model: model.pkl
- Scaler: scaler.pkl
- This report: Credit_Card_Fraud_Detection_Report.pdf

Conclusion

This project provided valuable experience in detecting fraud with real-world, imbalanced datasets and reinforced key concepts in machine learning, data preprocessing, and model evaluation.

Submitted By

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Company: Brainwave Matrix Solutions