Assignment Report: Fintech Firm AI Strategy

Objective of the Assignment

To analyze the financial data of a fintech firm undergoing a transition to an AI-first strategy. Tasks include preprocessing, strategy formulation, feature engineering, modeling, evaluation, and clustering.

1. Preprocessing and Noise Removal

- Loaded and explored data
- Checked data types, summary stats, and missing values
- Imputed missing values using mean strategy
- Removed whitespace issues in column names

2. Business Strategy Formation

- Used KMeans clustering to segment companies based on financial health
- Evaluated clusters with Silhouette Score
- PCA applied to improve clustering

3. Feature Engineering

- Created domain-driven features like:
  * High_Debt_Equity
  * Low_Profit_Margin
  * High_Risk_Flag
- Flags help identify risky companies

4. Modeling and Evaluation

- Classification task using Random Forest & Logistic Regression
- SMOTE used to balance classes
- RandomForest hyperparameter tuned using GridSearchCV
- Evaluation via classification report (Precision, Recall, F1)
- Model saved: bankruptcy_rf_model.pkl

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5. Clustering Evaluation

- Evaluated Silhouette Score for multiple cluster counts
- PCA applied to improve clustering
- Final clustering stored in data

Conclusion

All required tasks were successfully implemented:

- Preprocessing
- Business strategy via segmentation
- Feature engineering
- Classification modeling
- Clustering insights

The pipeline is clean, reproducible, and ready for dashboarding or deployment.