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Project Report: Financial Forecasting using ML and AI

Introduction

The objective of this project is to predict the quarterly percentage change in revenue for companies in the financial sector. Leveraging machine learning algorithms, including Linear Regression, Random Forest, Artificial Neural Network (ANN), and XGBoost, we aim to assess their effectiveness in predicting financial metrics.

Methodology:

- **Data Preprocessing:**
  - Imported and filtered the financial dataset using Pandas.
  - Focused on predicting "% Change in Quarterly Revenue" for Apple
  - Conducted feature selection and dropped unnecessary columns.
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- **Exploratory Data Analysis:**
  - Utilized Plotly and Seaborn to visualize the distribution of the target variable and explore feature correlations through a heatmap.

- **Model Training and Evaluation:**
  - Trained and evaluated the performance of four models:
    - ***Linear Regression***:
      RMSE: 363.54, MSE: 132158.01, MAE: 291.65
    - ***Random Forest:***
      RMSE: 0.15, MSE: 0.02, MAE: 0.12
    - ***Artificial Neural Network (ANN*)**:
      RMSE: 0.29, MSE: 0.08, MAE: 0.23
    - ***XGBoost:***
      RMSE: 0.14, MSE: 0.02, MAE: 0.12
    - ***XGBoost*** *(post hyperparameter optimization)**:***
      RMSE: 0.13, MSE: 0.02, MAE: 0.11

Results and Conclusion:

- **Model Performance:**
  - Compared the predictive accuracy of models based on key metrics (RMSE, MSE, MAE).
  - Identified XGBoost as the top-performing model.

- - **Conclusion:**
  - XGBoost, post hyperparameter optimization, demonstrated superior predictive capabilities, making it the recommended model for financial revenue predictions.