AAC 414 ACCOUNTING ANALYTICS CAPSTONE (SMU-X) – Group 5

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Problem Statement
Our objective is to develop a model to make more informed decisions related to **anomaly detection** which would enable better investment decisions.

Approach
- **Model 1 – Explicit Rules**
- **Model 2 – K-Means Clustering**
- **Model 3 – Random Forest**
- **Dashboard Development**

DATA PREPARATION AND MACHINE LEARNING

Three-Pronged Approach:

Model 1 – Explicit Rules
Technical market indicators to test for the presence of price, volume, liquidity, momentum, volatility and mean-reversion anomalies.

Model 2 – K-Means Clustering
Unsupervised learning algorithm which segregates historical data into groups and identifies anomalies.

Model 3 – Random Forest
Supervised learning algorithm leveraging on decision trees to distribute data and flag anomalies.
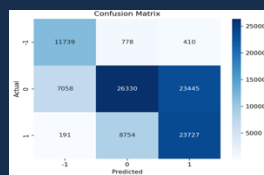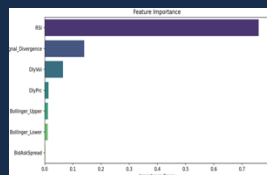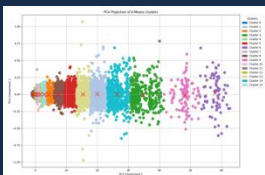
Combine the outputs to identify the **common stocks** flagged for anomalies across the selected period by all 3 models.

K-Means Clustering

Feature Importance

Confusion Matrix

Evaluation Metrics
- ◇ **Accuracy**
- ◇ **Recall**
- ◇ **Feature Importance**
- ◇ **Precision**
- ◇ **F1-Score**
- ◇ **Back-Test Accuracy**

DATA VISUALISATION – TABLEAU

Dashboard Development
Our Tableau dashboard serves to provide a comprehensive analysis of each stock's performance in terms of both selected market indicators and financial ratios.

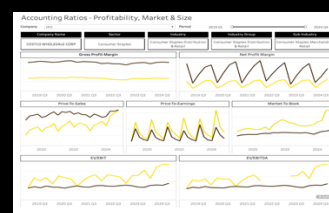**Contents:**
- ⭐ **General Stock Information**
- ⭐ **Trading Recommendations**
- ⭐ **Daily Performance Analysis**
- ⭐ **Financial Ratio Analysis**

- General overview of all stocks in the S&P 500 selections.
- Identifies the companies flagged by the overlaps of the Three-Pronged Approach
- Ranks the top 5 best and worst performing stocks.
- Drilldown option on the selected stock automatically filters all the charts and tables on the subsequent pages for the selected stock.

- Overall view of all the technical indicators.
- Compares the individual trade signals such as signals determined by price indicators alone or momentum indicators alone and compare them with the overall trade signals.
- Narrows user's decision-making rationale to a combination of a select few indicators, should he not wish to rely on the combined assessment of all indicators selected.

- Zoomed in view of the Price Graph showing daily movement that highlights the portion flagged out by the overlapping approach in black.
- Contains Bollinger Bands and Price Z-scores used to flag price anomalies.
- Select the flagged data-point on the Price Graph, which acts as a filter for the entire page.
- Allow the user to gain deeper insights on the reasons for which the particular data point was flagged as an anomaly by the ML models.

- Display of company's sector, industry, industry group and sub-industry information.
- Contains comparison of company's Profitability, Liquidity, Investment Returns & Size against sector performance.
- Enables users to assess any abnormal behaviour in terms of financial performance.