

AI-Driven Stock Market Forecasting Using Financial Statement Analysis

Report (2)

By

Marwa Othman Esaa

Midocean University

Advisor

Dr. Ashraf Elsayed

Data Description

This dataset contains historical financial ratios for 100 Saudi companies listed on the Tadawul All Share Index (TASI). We selected 100 stocks, spanning from 2017Q1 to 2025Q1, encompassing a total of 33 quarters' worth of financial data.

Handling Missing Values

Estimate missing values located between valid time points by finding the averaging, for example, if Q2 is missing but Q1 and Q3 exist, Q2 is estimated as the average of Q1 and Q3. If there is only one quarter we use Forward and Backward Fill which Propagates the last or next known valid value forward. Finally, handle remaining missing values with (-1) to tell the model ignore them.

GRU Modeling

Starting with three companies, train GRU to predict stock returns using a sequence of historical quarterly financial ratios. The model was trained on 17 financial features per quarter, structured into rolling sequences of four consecutive quarters per company. These sequences served as the input to the GRU model, which was designed with a single GRU layer followed by a fully connected layer and a sigmoid activation function. The target variable was the normalized stock return in the quarter immediately following each input sequence. The model was trained using the mean squared error (MSE) loss function and optimized via the Adam optimizer over 100 epochs.