We aim to investigate the validity of the sympathy play strategy on Pinterest (PINS) in the Internet sector. We selected the stock prices of 10 companies within this sector—GOOG, META, IAC, MTCH, PINS, SNAP, SPOT, TWLO, YELP, and YNDX. Daily stock prices from January 1, 2020, to May 30, 2024, were sourced from Yahoo Finance, from which we computed the daily return. We introduce a new categorizable variable termed 'sympathy play'. If the daily return of PINS falls below the 0.5 quantile of its historical prices within the specified period, and at least one of the other stocks exceeds the 0.8 quantile of its prices, we assign a value of 1 to the sympathy variable. Otherwise, it is set to 0. Subsequently, 80% of the data will be allocated as training data, while the remaining 20% will serve as test data. The training data will be used to fit several time series models, enabling us to predict the returns of these stocks and assess the models' accuracy.

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03041 |
| Training Mean Squared Error | 0.00197 |
| Test Mean Absolute Error | 0.01718 |
| Test Mean Squared Error | 0.00078 |

1.Naïve model (without sympathy play)

A graph showing a number of data

Description automatically generated

2. Rolling Average (without sympathy play)

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.02879 |
| Training Mean Squared Error | 0.00176 |
| Test Mean Absolute Error | 0.01718 |
| Test Mean Squared Error | 0.00078 |

A graph showing a number of data

Description automatically generated

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03067 |
| Training Mean Squared Error | 0.00200 |
| Test Mean Absolute Error | 0.01726 |
| Test Mean Squared Error | 0.00078 |

3. Exponential Smoothing (without sympathy play)

A graph showing a graph of a graph

Description automatically generated with medium confidence

1. Double Smoothing (without sympathy play)

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03626 |
| Training Mean Squared Error | 0.00265 |
| Test Mean Absolute Error | 0.04921 |
| Test Mean Squared Error | 0.00324 |

A graph of a graph

Description automatically generated with medium confidence

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03041 |
| Training Mean Squared Error | 0.00197 |
| Test Mean Absolute Error | 0.01726 |
| Test Mean Squared Error | 0.00078 |

1. Triple Smoothing (without sympathy play)

A graph showing a graph of a wave

Description automatically generated with medium confidence

A graph of a function

Description automatically generated A graph of a line graph

Description automatically generated

Given PACF and ACF close to zero beyond the first lag, as observed in the plots, it suggests that the time series is stationary and no differencing is required, indicating that the appropriate differencing order d, for this ARIMA model is zero.

1. ARIMA model (without sympathy play)

Best ARIMA model: p=3, d=0, q=1

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03039 |
| Training Mean Squared Error | 0.00195 |
| Test Mean Absolute Error | 0.01726 |
| Test Mean Squared Error | 0.00078 |

A graph showing a graph of data

Description automatically generated with medium confidence

1. SARIMA model (with sympathy play)

Best SARIMA model: p=3, d=0, q=1, P=0, D=0, Q=0, m =0

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03031 |
| Training Mean Squared Error | 0.00194 |
| Test Mean Absolute Error | 0.01734 |
| Test Mean Squared Error | 0.00079 |

A graph showing a number of data

Description automatically generated

1. LSTM(without sympathy play)

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03085 |
| Training Mean Squared Error | 0.01801 |
| Test Mean Absolute Error | 0.00199 |
| Test Mean Squared Error | 0.00081 |

Training condition: batchsize 25, epoch 1000, Two LSTM layers: number of neurons=50

One dense layer with number of neurons 25

A graph of a sound wave

Description automatically generated

|  |  |
| --- | --- |
| Training Mean Absolute Error | 0.03047 |
| Training Mean Squared Error | 0.01744 |
| Test Mean Absolute Error | 0.00197 |
| Test Mean Squared Error | 0.00079 |

1. LSTM (same training condition as 8 with sympathy play)A graph of a sound wave

   Description automatically generated

From the results, it appears that employing sympathy play does not significantly reduce errors, suggesting that this strategy may not play a crucial role in stock market decision-making.