

# Academic Report Cover Page

Subtitle

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Instructor's Name

November 5, 2023

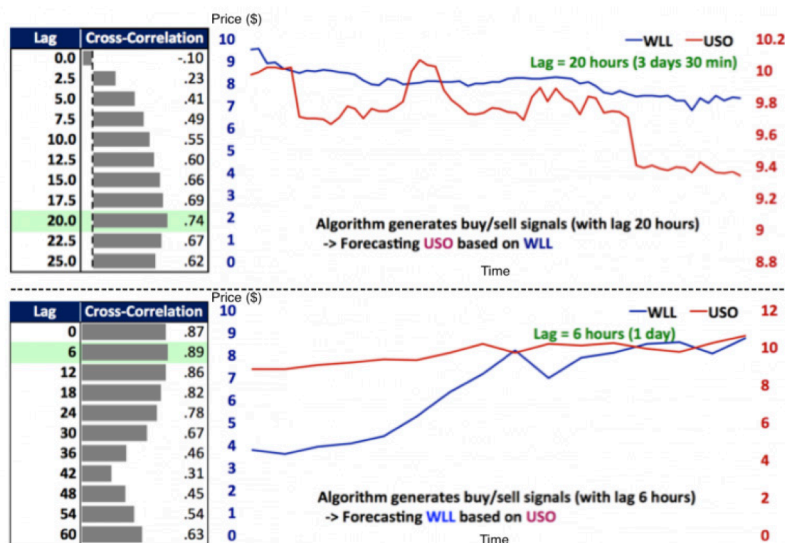
# Research Methods and Objectives

In this study, we aim to explore and evaluate common stock market trading methods, employing a variety of approaches to enhance our understanding of effective strategies. Our objectives include testing three widely used trading methods, seeking ways to improve trading returns, and integrating observations from the stock market into our models.

## Study common stock market trading method

### A Cross Correlation-Based Stock Forecasting Model

A stock forecasting model that utilizes cross-correlation analysis to identify relationships between stock prices and market indicators. The model aims to provide accurate predictions by analyzing historical data and leveraging statistical methods.



Sungil Kim, Michael E. Baginski

Auburn University Journal of Undergraduate Scholarship

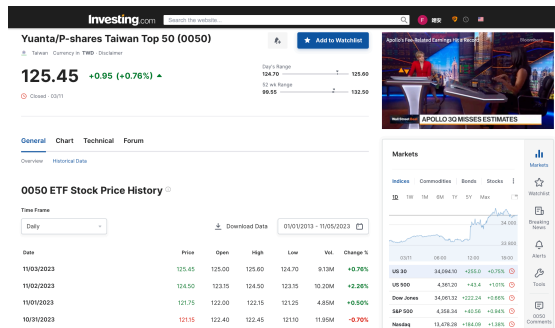
November 17, 2016

## Test three common methods

### How to obtain data?

- Data Source: 0050 Taiwan Stock Market - Yuanta/P-shares Taiwan Top 50

- Data Selection Period: January 1, 2014, to November 4, 2023
- <https://www.investing.com/etfs/yuanta-p-shares-taiwan-top-50-historical-data>



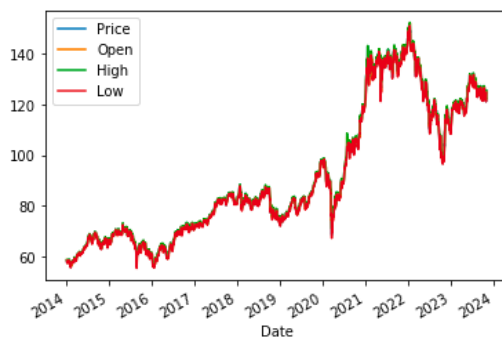
Web page screenshot

	Date	Price	Open	High	Low	Vol.	Change %
0	11/03/2023	125.45	125.00	125.60	124.70	9.13M	0.76%
1	11/02/2023	124.50	123.15	124.50	123.15	10.20M	2.26%
2	11/01/2023	121.75	122.00	122.15	121.25	4.85M	0.50%
3	10/31/2023	121.15	122.40	122.45	121.10	11.95M	-0.70%
4	10/30/2023	122.00	122.40	122.85	121.75	9.79M	-0.25%
...	...	...	...	...	...	...	...
2397	01/08/2014	57.80	57.70	57.95	57.70	7.61M	0.17%
2398	01/07/2014	57.70	57.75	57.90	57.70	13.13M	0.00%
2399	01/06/2014	57.70	57.75	57.95	57.55	14.87M	-0.26%
2400	01/03/2014	57.85	58.45	58.45	57.70	14.51M	-1.20%
2401	01/02/2014	58.55	58.70	58.75	58.35	10.76M	-0.26%

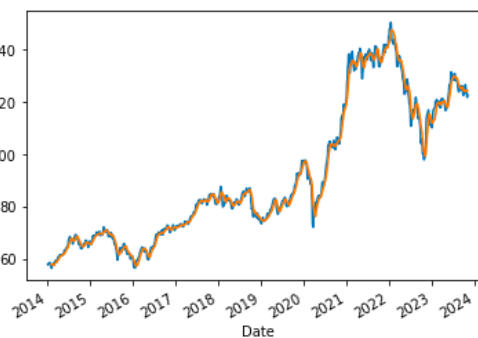
Original data format

## 1. Golden Cross

- Moving Average Parameters: Short = 5, Long = 20
- Total Return Rate of Backtesting Analysis: 62.48%



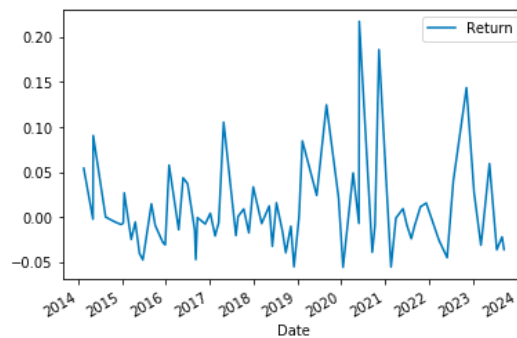
Trend chart of original data



Long and short moving averages



Entry points



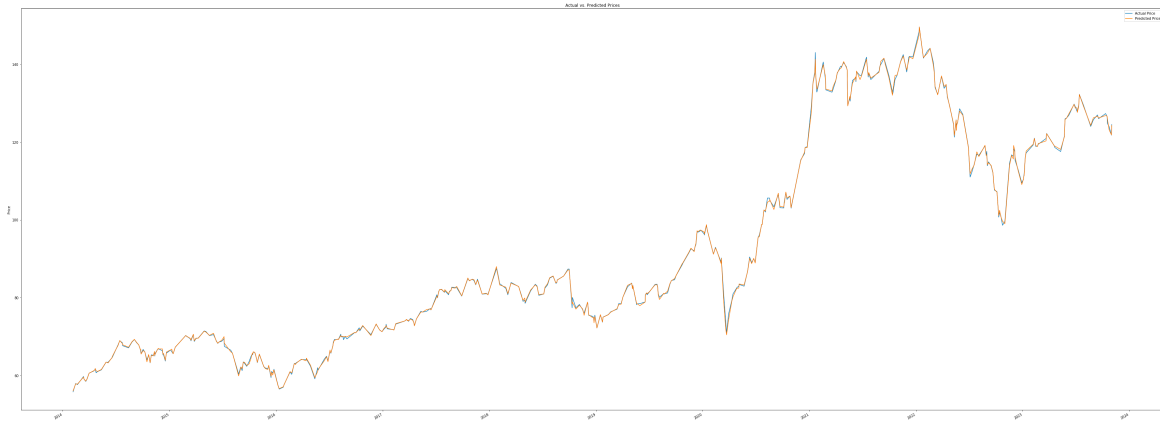
Return rate for each trade

## 2. Machine Learning-random forest

- 80% of the data is the training set, and 20% is the test set

```
# 將資料分為訓練和測試集
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

- R2 Score: 0.9997980640298204
- Issue: No concept of time series



Actual price and predicted price trend chart

## 3. LSTM

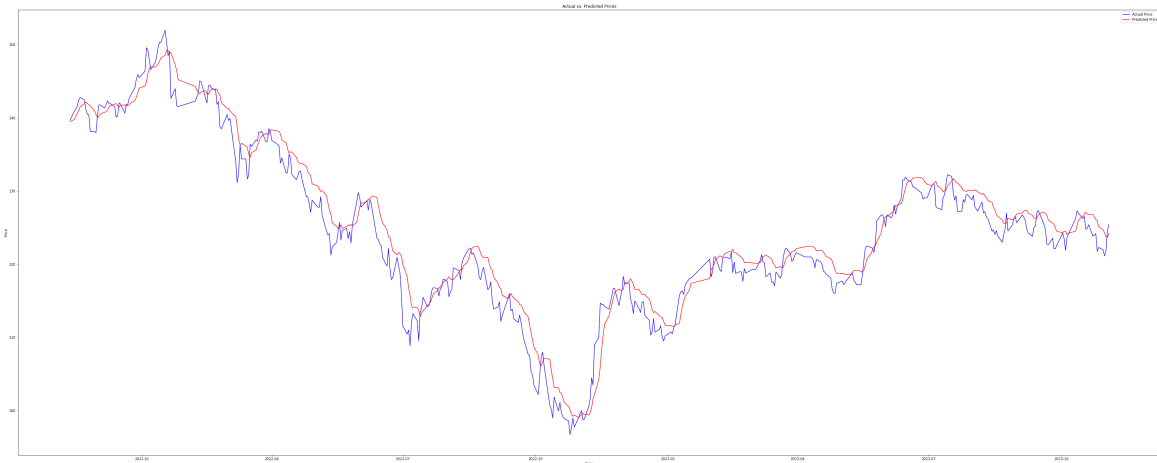
- Using data from the past ten days as the training set for each training.

```
# 設定時間窗口大小
time_steps = 10
```

- The first 80% of the data is the training set.

```
# 分割訓練集和測試集
train_size = int(len(X) * 0.8)
test_size = len(X) - train_size
trainX, testX = X[0:train_size], X[train_size:len(X)]
trainY, testY = y[0:train_size], y[train_size:len(y)]
```

- R2 Score: 0.9535430373937358
- RMSE: 2.4544517600216915



Actual price and predicted price trend chart

## **Incorporating stock market observations**

## **Integrating prediction / trading methods**

## **Reference**

- <https://wealth.businessweekly.com.tw/GArticle.aspx?id=ARTL000091498&p=1>
- <https://github.com/nickmccullum/algorithmic-trading-python>
- Python Programming for Finance
- How to Backtest your First Trading Strategy in Python
- <https://medium.com/overfitted-microservices/looking-for-correlations-in-the-stock-market-1b90bd438745>
- <https://www.posternerd.com/sciposters-templates>
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