7COM1079-0901-2024 - Team Research and Development Project

Analysing the Correlation Between Simple Moving Average of Close Prices and the Price Volatility (Difference Between High and Low Prices) in Hyundai's Stock Data

Group ID: A 246
Dataset number: DS327 - Hyundai Motor Company Stock Historical Price
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Abstract

This research investigates the relationship between the Simple Moving Average (SMA) of closing prices and the difference between the highest and lowest prices of Hyundai's stock. The goal is to understand how these two factors are related and whether one can help predict the other. To analyse this, we used two visualizations: a histogram and a scatter plot. The histogram showed that the price differences were not normally distributed, with most values clustering around smaller differences, and fewer occurrences of large price changes. The scatter plot illustrated a positive relationship between SMA and price differences, though there was considerable variability and outliers, suggesting that the relationship is not straightforward. Due to the non-normal distribution of the data, non-parametric methods, such as Spearman's Rho and Kendall's Tau, were used to measure the correlation between these two factors. The results indicated a moderate correlation, but also highlighted the importance of considering outliers and variability when interpreting market data. Overall, this research provides insights into how SMA and price differences can be used together to better understand Hyundai's stock behaviour, guiding future analysis and investment strategies.

Table of Contents

1. Introduction

1.1. Problem Statement and Research Motivation

In the financial world, stock data refers to information about the performance of a company's shares on the stock market. This data typically includes details like the prices at which shares were bought and sold, how much the prices fluctuated, and how many shares were traded. Studying stock data helps investors, analysts, and stakeholders make better decisions by identifying patterns or trends in how the stock behaves.

For this research, we focus on the stock data of Hyundai Motor Company, a global leader in the automotive industry. Hyundai Motor Company, based in Seoul, South Korea, is a global leader in vehicle manufacturing, offering cars, SUVs, and eco-friendly models like electric and hybrid vehicles. Investing in Hyundai stocks means owning a part of a company involved in diverse areas like car production, financing, and mobility services. The stock's performance depends on factors like global vehicle demand and advancements in green technology, making it an exciting option for this Research. The goal is to investigate if there is a relationship between two key aspects of its stock performance:

1. The Simple Moving Average (SMA) of Closing Prices: This is the average of a stock's closing prices over a specific time frame. It smooths out price fluctuations to help identify trends.
2. The Price Volatility (Difference Between High and Low Prices): This shows how much the stock's price changes within a single day, capturing the range of volatility.

By analysing this relationship, we aim to uncover patterns that could guide investment decisions or provide insights into market behaviour.

1.2. Dataset Description

The dataset shown in Fig 1.1. is titled "Hyundai Motor Company Stock Historical Price" and is sourced from Kaggle [5], with data originally taken from Yahoo Finance. It contains daily stock price records from January 2016 to the present. Each record in the dataset has several columns, and here is what they represent:

- **Date:** The specific day the stock prices were recorded.
- **Open:** The price at which Hyundai's stock started trading that day.
- **High:** The highest price the stock reached during the day.
- **Low:** The lowest price the stock fell to during the day.
- **Close:** The price at which the stock finished trading that day.
- **Adjusted Close (Adj Close):** The stock's closing price adjusted for corporate actions like dividends, stock splits, or other events.
- **Volume:** The total number of shares traded during the day.

For this study, to examine this relationship, we will focus on the following:

- SMA of Closing Prices (independent variable) calculated by the following formula:

$$sma_t = \frac{1}{n} \sum_{i=t-n+1}^{t} close_i$$

Where,
  - sma_t: Simple Moving Average at time t.
  - n: Number of periods for the moving average.
  - $close_i$: The Close price at time i.
  - t: The current time period.
- the Price Volatility (dependent variable) which is calculated as follows.

$$pricevolatility_t = high_t - low_t$$

Where,
  - $pricevolatility_t$: Price Volatility at time t.
  - $high_t$: High Price at time t.
  - low_t: Low Price at time t.
  - t: The current time period.

	Date	Open	High	Low	Close	Adj.Close	Volume	sma	pricevolatility
1	2016-01-04	147500	148000	143500	144000	109247.69	445332	NA	4500
2	2016-01-05	143000	145000	142000	143500	108868.38	530496	NA	3000
3	2016-01-06	144000	145000	139000	140000	106213.03	769406	NA	6000
4	2016-01-07	138500	140000	137500	137500	104316.39	586187	NA	2500
5	2016-01-08	134500	138000	133500	136500	103557.72	888701	NA	4500
20	2016-01-29	135000	136000	131000	133000	100902.39	990382	138550	5000
21	2016-02-01	132000	132500	130500	132500	100523.04	689972	137975	2000
22	2016-02-02	131500	132500	129000	129500	98247.06	594441	137275	3500
23	2016-02-03	127500	129500	126500	129000	97867.73	649021	136725	3000
24	2016-02-04	130000	132500	129500	132500	100523.04	600523	136475	3000
25	2016-02-05	132000	133500	131000	133500	101281.73	513150	136325	2500

Fig 1.1. Modified Hyundai Stock Dataset

1.3. Research Question

This study investigates:

"Is there a correlation between the Price Volatility (Difference Between High and Low Prices) and the Simple Moving Average (SMA) of Closing Prices in Hyundai's stock data?"

This question explores whether the average of past closing prices (SMA) is connected to the daily price range volatility. Answering this can provide insights into how historical trends in closing prices relate to the stock's daily volatility.

1.4. Null Hypothesis and Alternative Hypothesis (H_0/H_1)

- **Null Hypothesis (H_0):** There is no correlation between the Price Volatility (Difference Between High and Low Prices) and the Simple Moving Average of Closing Prices.
- **Alternative Hypothesis (H_1):** There is a correlation between the Price Volatility (Difference Between High and Low Prices) and the Simple Moving Average of Closing Prices.

The hypotheses will be tested using statistical methods to understand the relationship between these two variables. By exploring this relationship, we aim to contribute to the understanding of stock behaviour and provide useful insights to stakeholders, even for those new to the world of finance or data analysis.

2. Background Research

2.1. Literature Review

Understanding financial markets often relies on identifying patterns and trends that inform investment decisions. A widely used tool in this process is the Simple Moving Average (SMA), which helps smooth out price fluctuations over time by averaging an asset's closing prices for a given period. Several studies have explored the utility of SMA in improving trading strategies and mitigating risks associated with market volatility. However, the specific relationship between SMA and the Price Volatility for Hyundai's stock has received limited attention. This study seeks to fill this gap by investigating how these factors interact and contribute to more effective trading strategies, addressing the Research Question (RQ): How does the interplay between SMA and Price Volatility affect trading strategies for Hyundai's stock?

Research has demonstrated the versatility of SMA as a tool for trend identification and risk reduction. A study found that using SMA as a trend indicator for main stock and real estate indices notably reduced standard deviation and maximum drawdown, measures commonly used to assess investment risk [1]. Additionally, it highlighted that longer-term SMAs, spanning 9 to 20 months, were particularly effective for these purposes, offering insights into broader market trends and reducing the influence of short-term volatility.

The difference between an asset's high and low prices during a trading session provides a measure of its price volatility, which is influenced by factors such as liquidity constraints, transaction costs, and market shocks. Research indicates that these price extremes—high prices often representing the highest asking prices and low prices the lowest bids—can be subject to unexpected influences such as unanticipated news events or systemic market changes [2]. Accurate forecasting of these high-low price dynamics has been shown to improve trading performance by offering timely buy and sell signals. For example, if the intraday price crosses the upper predicted range, it may signal an optimal point to sell, whereas crossing the lower range might indicate a buying opportunity [2].

In addition to high-low price analysis, SMA has been widely used to identify trend changes and optimize trading strategies. Its application extends to techniques such as the moving average crossover, where traders compare short-term and long-term SMAs to detect trend reversals and potential trading opportunities [3][4]. These methods are particularly favoured by long-term traders who seek stability and wish to avoid reacting to short-term market fluctuations [4]. SMA thus serves as a robust tool for identifying opportunities and minimizing risks across different market conditions.

Despite these advancements, there remains a substantial gap in the literature concerning the specific application of SMA in combination with high-low price dynamics for individual stocks such as Hyundai's. This study aims to address this gap by investigating the correlation between SMA signals and high-low price differences. Understanding this relationship is crucial for technical analysts and investors, as it could provide actionable insights for predicting market movements and refining trading strategies.

2.2. Why RQ is of Interest.

The significance of this research lies in its potential to contribute both to academic understanding and practical application. By focusing on Hyundai's stock, the study provides a targeted analysis that can serve as a foundation for future research in this area. Additionally, the insights gained may help traders and investors better navigate market complexities, thereby improving their decision-making processes and enhancing overall market efficiency.

3. Visualization

To better understand the relationship between the Simple Moving Average (SMA) of closing prices and the Price Volatility in Hyundai's stock data, two visualizations were used: a histogram and a scatter plot. These visualizations provide foundational insights into the data and guide the selection of appropriate statistical methods.

## 3.1. Histogram: Distribution of High-Low Price Differences
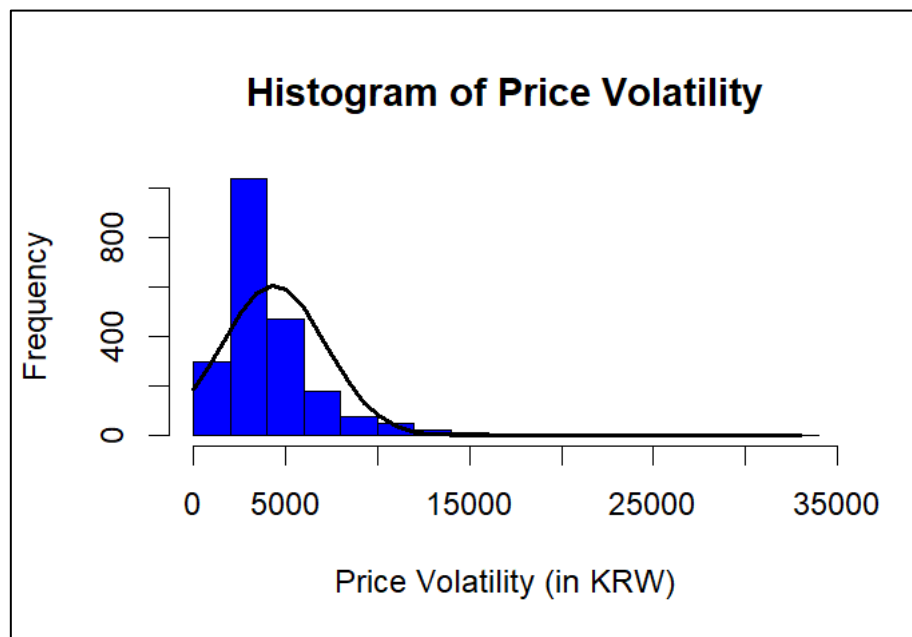
Fig 4.1. Histogram of Price Volatility

The histogram shown in Fig 4.1. reveals the frequency distribution of the differences between high and low prices. The data shows a strong concentration of smaller price differences, with fewer instances of larger differences. This right-skewed distribution is non-normal, as indicated by the tail stretching towards higher price differences. This skewness suggests the presence of outliers, potentially arising from substantial market events or abnormal trading activity.

The lack of normality in the data distribution is an important finding, as it directly influences the choice of statistical methods for further analysis. Traditional parametric tests, which assume normality, would be inappropriate here, leading to the selection of rank-based methods like Spearman's Rho and Kendall's Tau.

3.2. Scatter Plot: SMA vs. High-Low Price Differences
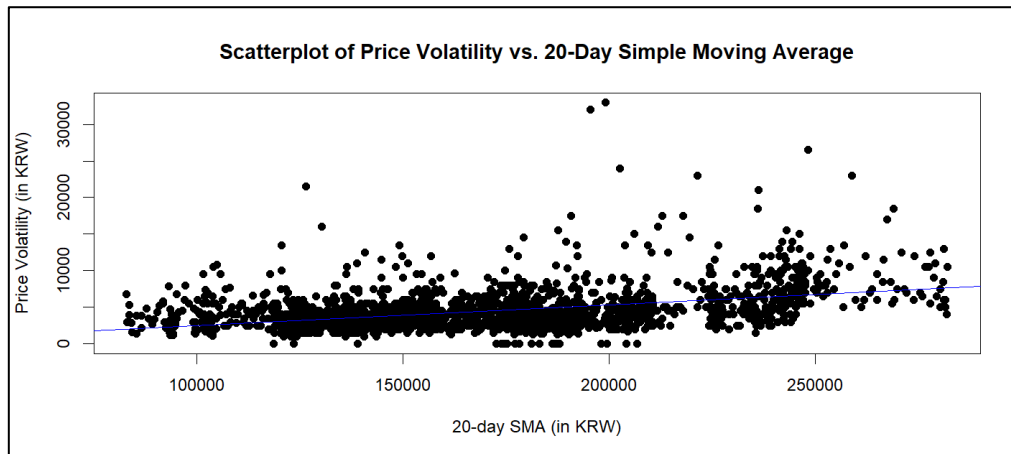
Fig 4.2. Scatterplot of Price Volatility vs 20-Day Simple Moving Average

The scatter plot in Fig 4.2. depicts the relationship between the SMA (x-axis) and the high-low price differences (y-axis). A fitted regression line provides a clear indication of a positive trend, suggesting that as SMA values increase, the differences between high and low prices also tend to rise.

However, the spread of data points around the regression line is considerable, indicating variability in the relationship. The presence of outliers, visible as points deviating considerably from the general trend, further emphasizes the complexity of the relationship. This variability necessitates robust statistical methods that can handle such irregularities without being unduly influenced by extreme values.

3.3. Why the Data Distribution Influences Method Selection

The non-normal distribution observed in the histogram justifies the choice of Spearman's Rho and Kendall's Tau for correlation analysis. Both methods are non-parametric and rank-based, making them ideal for datasets with skewed distributions and outliers. Spearman's Rho measures the strength and direction of the monotonic relationship, while Kendall's Tau assesses the agreement between data rankings. Their robustness ensures reliable results even when normality assumptions are violated.

4. Analysis

In financial markets, identifying relationships between various price metrics is crucial for understanding trends and making informed decisions. This study explores whether there is a meaningful correlation between the Simple Moving Average (SMA) of closing prices and the Price Volatility prices in Hyundai's stock data. To assess this, statistical methods were employed to determine the strength and significance of the relationship between these two variables.

By examining the relationship between these two measures, this study aims to uncover whether trends observed in SMA align with variations in daily price ranges. Such a relationship, if present, could help traders refine their strategies by combining long-term trend analysis (SMA) with real-time price movement data.

4.1. Results from Statistical Analysis

Two statistical tools, Spearman's rank correlation (rho) and Kendall's rank correlation (tau), were used to analyse the relationship between SMA and the high-low price difference. These methods are particularly useful because they measure the strength and direction of associations between variables without assuming any specific type of relationship (linear or otherwise).

	Spearman Test	Kendall Test
	S = 975949783	z = 19.642
p-value	< 2.2e-16	< 2.2e-16
Rank Correlation	rho = 0.4083257	tau = 0.2914608

Table 1 – Statistical Test Findings

- **Spearman's rho:** From Table 1, we can see that the analysis yielded a rho value of 0.408, which suggests a moderate positive correlation. This means that, generally, as the SMA of closing prices increases, there is a tendency for the high-low price difference to increase as well. The associated p-value was less than 2.2e-16, indicating that this result is statistically important and highly unlikely to be due to random chance.
- **Kendall's tau:** Similarly, Table 1 shows that the Kendall's tau analysis produced a tau value of 0.291, also pointing to a positive correlation. Although this value is slightly lower than rho, it reinforces the finding that there is a meaningful association between the two variables. The p-value, once again less than 2.2e-16, confirms the significance of this result.

4.2. Interpretation of Findings

The results suggest that there is a consistent relationship between the SMA of closing prices and the Price Volatility in Hyundai's stock. A positive correlation indicates that these two measures tend to move in the same direction. In simpler terms, when the SMA, which represents the long-term trend of closing prices, increases, it is often accompanied by a larger range of daily price movement.

This relationship is not only statistically meaningful but also relevant for traders and analysts. It implies that the SMA could be a useful tool for predicting changes in price volatility. For instance, if an increasing SMA trend is observed, it may signal that the stock is experiencing broader price swings, which could influence decisions on when to buy or sell.

5. Evaluation

This evaluation offers a heartfelt reflection on our group's experiences and the overall success of the project. It highlights what went well, areas we can improve on, and the lessons we've learned along the way.

5.1. What Went Well

Working together as a group was one of the most rewarding aspects of this project. Everyone brought their unique skills and perspectives to the table, and we complemented each other's strengths really well. It felt like a team effort from start to finish, with every member playing an important role in producing results we can all be proud of.

Using GitHub made collaboration much easier than we initially thought. It helped us stay organized, avoid version conflicts, and keep track of our progress seamlessly. Choosing Hyundai's stock data was also a win—it was interesting, relevant, and kept us all motivated. The real-world connection made it easier to stay engaged and encouraged everyone to contribute wholeheartedly.

5.2. Points for Improvement

That said, no project is without its challenges. One thing we realized is that we could have started earlier. Like many groups, we fell into the trap of underestimating how much time some tasks would take, especially the analysis and visualization. By the end, we felt a bit rushed, which could have been avoided with better time planning.

Another area to improve was the frequency of our meetings. We were considerate of everyone's schedules, but that sometimes meant meeting less often than we probably needed. More regular discussions might have helped us clarify doubts earlier and made the whole process smoother. We also felt a bit isolated from the rest of the class and had to rely heavily on our professors for guidance. While we managed to work through the challenges, having more peer interaction might have added even more value to our efforts.

5.3. Group's Time Management

Time management became a bit of a learning curve for us. The initial stages of the project felt steady, but as the deadline approached, we realized we had underestimated the time needed for some of the more complex tasks, like creating visualizations and finalizing our analysis. While we made it work, the last-minute rush was definitely stressful. For future projects, we now know the importance of setting up a detailed timeline with enough breathing room for unexpected hurdles.

5.4. Project's Overall Judgement

Looking back, we're really proud of what we achieved. Despite some hiccups along the way, the project met all of its goals and provided meaningful insights into Hyundai's stock data. The analysis was comprehensive, and the results gave us a better understanding of how the stock's closing prices and price volatility are connected.

More than anything, this project showed how well we could work together as a team. Everyone put in their best effort, and the final product reflected our collective strengths. It's a

good feeling to know that, even when things got tricky, we stayed committed and delivered something we can genuinely be proud of.

5.5. Changes to the Group Since Assignment 1

There were no changes to the group since Assignment 1. Every single member stayed fully committed, and that consistency made a big difference. We all shared the workload equally and made sure no one felt left behind.

In the end, this project was more than just about the numbers—it was a learning experience that taught us the importance of teamwork, time management, and problem-solving. While there's always room for improvement, we've come away with valuable lessons that will stick with us for future projects.

6. Conclusions

6.1. Key Findings

Our analysis of Hyundai's stock data revealed valuable insights that can help investors and traders better understand market trends. Specifically, we found a meaningful and moderate positive correlation between the 20-day Simple Moving Average (SMA) and the Price Volatility (Difference between High and Low Prices). This suggests that when the SMA increases, the variability in daily prices also tends to rise, highlighting a relationship between long-term trends and daily price movements.

Additionally, we discovered a statistically substantial positive correlation between the SMA of closing prices and Price Volatility. This means that as the SMA rises, trading activity tends to increase. This behaviour aligns with the way technical indicators influence market participation.

6.2. What This Means for Investors

These findings provide a practical understanding of stock market behaviour. For example:

- **Price Trends and Variability:** Recognizing the connection between the SMA and Price Volatility allows investors to use SMA as a tool to gauge market momentum while also considering potential daily fluctuations.
- **SMA and Trading Activity:** The relationship between SMA and trading volumes indicates that traders often react to SMA trends, driving higher activity in the market.

However, the presence of outliers and variability in the data reminds us that market trends are influenced by many factors beyond just SMA, such as economic events and news.

6.3. Implications and Future Directions

While our findings highlight noteworthy correlations, they are not the sole determinants of stock performance. Other factors like company announcements, global market conditions, and investor sentiment also play crucial roles. Future research could integrate these external factors to build more robust predictive models.

Moreover, while correlation suggests a relationship, it does not confirm causation. For instance, the rise in trading volumes alongside SMA trends may be influenced by broader market dynamics. Investigating these causes can lead to a deeper understanding of market behaviours.

6.4. Concluding Remarks

In summary, this research demonstrates the value of using SMA and Price Volatility as tools to understand stock trends. By applying these insights, investors can enhance their strategies, reduce uncertainty, and make more informed trading decisions. However, as always in financial markets, caution and comprehensive analysis remain key to successful investing.

7. Reference list

1. Macijauskas, L., 2012. Simple moving average as a risk management method in main asset classes.
2. Pramudya, R. and Ichsani, S., 2020. Efficiency of technical analysis for the stock trading. International Journal of Finance & Banking Studies, 9(1), pp.58-67.
3. Kardile, R., Ugale, T. and Mohanty, S.N., 2021, September. Stock price predictions using crossover SMA. In 2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO) (pp. 1-5). IEEE.
4. Moving average crossover strategies IG. Available at: https://www.ig.com/en/trading-strategies/_moving-average-crossover-strategies-191018 (Accessed: 20 December 2024).
5. Caesar, M. (2024) Hyundai Motor Company Stock Historical Price, Kaggle. Available at: https://www.kaggle.com/datasets/caesarmario/hyundai-motor-company-stock-historical-price (Accessed: 07 November 2024).

8. Appendices

A. R code used for analysis and visualization.

```
library(TTR)
data = read.csv("005380.KS.csv")
data

data$sma = SMA(data$Close, n = 20) # Calculation of 20-Day Simple Moving Average
data$pricevolatility = data$High - data$Low # Caculation of Price Volatility
data

write.csv(data, "Dataset_SMA.csv", row.names = FALSE) # Saving the modified
dataset for further Visualisation and Analysis

library(ggplot2)
library(dplyr)

data = read.csv("Dataset_SMA.csv")
data

summary(data)

# Data Cleaning - Removing Null values

sum(!is.finite(data$sma))
data_cleaned <- data[!is.na(data$sma) & !is.nan(data$sma) &
!is.infinite(data$sma), ]
sum(!is.finite(data_cleaned$sma))

y <- data_cleaned$pricevolatility
x <- data_cleaned$sma

# Histogram of Price Volatility

h <- hist(y
  , 12
  , main = "Histogram of Price Volatility"
  , xlab = "Price Volatility (in KRW)"
  , ylab = "Frequency"
  , col  = "blue"
  )
xfit <- seq(min(y), max(y), length = 40)
yfit <- dnorm(xfit, mean = mean(y), sd = sd(y))
yfit <- yfit * diff(h$mids[1:2]) * length(y)

lines(xfit, yfit, col = "black", lwd = 2)

# Scatterplot of Price Volatility vs. 20-Day Simple Moving Average

plot(x,y,main = "Scatterplot of Price Volatility vs. 20-Day Simple Moving Average"
, xlab = "Price Volatility (in KRW)" , ylab = "20-day SMA (in KRW)" , pch = 19,
frame = T)
model <- lm(y ~ x, data = data_cleaned)
abline(model, col = "blue")
```

```
# Kendall Statistical Test

cor_test_result <- cor.test(x, y, method = "kendall")
print(cor_test_result)

# Spearman Statistical Test

cor_test_result <- cor.test(x, y, method = "spearman")
print(cor_test_result)
```

B. GitHub log output

```
commit a4dd71a1b363735adb6b4e551b224896bf6a5890 (HEAD -> main, origin/main,
origin/HEAD)
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Jan 7 09:01:43 2025 +0000

    Unused File Deletion

commit 6889ea7cfa42db8c512349f86f2779d4fd97f52f
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Jan 7 08:59:28 2025 +0000

    Report Changes - Abinaya

commit a833b44faee749629ec3fb7c89827241ab3776c9
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Jan 7 08:58:20 2025 +0000

    Changing Column Name - Abinaya

commit 679d67cd3051bb4afa292906d5baf144f0cf05ef
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Jan 7 08:58:03 2025 +0000

    Modified and Finalized Plots - Abinaya

commit 9e11cdde3f19f1f1f76fefc4821f0120fd07afe8
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Jan 7 08:57:39 2025 +0000

    Changes in Name of Column
:...skipping...
commit a4dd71a1b363735adb6b4e551b224896bf6a5890 (HEAD -> main, origin/main,
origin/HEAD)
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Jan 7 09:01:43 2025 +0000

    Unused File Deletion

commit 6889ea7cfa42db8c512349f86f2779d4fd97f52f
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Jan 7 08:59:28 2025 +0000

    Report Changes - Abinaya

commit a833b44faee749629ec3fb7c89827241ab3776c9
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
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Date:    Tue Jan 7 08:58:20 2025 +0000

    Changing Column Name - Abinaya

commit 679d67cd3051bb4afa292906d5baf144f0cf05ef
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Tue Jan 7 08:58:03 2025 +0000

    Modified and Finalized Plots - Abinaya

commit 9e11cdde3f19f1f1f76fefc4821f0120fd07afe8
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Tue Jan 7 08:57:39 2025 +0000

    Changes in Name of Column

commit 13c4e6004df110624c9c4fb90e0e7fbee954c38b
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Tue Jan 7 08:57:24 2025 +0000

    Finalizing Data Visualization Code - Abinaya

commit f09c6834006e6be3e20d4b81d6f46038202d8098
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Tue Jan 7 01:55:09 2025 +0000

    More changes

commit e1b352350612e3739132e26d76259468cf99a6ba
Author: Mahesh-UH <mr24ady@herts.ac.uk>
Date:    Mon Jan 6 18:36:09 2025 +0000

    Changes in Report - Background Research

commit 8ffe11297e0c454e8e935025818172f05701dce0
Author: Yesudian <jy23aau@herts.ac.uk>
Date:    Mon Jan 6 18:30:33 2025 +0000

    Added  comments

commit 0434ceb64d292530085f2cd11925810fc4b52dea
Author: Yesudian <jy23aau@herts.ac.uk>
Date:    Mon Jan 6 18:28:39 2025 +0000

    Added the comments

commit cc7e872b9c5097a38f8d3648dc4924333711b583
Author: Yesudian <jy23aau@herts.ac.uk>
Date:    Mon Jan 6 18:25:47 2025 +0000

    Added the comments

commit 1259603e5ad6f7bc0f2465684ae9e093a6627dae
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Mon Jan 6 13:48:53 2025 +0000

    Improvising the Introduction of the Report - Abinaya

commit f9692e63cb3ec5471e82de42f6678ee806f4750c
```

Author: john chris <jy23aau@herts.ac.uk>
Date: Sun Jan 5 17:01:42 2025 +0000

    changes in report

    added the passage Evaluation in report

commit e05ff13911221cc213915fa4edb83181f72691e4
Author: john chris <jy23aau@herts.ac.uk>
Date: Fri Jan 3 15:09:42 2025 +0000

    Report added

commit d198d59ffada0b2c58a4ed28ae9271f42e743e90
Author: Yesudian <jy23aau@herts.ac.uk>
Date: Fri Jan 3 15:03:51 2025 +0000

    checked & corrected the comment which is placed in wrong place

commit 03a3981fd37b99d13a1b50b614ac7d96db8bc52c
Author: Yesudian <jy23aau@herts.ac.uk>
Date: Fri Jan 3 15:01:37 2025 +0000

    just added a comment for histogram and deleted duplicate

commit 39d6421a2792aa43109445b1053aaeb08fd62c8e
Author: Mahesh <mr24ady@herts.ac.uk>
Date: Thu Jan 2 22:09:17 2025 +0000

    sma benefits-mahesh

commit 3607dcc13b8c7e181fddf34c4db759a90de22997
Author: Mahesh <mr24ady@herts.ac.uk>
Date: Thu Jan 2 21:47:05 2025 +0000

    changes in plot

commit dd93f61ebf8a010bbe7f3d992c83369b69a52313
Author: Mahesh <mr24ady@herts.ac.uk>
Date: Thu Jan 2 21:33:36 2025 +0000

    changes done in hist line 22

commit 7bb9a96458dfbf72862b4122819510c4b9733f61
Merge: 8b97c73 b5e91f2
Author: Mahesh <mr24ady@herts.ac.uk>
Date: Thu Jan 2 21:09:32 2025 +0000

    Merge branch 'main' of https://github.com/aa24abf/A246_7COM1079

    # Conflicts:
    #   Data_Visualization.R

commit b5e91f29c10db9b27c5035bbbb3bb2193b1ad6e3
Author: Parasuraman <vp24aau@herts.ac.uk>
Date: Thu Jan 2 19:52:53 2025 +0000

    Added comments to read csv in data

```
commit 9e56652d71291894a373dda40d0936a688edb179
Author: Parasuraman <vp24aau@herts.ac.uk>
Date:    Thu Jan 2 19:50:14 2025 +0000

    Added comments to CSV data

commit 02e05fa9493ff09f71fe866175f05d0a172964e1
Author: Parasuraman <vp24aau@herts.ac.uk>
Date:    Thu Jan 2 19:46:20 2025 +0000

    Added comments to data high and low value

commit 77dc3fc7fca32d73d715dcac618d8e5978d9e4da
Author: Parasuraman <vp24aau@herts.ac.uk>
Date:    Thu Jan 2 19:40:26 2025 +0000

    Added comment for SMA 20 period data

commit 8b97c7330b41f9c75a7e1d8e3fb214697f76925e
Author: Mahesh <mr24ady@herts.ac.uk>
Date:    Wed Dec 25 14:44:29 2024 +0000

    No changes done

commit 08b38482b297697de886a979692b5aa8ced18915
Author: Balamurugan <tb24abi@herts.ac.uk>
Date:    Tue Dec 24 23:08:23 2024 +0000

    Correlation Test - Tilak

commit 235af3b81b66433f54edbac885d2956544d202cd
Author: Balamurugan <tb24abi@herts.ac.uk>
Date:    Tue Dec 24 22:58:12 2024 +0000

    Scatterplot Changes - Tilak

commit 7c413ae8ad80e9dba8eae4e56090e8dda4e7c13c
Author: Balamurugan <tb24abi@herts.ac.uk>
Date:    Tue Dec 24 22:37:25 2024 +0000

    Comments Detele

commit d57c6b0d28884afe68992cd0fe77982d7bd782e0
Author: Balamurugan <tb24abi@herts.ac.uk>
Date:    Tue Dec 24 22:35:48 2024 +0000

    comment tilak

commit 1ff56f59c1e104f4957ba593d6aab951607c50eb
Author: Parasuraman <vp24aau@herts.ac.uk>
Date:    Tue Dec 24 22:19:00 2024 +0000

    Summary of Dataset

commit 9860bd91c5cccafbead3ba336b93fd43d8c34c47
Author: Parasuraman <vp24aau@herts.ac.uk>
Date:    Tue Dec 24 21:53:42 2024 +0000

    Histogram Update - Vishnu
```

```
commit 689b063944ccf53cfd622b791121ab71ff644298
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Thu Nov 28 23:06:13 2024 +0000

    New Scatterplot after changes

commit 5a2948865bb2f5856dd1d4dd2ac9228fcfd806be
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Thu Nov 28 23:05:54 2024 +0000

    SMA function Changes

commit 1d065d937d6640d8808fa9a95ccd20313794a928
Author: Vishnuvardhan Parasuraman <vp24aau@herts.ac.uk>
Date:    Thu Nov 28 22:19:56 2024 +0000

    Changed the code for SMA function, got success.

commit 64225c98efd8c3eb2bdb5003398da1834a41ec80
Author: Vishnuvardhan Parasuraman <vp24aau@herts.ac.uk>
Date:    Thu Nov 28 22:12:22 2024 +0000

    Trying SMA function.

commit cdb5dd432d48f11136cc0456239053e71a2a20c1
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Sun Nov 24 23:35:55 2024 +0000

    Graphs (Data Visualization) - Abinaya

commit 2ef4013da08d1f973bece301b01528efee805d1d
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Sun Nov 24 20:08:15 2024 +0000

    Correlation Test - Abinaya

commit 0fbf6d21aea8eedbf0cd770ac366ebab68070eb4
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Sun Nov 24 19:35:17 2024 +0000

    Scatterplot is fine now - Abi

commit 5bf39f46cff421ec686a06ea24a58040d83fd965
Merge: a5cba68 f25322d
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:    Sun Nov 24 19:20:45 2024 +0000

    Merge branch 'main' of https://github.com/aa24abf/A246_7COM1079

commit f25322d2a60a922c1d82d54f7fe04bc7a1fadf2b
Author: Mahesh-UH <mr24ady@herts.ac.uk>
Date:    Sun Nov 24 15:56:57 2024 +0000

    Add files via upload

    Histogram code-Mahesh

commit 4c51c219d33dbfb59dcb941d653ce32b43c89d46
```

Author: Mahesh-UH <mr24ady@herts.ac.uk>
Date: Sun Nov 24 11:16:35 2024 +0000

Add files via upload

commit abe16752312410dca4313bafee4cd632ba6b4ef9
Author: Mahesh-UH <mr24ady@herts.ac.uk>
Date: Sun Nov 24 06:52:39 2024 +0000

Add files via upload

commit a860f83ae1cb017f12ddaa6bbbf514367abf5a6c
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date: Fri Nov 22 00:27:06 2024 +0000

Add files via upload

commit a5cba68ce04444489b767b32ff84d1f98fa47aee
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date: Fri Nov 22 00:25:35 2024 +0000

Data Visualization - Histogram & Scatterplot

commit 8b053bf0cbdd34cad37094b93a2651facebf3bf4
Merge: f5eaa7f e0f87af
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date: Thu Nov 21 22:54:12 2024 +0000

Merge branch 'main' of https://github.com/aa24abf/A246_7COM1079

commit e0f87afec63050b43f0003836627de1820175502
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date: Wed Nov 20 10:21:54 2024 +0000

Update Websites.txt

commit 50b655ad9e68bae06084cbefed6024c07f3ef0c8
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date: Wed Nov 20 10:11:41 2024 +0000

Update Websites.txt

commit f0c28cdf4d04e45b1a3438e937442e02349b4d38
Author: tb24abi <tb24abi@herts.ac.uk>
Date: Mon Nov 11 12:20:53 2024 +0000

RQ PPT - Tilak

commit 95979ec03cfaf5500d63d8c79cb8c8f136a42284
Author: tb24abi <tb24abi@herts.ac.uk>
Date: Mon Nov 11 12:20:18 2024 +0000

Delete reseach_question_presentation_template.pptx

commit 4be2c7a0f71909928d7fcc37d8f22d0c0518f406
Author: tb24abi <tb24abi@herts.ac.uk>
Date: Mon Nov 11 12:19:20 2024 +0000

Add files via upload

```
commit d3aaadb7cc368909ca18e7f6b650f0dcc67ebebc
Author: tb24abi <tb24abi@herts.ac.uk>
Date:   Mon Nov 11 12:17:54 2024 +0000

    RQ PPT - Tilak

commit 083c3d7bbe92ffdbd41c6ae13f59eb8d1ca6320c
Author: tb24abi <tb24abi@herts.ac.uk>
Date:   Mon Nov 11 12:17:09 2024 +0000

    Add files via upload

commit 31fff749c01daf7092ddf9858ccc382c63ce8f57
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Mon Nov 11 00:41:17 2024 +0000

    Research Question PTT Changes - Abinaya

commit f5eaa7f815e68f9bcfdc1ca8068a81cc65d8b468
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Mon Nov 11 00:25:23 2024 +0000

    SMA Calculations - Abinaya

commit a3fedeb14e047b08836971e1b479d579c4ad7eb9
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Mon Nov 11 00:21:10 2024 +0000

    Website Links -Abinaya

commit 6d1535ba4b7ba060988e2216b55eaa881a84c230
Author: john chris <jy23aau@herts.ac.uk>
Date:   Mon Nov 11 00:12:30 2024 +0000

    Research PPT template - john

commit c5b8439b88cfb21e69d25d53247d32777cb4d7ab
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Sun Nov 10 22:09:07 2024 +0000

    Add files via upload

commit 6a0a142e15355164c57bd1d54d03ecd5a4f80dc0
Author: Abinaya Sri Arunkumar <aa24abf@herts.ac.uk>
Date:   Tue Nov 5 15:30:34 2024 +0000

    Add files via upload
```