

# TESLA Stock Price Analysis

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2024-01-04

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
library(ggplot2)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##   filter, lag
```

```
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
```

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.2 --
```

```
## v tibble  3.1.8    v purrr   0.3.4
## v tidyr   1.2.1    v stringr 1.4.0
## v readr   2.1.2    v forcats 0.5.2
```

```
## Warning: package 'tidyr' was built under R version 4.2.2
```

```
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(zoo)
```

```
## Warning: package 'zoo' was built under R version 4.2.3
```

```
##
## Attaching package: 'zoo'
##
## The following objects are masked from 'package:base':
##
##      as.Date, as.Date.numeric
```

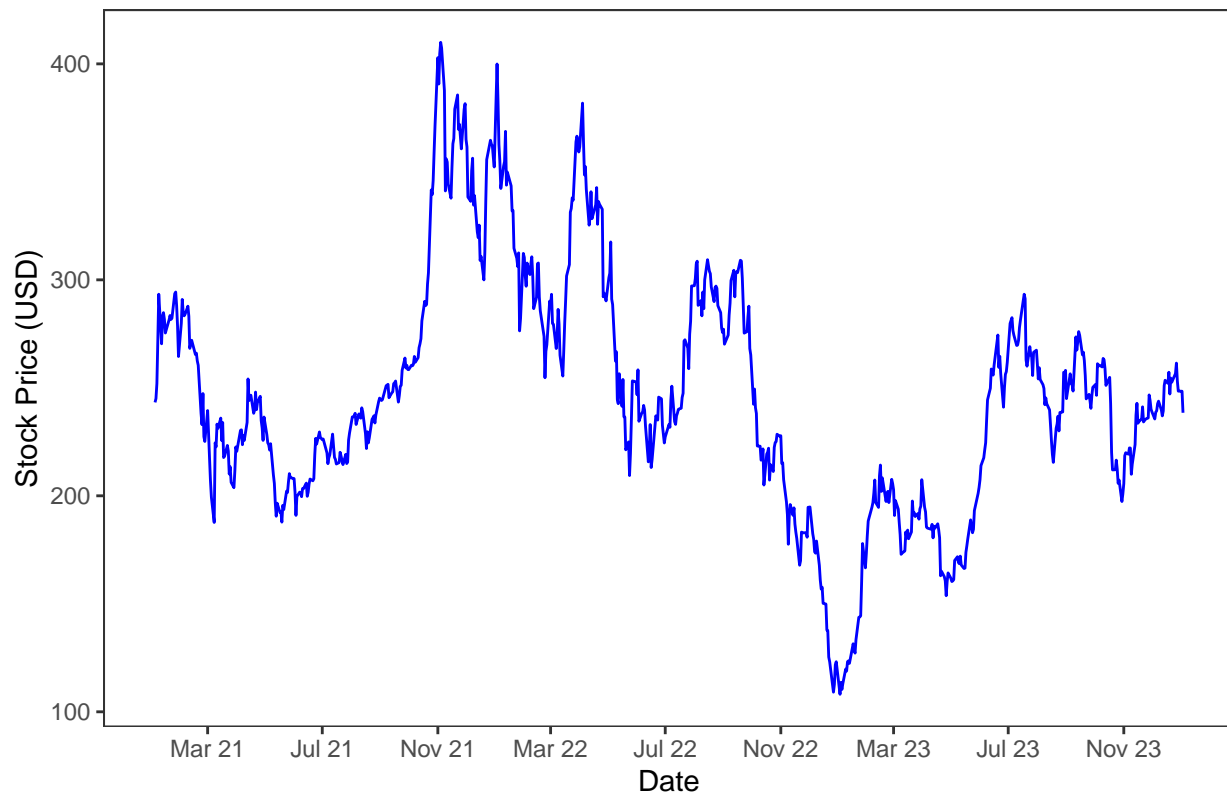
Load Tesla data from csv file, and convert the date column into date format

```
tesla_data <- read.csv("D:/Anagha/Projects/Tesla/tsla.csv")
tesla_data$Date <- as.Date(tesla_data$Date)
```

Basic trend Analysis using Closing prices of stock data

```
ggplot(tesla_data, aes(x = Date)) +
  geom_line(aes(y = Close), color = "blue") +
  labs(
    title = "Tesla Stock Price Trend Analysis",
    x = "Date",
    y = "Stock Price (USD)"
  ) +
  scale_x_date(date_labels = "%b %y", date_breaks = "4 months") +
  theme_bw() +
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank())
)
```

## Tesla Stock Price Trend Analysis



Find Simple Moving Averages for 30, 100 and 200 days

```
tesla_data <- tesla_data %>%  
  mutate(SMA_30 = rollmean(Close, k = 30, fill = NA),  
         SMA_100 = rollmean(Close, k = 100, fill = NA),  
         SMA_200 = rollmean(Close, k = 200, fill = NA))
```

Plot moving averages along with closing prices

```
# Create breaks and labels for x-axis  
  
tesla_data_long <- tesla_data %>%  
  pivot_longer(cols = c(Close, SMA_30, SMA_100, SMA_200), names_to = "Series", values_to = "Value")  
  
# Plot the reshaped data  
ggplot(data = tesla_data_long, aes(x = Date, y = Value, color = Series)) +  
  geom_line() +  
  labs(title = "Tesla Stock Price with Moving Averages (30, 100, and 200 days)",  
       x = "Date",  
       y = "Stock Price (USD)",  
       color = "Series") +  
  scale_color_manual(values = c("Close" = "blue",
```

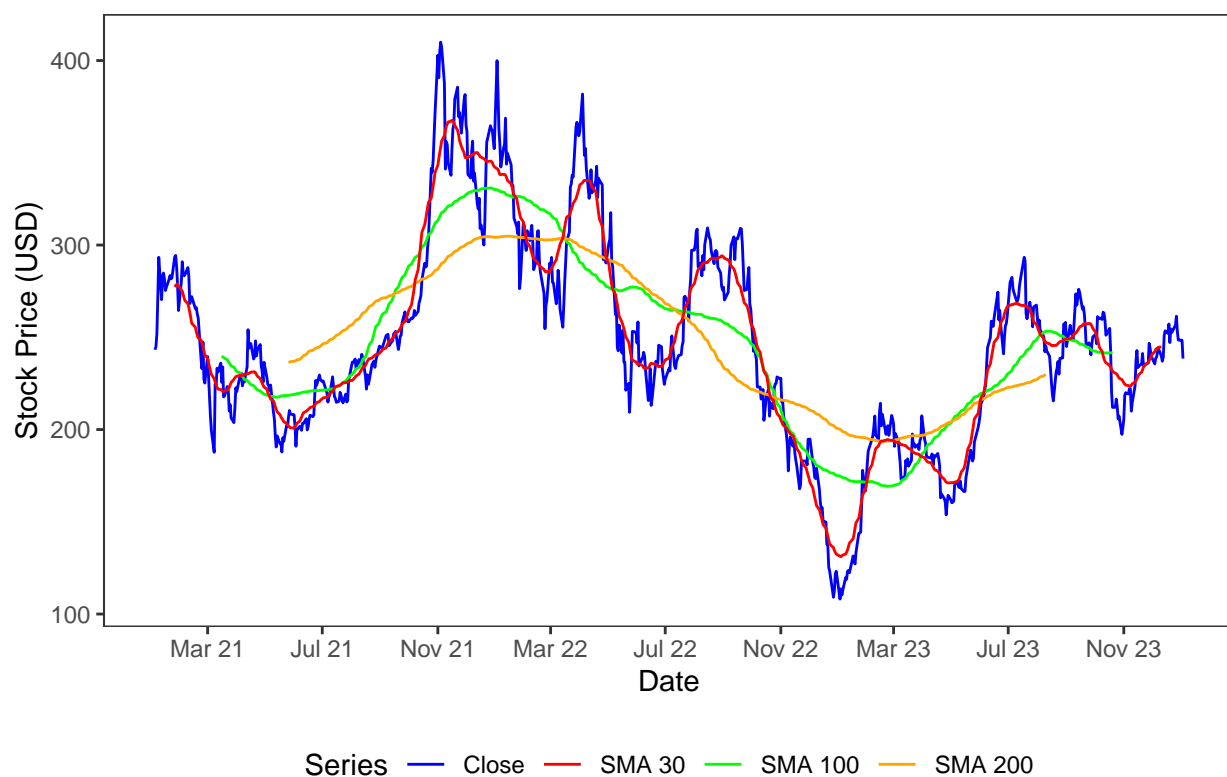
```

        "SMA_30" = "red",
        "SMA_100" = "green",
        "SMA_200" = "orange"),
        labels = c("Close", "SMA 30", "SMA 100", "SMA 200")) +
scale_x_date(date_breaks = "4 months", date_labels = ("%b %y"))+
theme_bw()+
theme(panel.grid.major = element_blank(),
      panel.grid.minor = element_blank(),
      legend.position = "bottom"
)

```

## Warning: Removed 327 row(s) containing missing values (geom\_path).

Tesla Stock Price with Moving Averages (30, 100, and 200 days)



Calculate rolling standard deviation for 100 day and perform Volatility Analysis

```

tesla_data <- tesla_data %>%
  mutate(Volatility_100 = rollapply(Close, width = 100, FUN = sd, fill = NA))

ggplot(data = tesla_data, aes(x = Date)) +
  geom_line(aes(y = Volatility_100, color = "100-Day"), linetype = "solid") +
  labs(title = "Tesla Stock Volatility Analysis (100 days)",
       x = "Date",
       y = "Volatility",

```

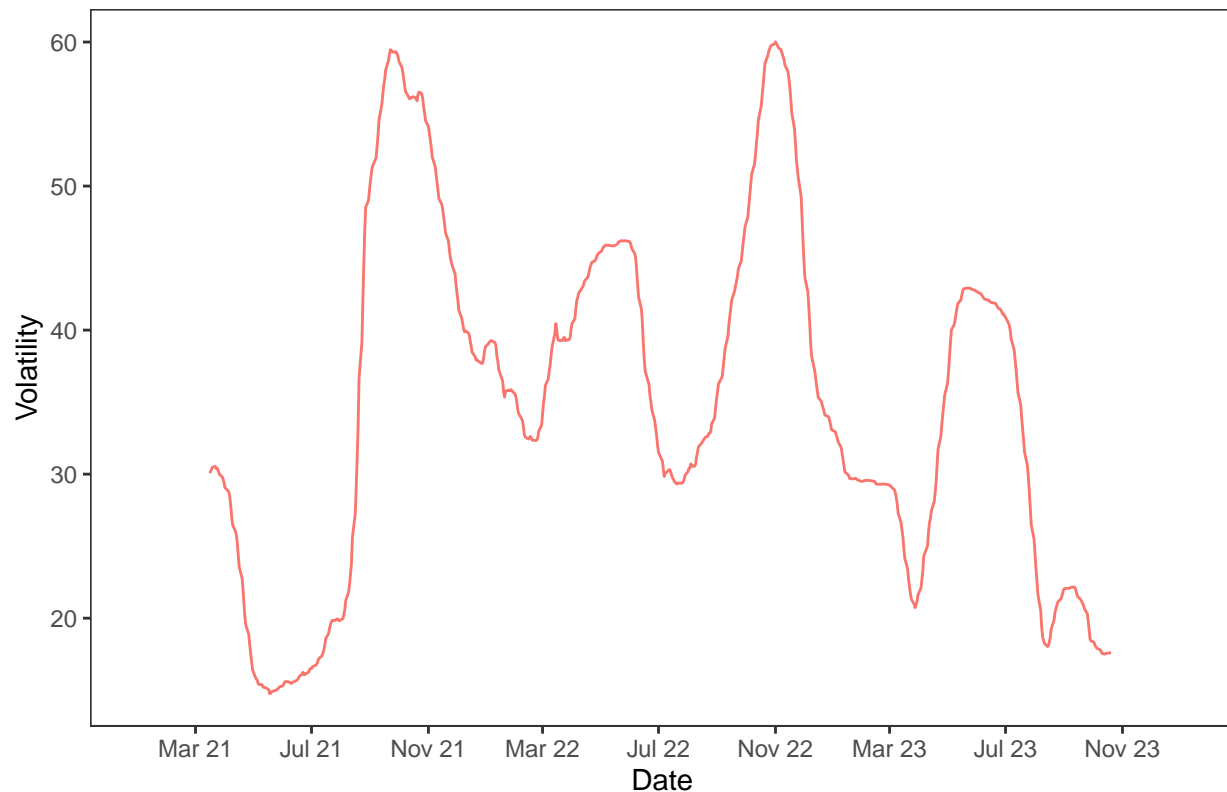
```

    color = NULL) +
  scale_x_date(date_labels="%b %y", breaks="4 months")+
  theme_bw()+
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank(),
        legend.position="none"
  )

```

## Warning: Removed 99 row(s) containing missing values (geom\_path).

### Tesla Stock Volatility Analysis (100 days)



Perform Seasonal Trend Analysis by calculating monthly average prices.

```

# Add Month column
# Create 'Month' column from 'Date' column
tesla_data <- tesla_data %>%
  mutate(Month = format(Date, "%Y-%m"))

# Calculate average stock price for each month
monthly_avg <- tesla_data %>%
  group_by(Month) %>%
  summarize(Avg_Price = mean(Close, na.rm = TRUE))

# Modify the 'Month' column format to display in 'Year-Month' format (YYYY-MM)

```

```
monthly_avg$Month <- as.yearmon(monthly_avg$Month)

# Plot seasonal trend using scatter plot
ggplot(monthly_avg, aes(x = Month, y = Avg_Price)) +
  geom_point(color = "blue", size = 3) +
  geom_smooth(method = "lm", se = FALSE, color = "red", linetype = "dashed") + # Add a linear trendline
  labs(title = "Seasonal Trend of Tesla Stock Price by Month",
       x = "Month",
       y = "Average Stock Price (USD)") +
  theme_bw()+
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank())
)
```

## 'geom\_smooth()' using formula 'y ~ x'

