Analyzing Cryptocurrency Using Hive and R

Project submitted to the

SRM University – AP, Andhra Pradesh

for the partial fulfillment of the requirements to award the degree of

Bachelor of Technology/Master of Technology

In

Computer Science and Engineering

School of Engineering and Sciences

Submitted by

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Andhra Pradesh – 522 240

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Code:

->Hive Queries:

1) Create Table:

```
CREATE TABLE crypto_data (open FLOAT, high FLOAT, low FLOAT, close FLOAT, volume FLOAT,
marketCap FLOAT, time_stamp STRING, crypto_name STRING, cdate STRING,
percentage_change FLOAT, normalized_marketCap FLOAT, normalized_volume FLOAT) ROW
FORMAT DELIMITED FIELDS TERMINATED BY ',' STORED AS TEXTFILE;
```

2) Load data :

```
LOAD DATA INPATH '/bigdata/preprocessed_Data.csv' INTO TABLE crypto_data;
```

3) Calculates average open, high, low, close prices, and volume for each cryptocurrency:

```
SELECT crypto_name, AVG(open) AS avg_open, AVG(high) AS avg_high, AVG(low) AS
avg_low, AVG(close) AS avg_close, AVG(volume) AS avg_volume FROM crypto_data GROUP
BY crypto_name;
```

4) Finds the maximum high and minimum low prices for each cryptocurrency:

```
 SELECT crypto_name, MAX(high) AS max_high, MIN(low) AS min_low FROM crypto_data
GROUP BY crypto_name;
```

5) Computes the daily average percentage price change for each cryptocurrency:

```
 SELECT crypto_name, cdate, AVG(percentage_change) AS avg_percentage_change FROM
crypto_data GROUP BY crypto_name, cdate ORDER BY crypto_name, cdate limit 10;
```

6) Average Market Cap & Volume for Top 15 Cryptos:

```
SELECT crypto_name, AVG(normalized_marketCap) AS avg_normalized_marketCap,
AVG(normalized_volume) AS avg_normalized_volume FROM crypto_data GROUP BY
crypto_name limit 15;
```

7) Top 5 Market Caps per Crypto :

```
SELECT crypto_name, cdate, marketCap FROM crypto_data ORDER BY crypto_name,
marketCap DESC LIMIT 5;
```

8) Calculate Correlation Between Closing Price and Market Cap for Each Cryptocurrency :

```
SELECT crypto_name, CORR(close, marketCap) AS correlation_close_marketCap FROM
crypto_data GROUP BY crypto_name;
```

9) Correlation between Volume and Market Cap :

```
SELECT crypto_name, CORR(volume, marketCap) AS correlation_volume_marketCap FROM
crypto_data GROUP BY crypto_name;
```

10) Top 10 Cryptocurrencies by Highest Closing Price :

```
SELECT crypto_name, MAX(close) AS max_close FROM crypto_data GROUP BY crypto_name
ORDER BY max_close DESC LIMIT 10;
```

11) Top 10 Cryptocurrencies by Lowest Closing Price :

```
 SELECT crypto_name, MIN(close) AS min_close FROM crypto_data GROUP BY crypto_name
ORDER BY min_close DESC LIMIT 10;
```

12) Top 10 Cryptocurrencies by Highest Closing Price :

```
 SELECT crypto_name, MAX(close) AS max_close FROM crypto_data GROUP BY crypto_name
ORDER BY max_close DESC LIMIT 10;
```

13) Top 10 Cryptocurrencies by Market Dominance :

```
WITH total_market_cap AS (SELECT cdate, SUM(marketCap) AS total_marketCap FROM
crypto_data GROUP BY cdate) SELECT a.cdate, a.crypto_name, (a.marketCap /
b.total_marketCap) * 100 AS market_dominance FROM crypto_data a JOIN
total_market_cap b ON a.cdate = b.cdate ORDER BY a.cdate, market_dominance DESC;
```

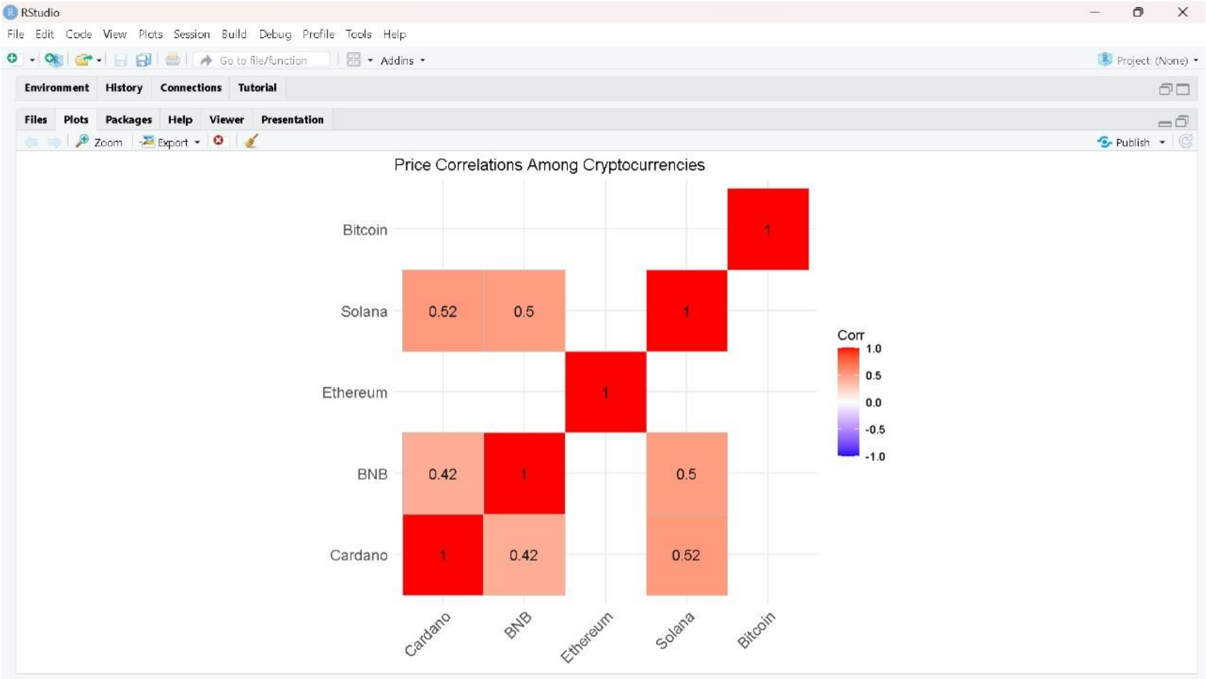
->R Programming:

```
setwd("C:/Users/geeth/OneDrive/Documents")
data <- read.csv('BigData_Project/Data.csv')
getwd()
library(lubridate)
install.packages("ggplot2")
library(ggplot2)
install.packages("dplyr")
library(dplyr)
data$date <- as.Date(data$date, format = "%d-%m-%Y")
library(tidyverse)
install.packages("ggcorrplot")
library(ggcorrplot)
#1)
crypto_data_filtered <- data %>%
  filter(crypto_name %in% c("Bitcoin", "Ethereum", "Cardano", "BNB", "Solana")) %>%
  select(date, crypto_name, close)

# Reshape data to wide format where each cryptocurrency is a column
crypto_wide <- crypto_data_filtered %>%
  pivot_wider(names_from = crypto_name, values_from = close)

# Calculate correlation matrix, using complete observations only
cor_matrix <- cor(crypto_wide[, -1], use = "complete.obs")

# Plot the correlation matrix
ggcorrplot::ggcorrplot(cor_matrix, lab = TRUE, title = "Price Correlations Among Cryptocurrencies")
```


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
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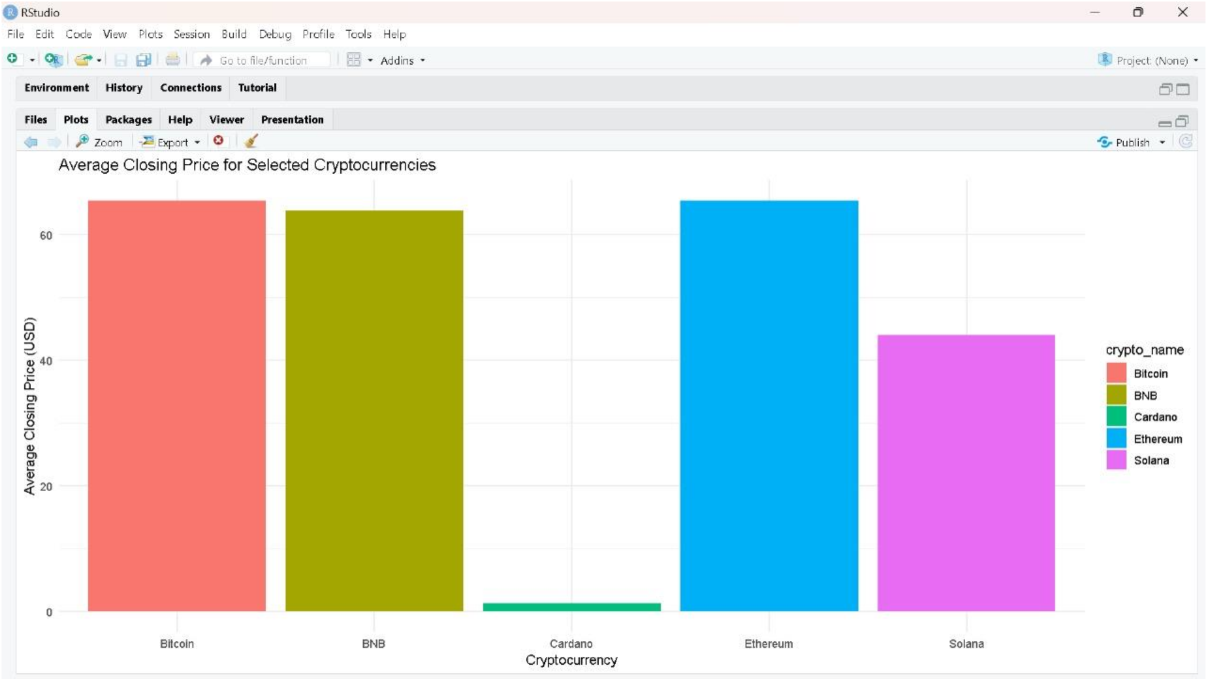
Publish
Price Correlations Among Cryptocurrencies
Bitcoin
Solana
Ethereum
BNB
Cardano
1
0.52
0.5
1
1
0.42
1
0.5
1
0.42
0.52
Cardano
BNB
Ethereum
Solana
Bitcoin
Corr
1.0
0.5
0.0
-0.5
-1.0

```
#2)

# Calculate summary statistics (average closing price for each crypto)

summary_stats <- crypto_data_filtered %>%

  group_by(crypto_name) %>%

  summarise(

    avg_close = mean(close, na.rm = TRUE)

  )


# Step 1: Plot Summary Statistics - Average Closing Prices

ggplot(summary_stats, aes(x = crypto_name, y = avg_close, fill = crypto_name)) +

  geom_bar(stat = "identity", position = "dodge") +

  labs(title = "Average Closing Price for Selected Cryptocurrencies",

       x = "Cryptocurrency", y = "Average Closing Price (USD)") +

  theme_minimal()
```


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
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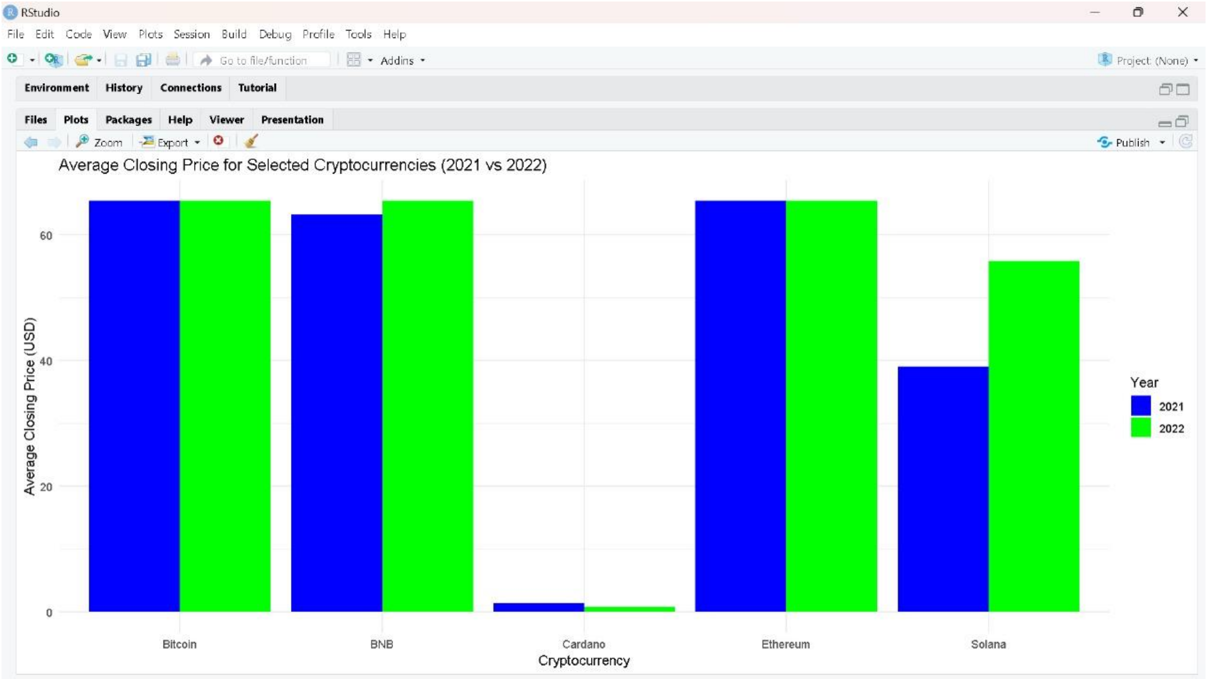
Export
Publish
Average Closing Price for Selected Cryptocurrencies
Average Closing Price (USD)
0
20
40
60
Bitcoin
BNB
Cardano
Ethereum
Solana
Cryptocurrency
crypto_name
Bitcoin
BNB
Cardano
Ethereum
Solana

```
#3)

# Sample Data (assuming 'data' is your original dataset)

crypto_data <- data %>%

  filter(crypto_name %in% c("Bitcoin", "Ethereum", "Cardano", "BNB", "Solana")) %>%

  select(date, crypto_name, close) %>%

  mutate(year = year(date))


# Calculate summary statistics (average closing price for each crypto by year)

summary_stats_yearly <- crypto_data %>%

  group_by(crypto_name, year) %>%

  summarise(

    avg_close = mean(close, na.rm = TRUE)

  )
```

```
#  Plot Average Closing Prices for 2021 and 2022

ggplot(summary_stats_yearly, aes(x = crypto_name, y = avg_close, fill = factor(year))) +
  geom_bar(stat = "identity", position = "dodge") +
  labs(title = "Average Closing Price for Selected Cryptocurrencies (2021 vs 2022)",
       x = "Cryptocurrency", y = "Average Closing Price (USD)",
       fill = "Year") +
  scale_fill_manual(values = c("2021" = "blue", "2022" = "green")) +
  theme_minimal()
```


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
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Project: (None)
Environment History Connections Tutorial
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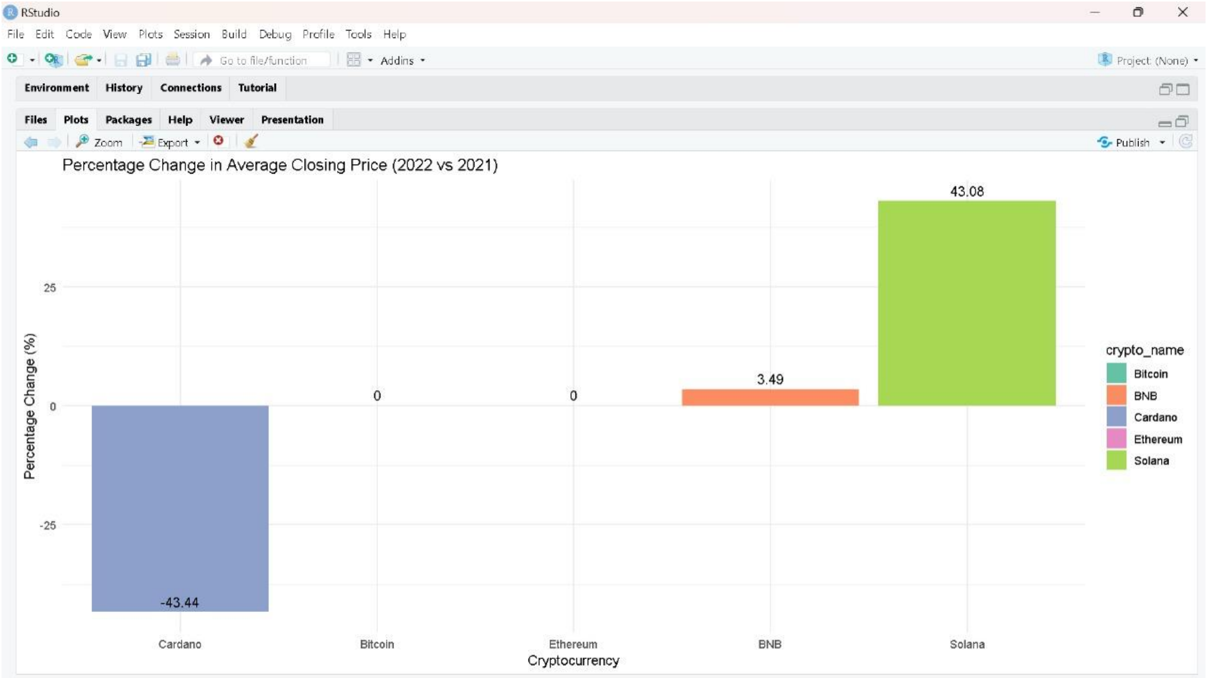
Publish
Average Closing Price for Selected Cryptocurrencies (2021 vs 2022)
Average Closing Price (USD)
0
20
40
60
Bitcoin
BNB
Cardano
Ethereum
Solana
Cryptocurrency
Year
2021
2022

```
#4)

# Calculate the percentage change from 2021 to 2022

crypto_data_comparison <- summary_stats_yearly %>%
  spread(key = year, value = avg_close) %>%  # Spread the data into 2021 and 2022 columns
  mutate(
    percentage_change = ((`2022` - `2021`) / `2021`) * 100  # Calculate percentage change
  ) %>%
  select(crypto_name, percentage_change)  # Select relevant columns
```

```
# Plot Percentage Change from 2021 to 2022

ggplot(crypto_data_comparison, aes(x = reorder(crypto_name, percentage_change), y =
percentage_change, fill = crypto_name)) +

  geom_bar(stat = "identity", position = "dodge") +

  geom_text(aes(label = round(percentage_change, 2)), vjust = -0.5) +

  labs(title = "Percentage Change in Average Closing Price (2022 vs 2021)",

       x = "Cryptocurrency", y = "Percentage Change (%)") +

  theme_minimal() +

  scale_fill_brewer(palette = "Set2")
```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Project: (None)
Environment History Connections Tutorial
Files Plots Packages Help Viewer Presentation
Zoom
Export
Publish
Percentage Change in Average Closing Price (2022 vs 2021)
43.08
3.49
0
0
-43.44
25
0
-25
Percentage Change (%)
Cardano
Bitcoin
Ethereum
BNB
Solana
Cryptocurrency
crypto_name
Bitcoin
BNB
Cardano
Ethereum
Solana