REPRORODUCIBLE RESEARCH WITH BITCOIN FORECASTING

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Contents

BITCOIN **1**

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Bitcoin, introduced in 2009 by the mysterious Satoshi Nakamoto, stands as the pioneering cryptocurrency. It operates on a decentralized peer-to-peer network, allowing secure and transparent transactions without the need for a central authority. Bitcoin's blockchain technology records every transaction in a public ledger, ensuring immutability and trustworthiness through cryptographic hashing.

This project is structured into two key sections:

1. Data Exploration - Analyzing and visualizing Bitcoin price data. - Identifying trends and patterns in historical price movements.

2. Time Series Analysis and Forecasting - Forecasting Methods: - LSTM (Long Short-Term Memory): Leveraging deep learning to capture complex temporal dependencies. - **XGBoost:** Harnessing gradient boosting to predict Bitcoin price fluctuations. - **Facebook Prophet:** Using a versatile tool for forecasting with seasonality and holidays. - **ARIMA (AutoRegressive Integrated Moving Average):** Employing a traditional statistical approach for time series forecasting.

This project draws inspiration from notable kernels and tutorials, including those focused on Prophet, XGBoost, and ARIMA models, tailored specifically for Bitcoin price prediction.

For those new to Bitcoin, you can learn more about its fundamentals here.

```
library(tidyverse)  # For data manipulation and visualization
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.1     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```r
library(plotly)     # For interactive plots
```

```
##
## Attaching package: 'plotly'
##
## The following object is masked from 'package:ggplot2':
##
##     last_plot
##
## The following object is masked from 'package:stats':
##
##     filter
##
## The following object is masked from 'package:graphics':
##
##     layout
```

```r
# Set the directory path
data_dir <- "~/Git/Data"

# List files in the directory
dir_contents <- list.files(data_dir)

# Print the contents of the directory
print(dir_contents)
```

```
## [1] "bitstampUSD_1-min_data_2012-01-01_to_2018-11-11.csv"
## [2] "coinbaseUSD_1-min_data_2014-12-01_to_2018-11-11.csv"
```