Forecasting and Analysis of Cryptocurrency Trends

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Abstract:

The development of financial technology has given rise to a new class of asset known as cryptocurrency, which has presented a significant potential for study. Forecasting cryptocurrency prices is challenging because of their dynamic and volatile nature. There are hundreds of different cryptocurrencies in circulation today. With prospects in peer-to-peer payments, remittance, e-commerce and retail, and media & entertainment, the cryptocurrency business appears to have a bright future. From 2019 to2024, the worldwide cryptocurrency industry is anticipated to expand at a 32% CAGR. The distributed ledger technology's immutability and transparency, the rise in remittances from poor nations, shifting monetary laws, and a sharp rise in venture capital investments are the main factors propelling this market's growth. We created a short-term prediction (between five and thirty days) for the cryptocurrencies using the ARIMA model. When it came to predicting cryptocurrency time series, we discovered that the suggested method outperformed the ARIMA-ARFIMA models in both periods of gradual rising (falling) and transition dynamics (change of trend).

Index Terms: digital currency,cryptocurrency, and ARIMA model.

Overview:

A virtual or digital currency utilized in financial systems is called cryptocurrency. It is protected by encryption, which prevents counterfeiting and duplicate spending. It differs from traditional currencies in that it is a decentralized virtual currency that can be converted using cryptographic processes, and it is not issued by central banks or authorities. The other characteristic is that it was made using a very sophisticated technology known as blockchain, which stores data that makes it difficult or impossible to change, hack, or cheat the system. Bitcoin has started to carve out a niche for itself, which could either contribute to the broader adoption of cryptocurrencies or be the primary factor in their downfall. Since cryptocurrencies are still quite new, it is hard to say whether or not they will be used extensively in international markets in the future. The most well-known cryptocurrency, Bitcoin, was created in 2009 and was the only blockchain-based cryptocurrency for over two years. However, the cryptocurrency market currently has 5.8 million active users and over 5000 cryptocurrencies. In the fields of computer science, cryptography, and economics, Bitcoin has garnered a lot of attention lately due to its inherent feature of fusing cryptocurrency with encryption technology.

The explosive growth of virtual currencies over the past ten years is one of the most contentious and confusing developments in the contemporary global economy. Investing in cryptocurrency assets has a substantial risk because to the high volatility and notable swings in exchange rates of cryptocurrencies, along with the absence of legal control of their transactions in most countries. This has sparked contentious debates on their position and function in the contemporary economy.

Review of the Literature:

The forecasting of Google's share price and the exchange rate for the cryptocurrency Bitcoin are the main topics of this report. The models that are going to be used are grounded on actual data. Theorists and statisticians are still working to develop the ideal model for forecasting stock prices, let alone those of Bitcoin. Regretfully, there isn't an ideal method to forecast changes in price. According to (Hill et al., 2010), forecasts are the primary use for autoregressive models. (Koop, 2013) reaffirm this and state that prior research has demonstrated the excellent forecasting capacity of the Autoregressive model.

PROBLEM STATEMENTS:

To use ARIMA to predict future values and analyze and show trends in previous cryptocurrency prices.

Technical Specifications :

I.Programs :

Python is a general-purpose, high-level programming language. Its design philosophy uses a lot of indentation to promote readability of the code. Its object-oriented methodology and language characteristics are designed to assist programmers in writing logical, understandable code for both small- and large-scale projects.

II. Collection :

One well-known Python tool for gathering web data is called yfinance; we may use it to get Yahoo's financial data. We can obtain and gather the company's financial data (financial ratios, etc.) and marketing data historically by utilizing the functionalities of the yfinance module. However, as the yfinance module is not pre-installed in Python, we must first install it on our machine before we can begin learning more about this module, its usage, and its applications. We will move on to the yfinance module's implementation phase after the installation is complete.

This link: finance.yahoo.com.

The Library:

I. Illuminated :

Streamlit is an open-source Python application framework. It speeds up the process of developing web apps for machine learning and data science. Major Python libraries like Scikit-Learn, Keras, PyTorch, SymPy (latex), NumPy, pandas, Matplotlib, and others are compatible with it. Callbacks are not required with Streamlit because widgets are handled like variables. Computation pipelines are made simpler and faster by data caching.

II. Matplotlib :

For the Python programming language and its NumPy numerical mathematics extension, Matplotlib is a graphing library. Plots can be embedded into programs utilizing general-purpose GUI toolkits such as Tkinter, wxPython, Qt, or GTK thanks to its object-oriented API.

III. Serpentines :

A software package called Pandas was created specifically for data analysis and manipulation in the Python programming language. It provides procedures and data structures specifically for working with time series and numerical tables.

IV. Seaborn :

Based on matplotlib, Seaborn is a Python data visualization package. It offers a sophisticated drawing tool for creating eye-catching and educational statistical visuals.

V. Delightful Soup :

Named after tag soup, BeautifulSoup is a Python tool for processing documents that contain faulty markup, or open tags. For online scraping purposes, it generates a parse tree for parsed pages that may be utilized to extract data from HTML.

Algo :

The abbreviation ARIMA represents AutoRegressive Integrated Moving Average. This type of model is capable of capturing a variety of common temporal features found in time series data.

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This acronym sums up the main features of the model itself in a descriptive manner. In a nutshell, they are:

AR stands for autoregression. a model that makes advantage of the dependent connection between an observation and a set of observations that are lags.

I: Consolidated. the process of making the time series steady by differencing raw observations (for example, by deducting an observation from an observation at a prior time step).

MA stands for Moving Average. a model that applies a moving average model's residual error to lagged observations, utilizing the dependence between the observations.

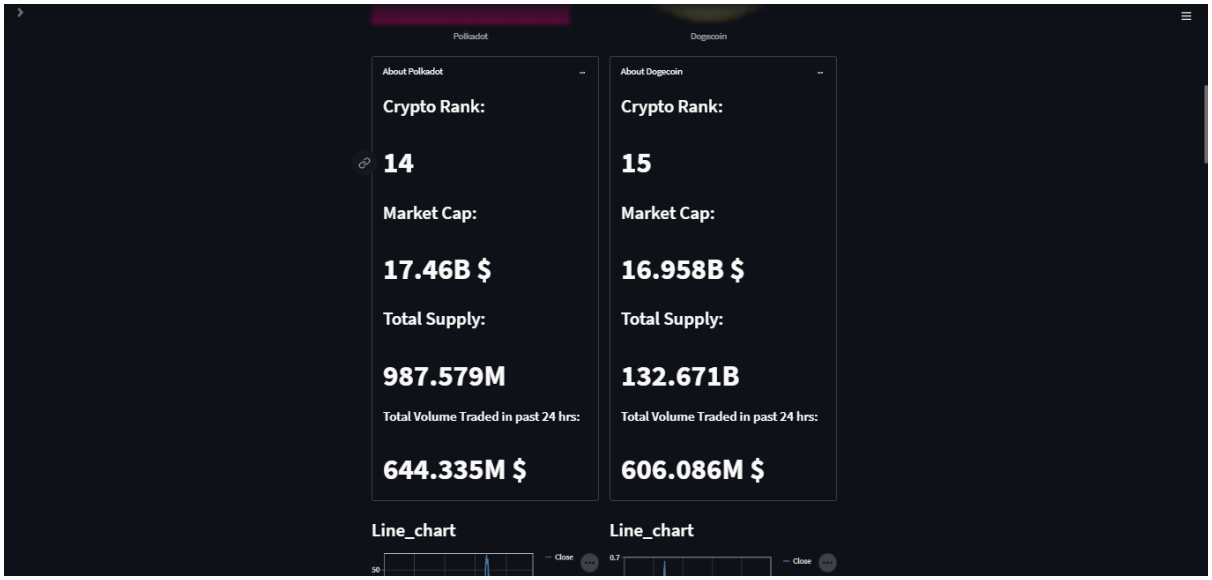
The following defines the ARIMA model's parameters:

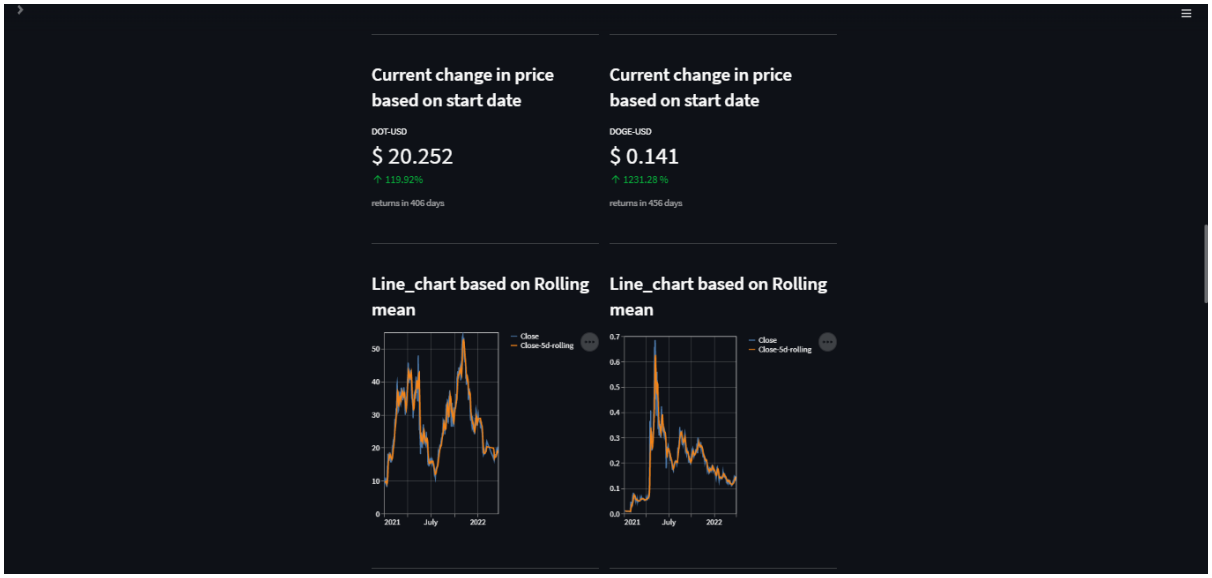
p: The number of lag observations, also known as the lag order, that are included in the model.

d: The degree of differencing, or the number of times the raw observations are differenced.

Q: The moving average window size, also known as the moving average order.

RESULT/ VISULIZATION :

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DOT-USD
$ 20.252
↑ 119.92%
returns in 406 days
Current change in price based on start date
DOGE-USD
$ 0.141
↑ 1231.28 %
returns in 456 days
Line_chart based on Rolling mean
Close
Close-5d-rolling
2021
July
2022
Line_chart based on Rolling mean
Close
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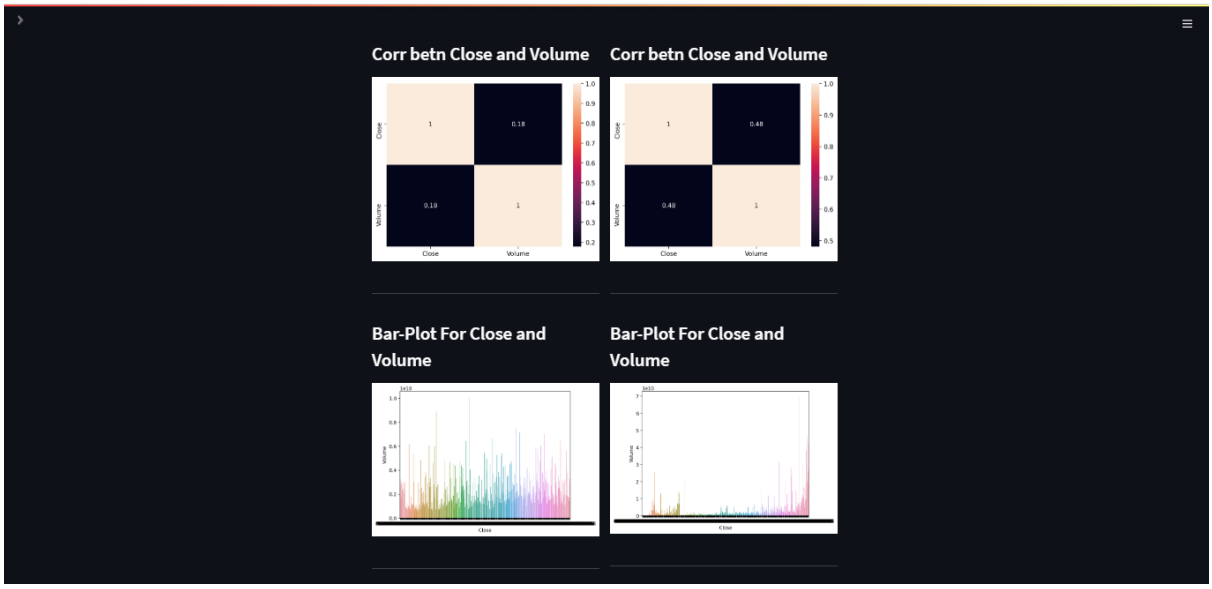
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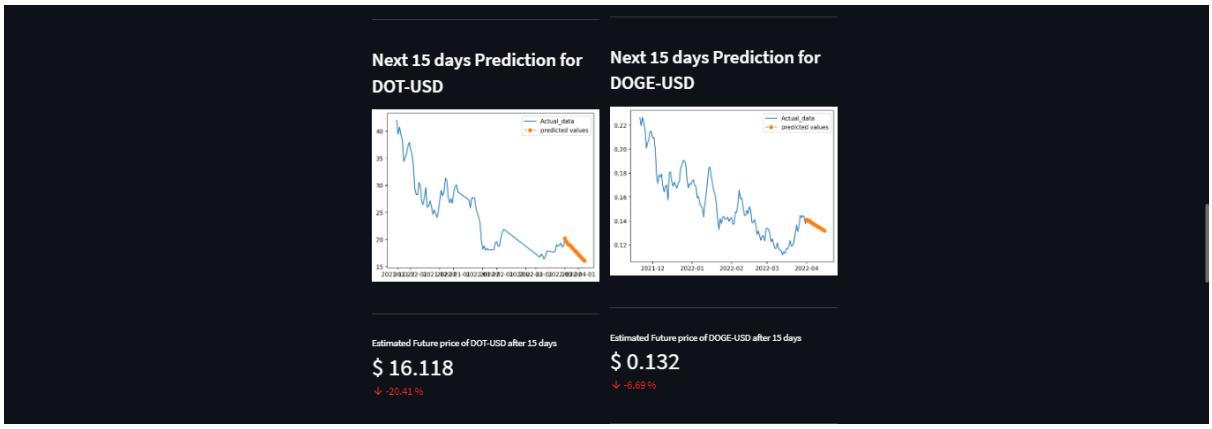
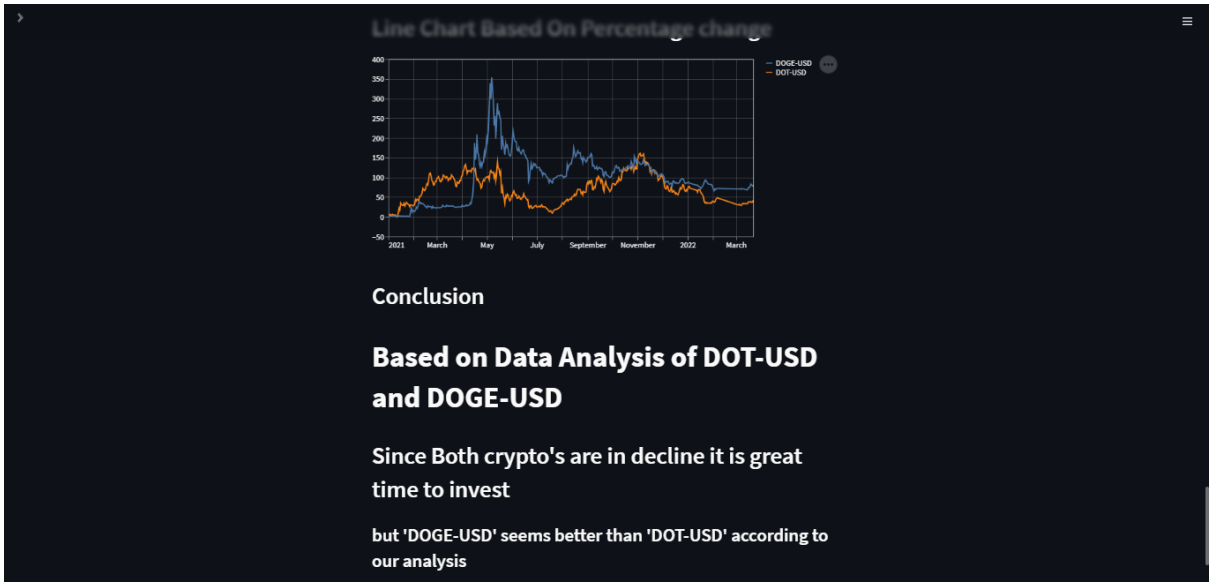

Next 15 days Prediction for DOT-USD
Actual_data
predicted values
Next 15 days Prediction for DOGE-USD
Actual_data
predicted values
Estimated Future price of DOT-USD after 15 days
$ 16.118
↓ -20.41 %
Estimated Future price of DOGE-USD after 15 days
$ 0.132
↓ -6.69 %



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