STOCK TREND PREDICTION

PROJECT WORKFLOW

DATA COLLECTION PROCESS

Acquiring detailed historical stock data from 2010 to 2019 through APIs such as yfinance, which offers a comprehensive array of information, including Open, High, Low, Close, Volume, and Adjusted Close values for each trading day. This data is vital for performing in-depth financial analysis, backtesting trading strategies, and gaining insights into market trends over time.

DATA PREPROCESSING STEPS

Implementing robust data cleaning processes while addressing missing values is essential. This encompasses techniques such as imputation, removal, or interpolation of absent data points. Furthermore, it entails conducting thorough calculations for technical indicators, such as the 100-day moving average, which aids in the stabilization of price trends over time and offers crucial insights for traders and analysts.

VISUALIZATION AND ANALYSIS

Generating comprehensive visual representations such as closing price versus time charts that depict price movements over a designated time period, along with overlays of the closing price against 100-day moving averages, thereby illustrating trends and aiding in the identification of potential buy and sell signals.

DATA DESCRIPTION

The table summarizes key attributes of stock data, highlighting crucial metrics like Open, Close, High, Low, and Volume for analysis.

| ATTRIBUTE	DESCRIPTION	EXAMPLE
Open	Initial price of stock at market open	$150.00
Close	Final price of stock at market close	$155.00
High	Highest price during the trading session	$157.00
Low	Lowest price during the trading session	$149.00
Volume	Number of shares traded	1,200,000
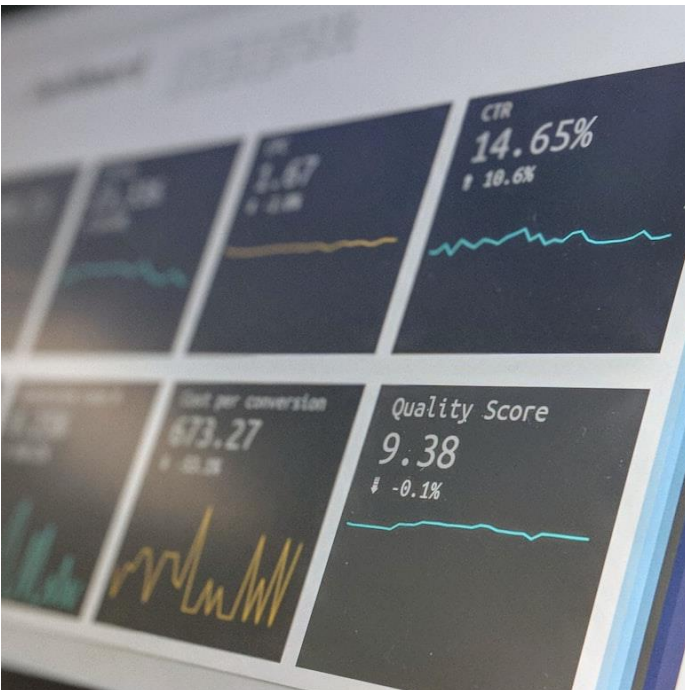
VISUALIZATION TECHNIQUES

MOVING AVERAGE COMPARISON

Displaying closing prices alongside the 100-day moving averages provides a visual representation that helps investors identify long-term trends in market behavior. This method allows traders to observe how the prices fluctuate in relation to the averages, thereby minimizing volatility risks and making informed investment decisions based on clearer patterns.

TRENDS OVER TIME

Utilizing line charts to effectively visualize closing prices over time provides a powerful tool for analysts and investors, enabling them to easily recognize trends in stock performance, such as upward or downward movements, volatility, and patterns that may inform future investment decisions.
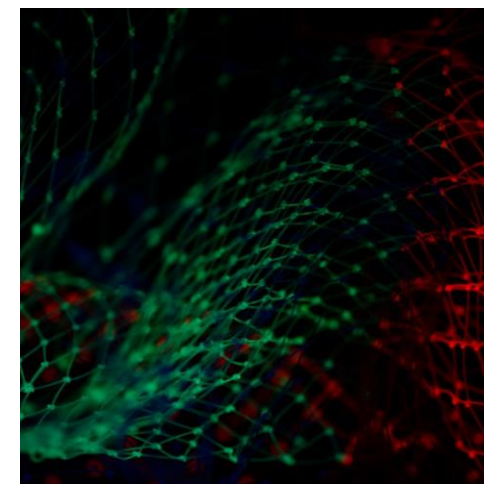
MODELS UTILIZED

MACHINE LEARNING TECHNIQUES

Various models such as Linear Regression and LSTM have been applied for predicting future stock prices, enhancing accuracy through methods like train-test splits.
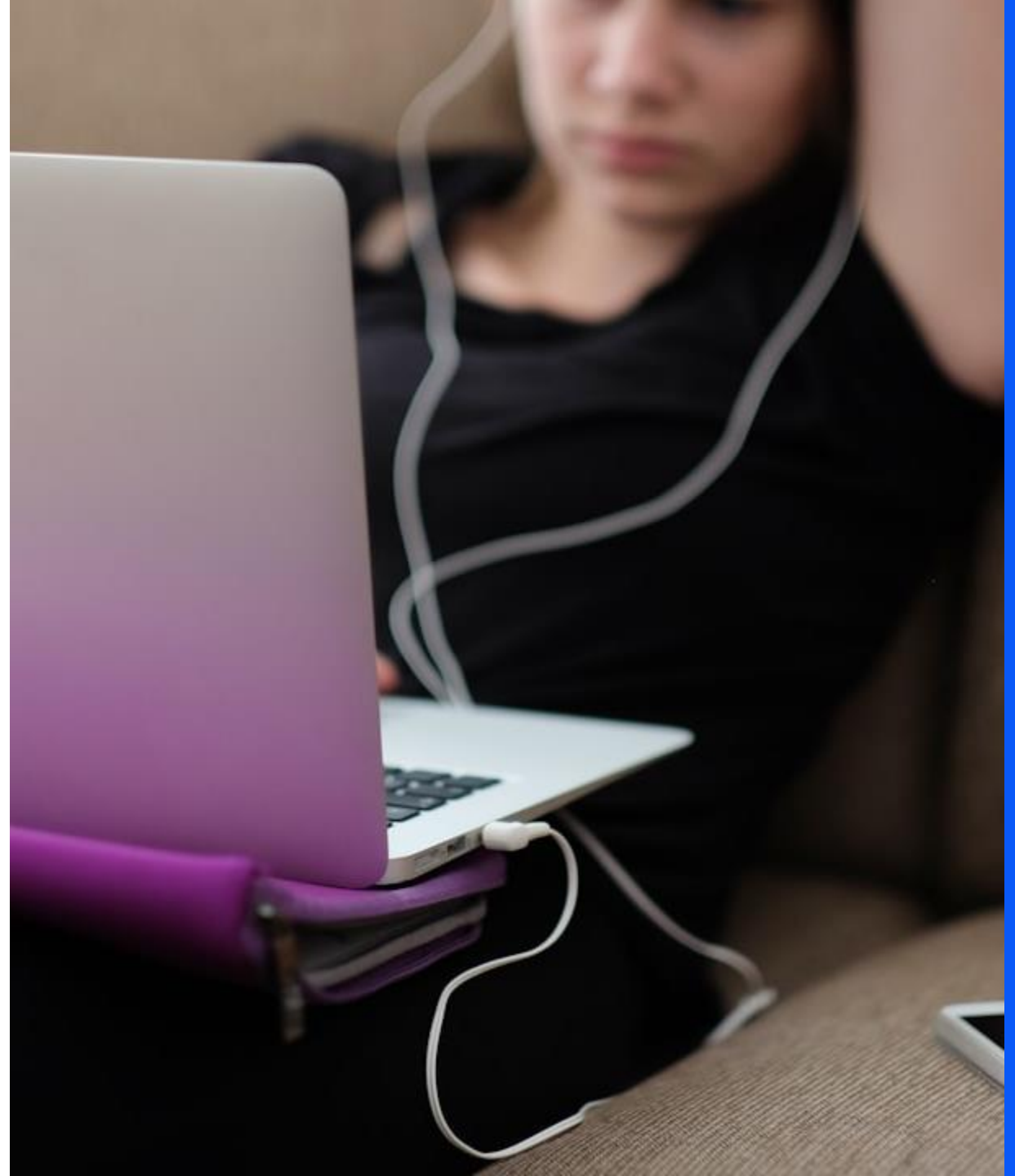
EXPERIMENTAL RESULTS

This detailed table provides a thorough comparison of various models based on critical performance metrics: Mean Squared Error (MSE) and R^2 Score, which together quantify the accuracy of predictions made by each model, revealing insights into their efficiency and reliability in different scenarios.

MODEL	MSE	R² SCORE
Linear Regression	15.8	0.82
LSTM	10.5	0.91
ARIMA	14.3	0.85
Random Forest	12.1	0.88

FUTURE ENHANCE MENTS

FUTURE DEVELOPMENTS

The implementation of advanced models, such as Long Short-Term Memory networks (LSTMs), specifically tailored for time-series forecasting, yields significant advantages by enabling highly accurate predictions based on historical data patterns. This capability is crucial for enhancing real-time data integration processes that respond promptly to immediate market fluctuations, thereby allowing businesses to expand their application capabilities. For instance, industries from finance to healthcare can utilize LSTMs to analyze extensive datasets, thus encompassing a broader range of financial sectors and adapting to diverse market conditions. Ultimately, this leads to improved predictive accuracy and enhanced decision-making, empowering organizations to remain competitive and agile in dynamic environments.

GITHUB LINK

https://github.com/PandaXD7/Stocks-Predi.git

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THANK YOU