1. **PROJECT EXPLANATION**

The project involves implementing a Time Series ARIMA (AutoRegressive Integrated Moving Average) model to analyze and forecast time-series data. Time series data refers to observations collected sequentially over time, and ARIMA models are widely used for forecasting future values based on historical patterns.

1. **CHALLENGES**

Challenges in implementing ARIMA models include:

* Identifying appropriate model parameters (p, d, q) through statistical methods.
* Dealing with seasonality and trend in the data.
* Handling outliers and missing values.
* Ensuring model robustness and accuracy.

1. **CHALLENGES OVERCOMED**

To overcome these challenges, various techniques such as:

* Data preprocessing to handle missing values and outliers.
* Conducting thorough diagnostics to select optimal model parameters.
* Implementing seasonality differencing and trend removal techniques.
* Validating model performance through cross-validation and statistical tests.

1. **AIM**

The aim of the project is to develop a reliable ARIMA model capable of accurately forecasting future values based on historical time series data.

1. **PURPOSE**

The purpose of the project is to assist businesses, researchers, and analysts in making informed decisions by providing accurate forecasts of future trends based on past data patterns.

1. **ADVANTAGE**

ARIMA models provide a systematic framework for time series forecasting.

They can capture complex patterns and dependencies in the data.

The forecasts generated by ARIMA models can help in resource allocation, planning, and risk management.

1. **DISADVANTAGE**

ARIMA models may struggle with nonlinear and non-stationary data.

They require a sufficient amount of historical data for accurate forecasting.

Interpretation of model parameters and diagnostics can be complex for non-experts.

1. **WHY THIS PROJECT IS USEFULL?**

This project is useful because:

* It empowers decision-makers with reliable forecasts for strategic planning.
* It aids in optimizing inventory management, sales forecasting, financial planning, and more.
* It contributes to the advancement of predictive analytics in various domains.

1. **HOW USERS CAN GET HELP FROM THIS PROJECT ?**

Users can benefit from this project by:

* Utilizing the developed ARIMA model for forecasting specific time series data.

1. **TOOLS USED**

**Tools Used:** Python, Pandas, NumPy, Matplotlib

**Project Name:** Time Series ARIMA Forecasting Model

1. **CONCLUSION**

ARIMA(2, 2, 3) gives a lower MSE than the base model,so this will be the best model as its MSE is lower than the base MSE.

So,NO more transformations are needed. You will need to transform your series by differencing/log transformations only if your base models MSE is lowest than your ARIMA models.