# Business Overview

## Leading Low-Cost Airline in East Africa.

- **Key Strength:** Preferred choice for cost-conscious travelers, emphasizing in the East African region.

- **Market Position:** Dominant player in the aviation industry, known for budget-friendly and reliable air travel. with a **Market Share** of **54+%** in domestic air travel.

- **Diversification: Launched advertising product in 2018,** leveraging their high-traffic website to boost revenue and advertiser satisfaction.
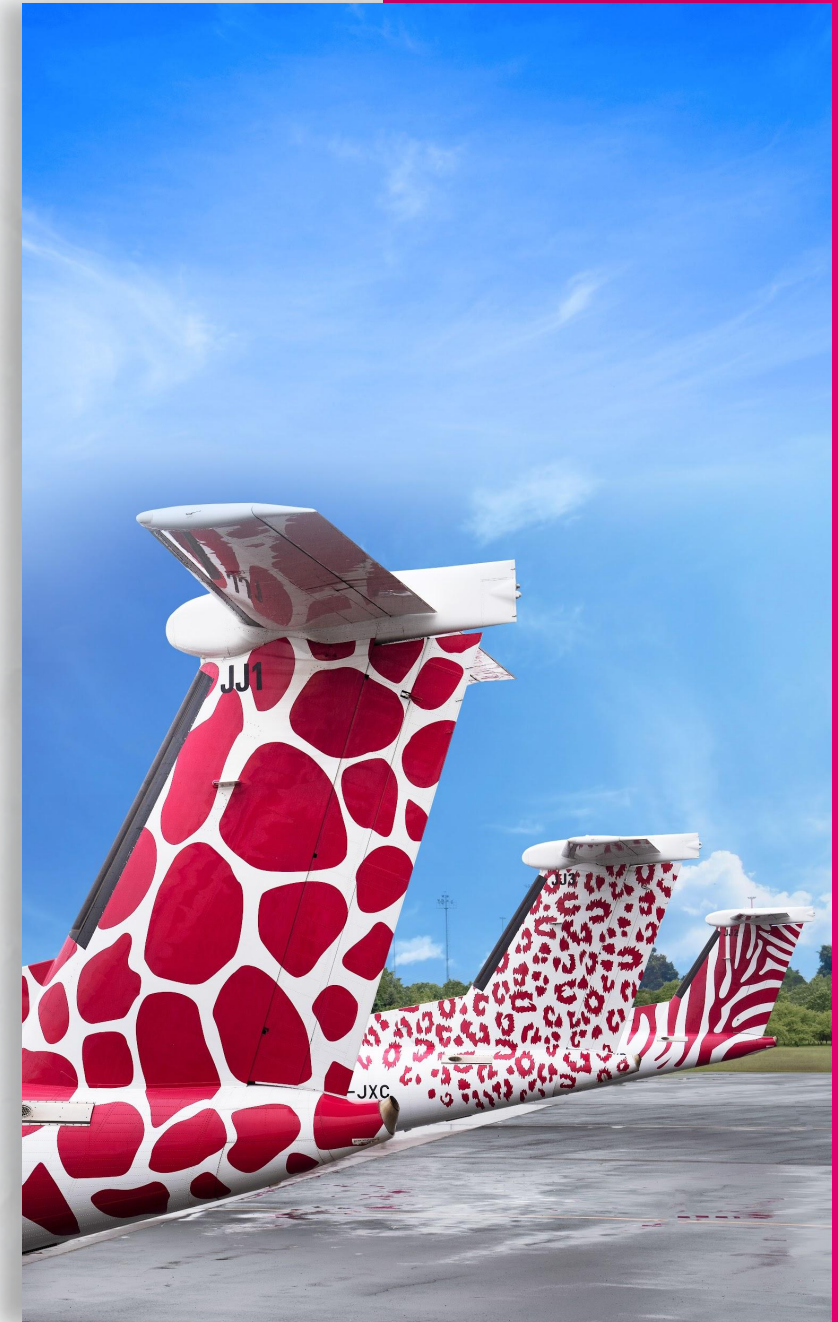
# Problem Statement and Project Objectives

Jambojet seeks to maximize revenue and improve advertiser satisfaction by optimizing ad spaces.

- This project focuses on revolutionizing ad placement through **Advanced Time Series Forecasting.**

- This approach will enhance Jambojet's platform competitiveness and contribute to the broader industry's shift towards **efficient online advertising solutions.**

# Data Collection and Understanding

- The dataset used simulates the web traffic behaviors of websites such as www.jambojet.com. real-time time series data can be scrapped from **Google Analytics**

- It considers their **marketing campaigns, travel restrictions,** and other industry factors that may influence web traffic.

- The dataset consists of **total users** ('Simulated_Users') and **new users** ('Simulated_New_Users') per day, sourced from Google Analytics.

- It captures daily fluctuations in user engagement, essential for precise forecasting and ad optimization.
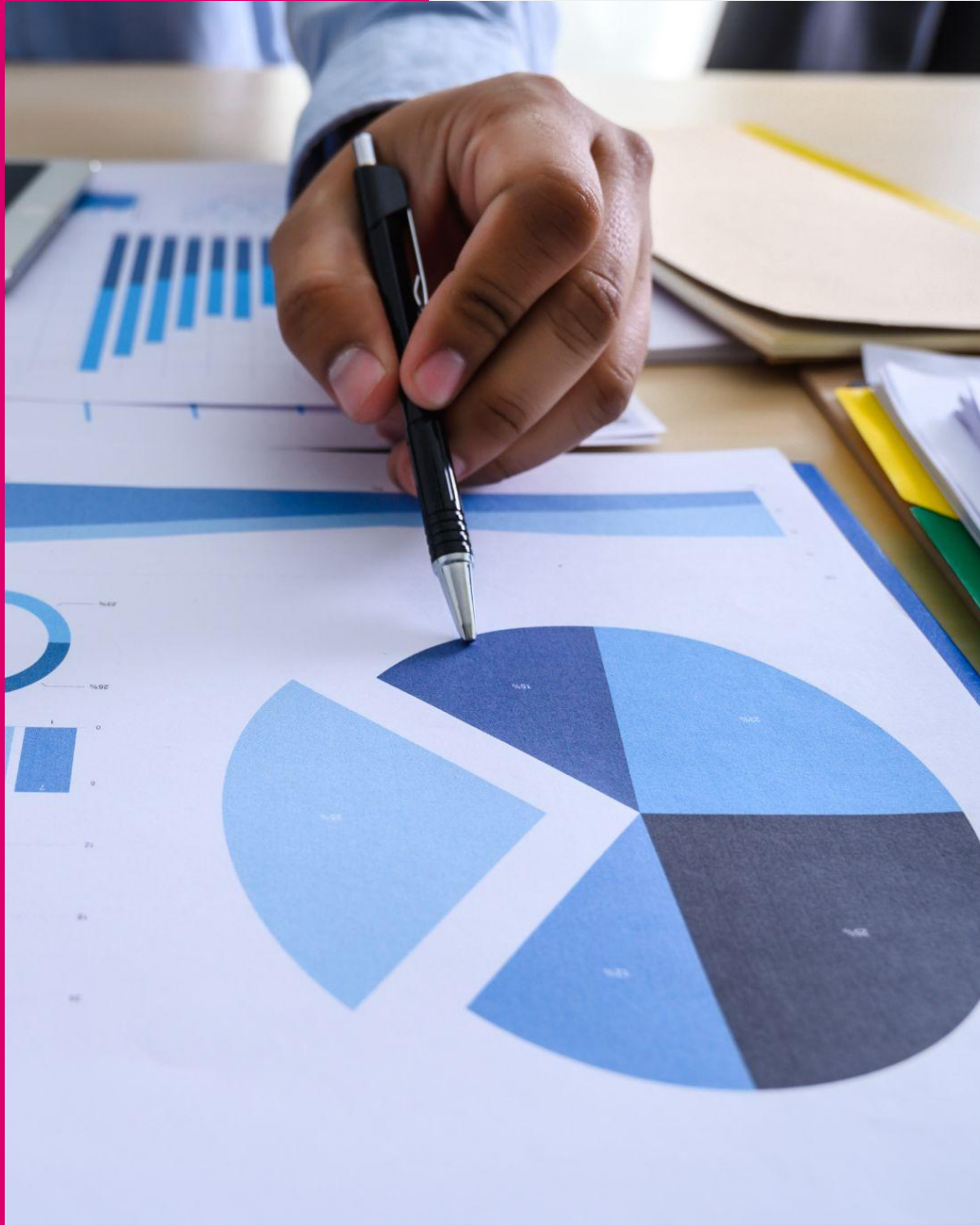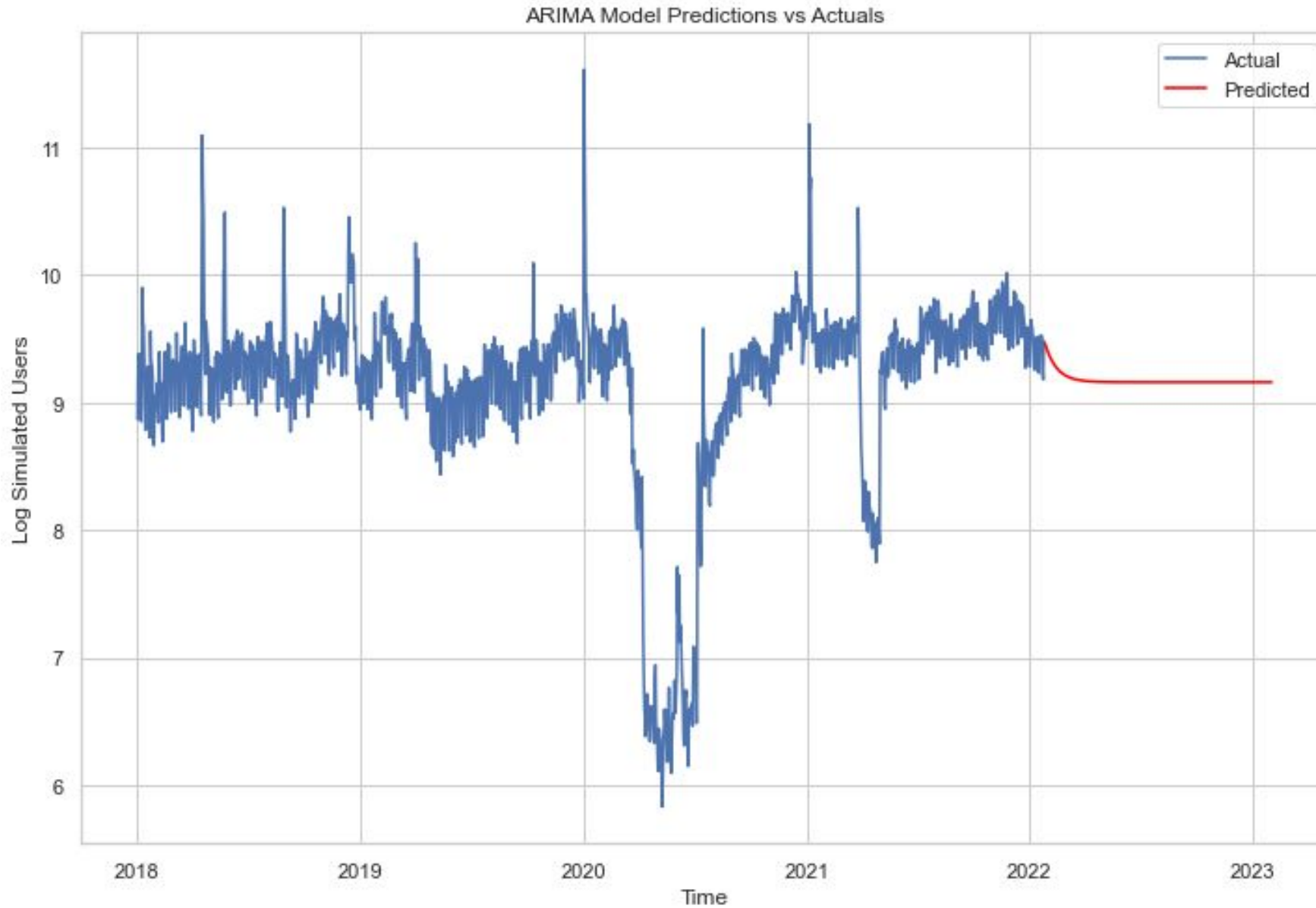
# Success Criteria

- **Root Mean Squared Error (RMSE)** is used to evaluate the accuracy of our time series forecasting models, specifically focusing on predicting daily total users.

# Baseline Model



ARIMA Model Predictions vs Actuals
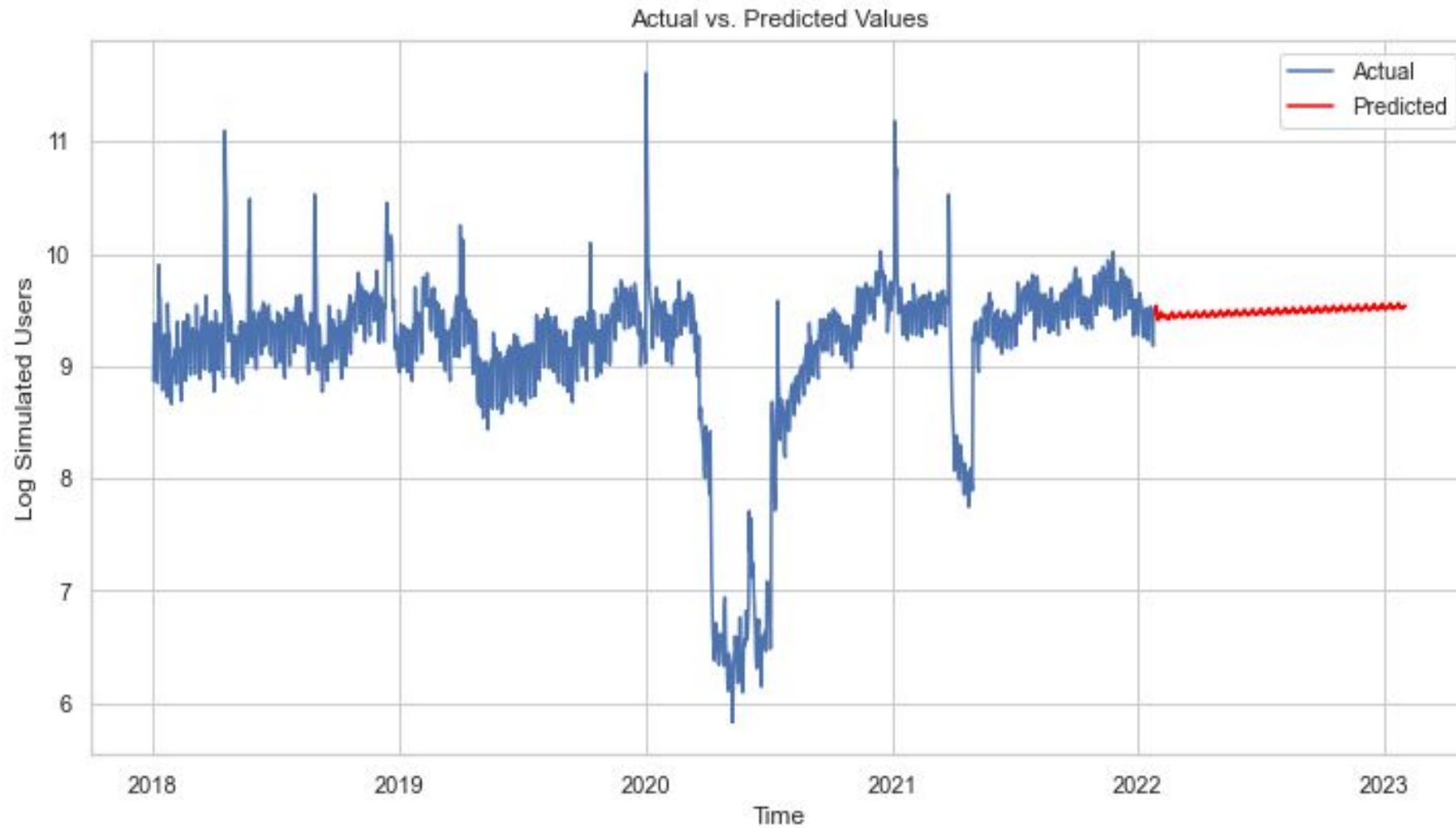
## Arima Model:
## RMSE: 0.5976628

The RMSE is relatively low, but not the lowest among the models presented.
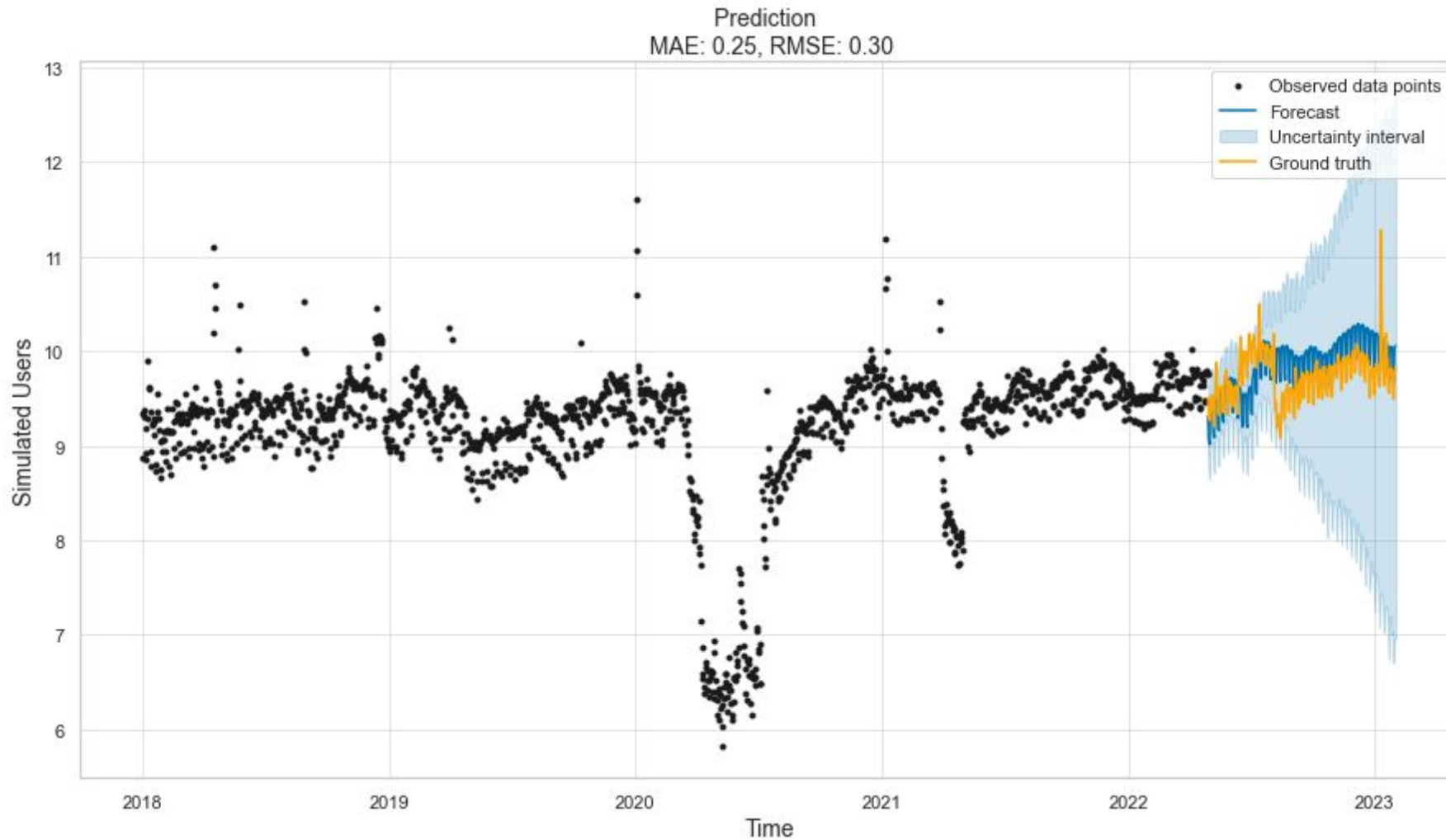
# Model 4

Actual vs. Predicted Values



## Sarima Model:
## RMSE: 0.327229

This model is a SARIMA model, which extends ARIMA by adding seasonal components.

The RMSE for this model is lower suggesting that the model is a good fit to the data.

# Best Performing Model



Prediction
MAE: 0.25, RMSE: 0.30

## Facebook Prophet:
## RMSE: 0.2965632

This is a an open-source forecasting tool developed by **Facebook's Core Data Science team.**

The RMSE is the lowest of the other models suggesting that it had the best fit to the data.

# Conclusion

In conclusion, the evaluation of the different time series models applied to the dataset provides valuable insights into their performance.

- **While the PMDARIMA model (Model 3) offers a competitive RMSE close to that of SARIMA,** its advantage lies in the automatic selection of model parameters, showcasing the effectiveness of the pmdarima package. **The ARIMA models (Models 1 and 2)** also provide reasonable predictive capabilities, with Model 2, incorporating differencing, outperforming Model 1.

- Considering the RMSE values, the **Facebook Prophet model (Model 5)** stands out as the most accurate among the evaluated models. **Its lower RMSE suggests that Prophet is well-suited** for forecasting the simulated user data in this particular scenario. It outperforms the traditional ARIMA and SARIMA models, as well as the auto_arima approach.

# Recommendations

1. **Facebook Prophet Model for Forecasting:**

   - Implement the Facebook Prophet model for accurate web traffic predictions.
   - Use forecasts to identify peak traffic periods for dynamic ad placement and pricing.

2. **Marketing and Communication Strategy:**

   - Align marketing with Jambojet's event calendar, focusing on peak travel times and holidays.
   - Plan campaigns in advance to build anticipation.
   - Use social media and email marketing for promoting deals during low seasons.

3. **Promotion and Event-Driven Marketing:**

   - Coordinate ad campaigns with peak travel periods and promotional events.
   - Partner with tourism boards and travel agencies for joint promotions.
   - Use real-time marketing strategies during high traffic periods.

4. **Segmentation and Targeted Advertising:**

   - Analyze different user segments for tailored advertising.
   - Offer personalized promotions, like targeting international travelers during winter.

# Cont..

5. **Dynamic Ad Space Pricing:**

   - Adopt a dynamic pricing strategy based on seasonality trends.

6. **Advertiser Dashboard and Real-Time Insights:**

   - Introduce a dashboard for real-time ad performance and web traffic insights.
   - Allow advertisers to adjust campaigns based on data-driven insights.

7. **Enhancing User Experience:**

   - Optimize the website for peak traffic times to prevent slowdowns.
   - Incorporate user feedback for continual improvement.

8. **Response to External Factors:**

   - Monitor external factors impacting web traffic.
   - Develop contingency plans for unexpected travel pattern changes due to global events.

# THANK YOU

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