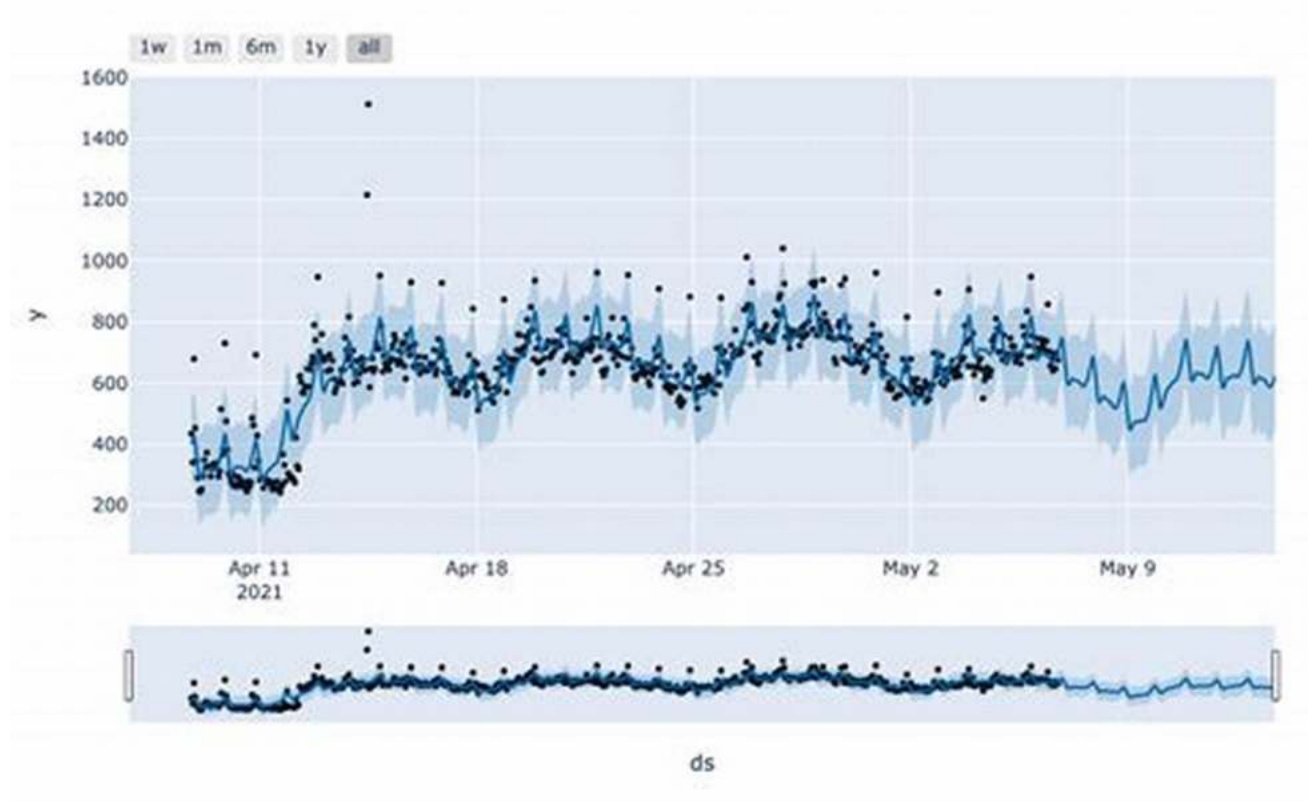


# Forecasting Time Data With Facebook Prophet



Time series forecasting is a crucial technique used in various fields such as finance, sales, and weather forecasting. Accurate predictions about future trends can help businesses make informed decisions and improve their strategies.

One popular tool in the world of time series forecasting is Facebook Prophet, an open-source library developed by Facebook's Core Data Science team. Prophet simplifies the process of predicting time series data using an additive model that accounts for seasonality, trends, and holidays.

**Forecasting Time Series Data with Facebook Prophet: Build, improve, and optimize time series**



## forecasting models using the advanced forecasting tool by Anubhav Singh (Kindle Edition)

★★★★☆ 4.8 out of 5

Language : English  
File size : 11912 KB  
Text-to-Speech : Enabled  
Screen Reader : Supported  
Enhanced typesetting : Enabled  
Print length : 270 pages



### What is Facebook Prophet?

Facebook Prophet is a powerful tool that combines the flexibility of traditional statistical models with the simplicity of machine learning. It provides an intuitive interface for analysts and data scientists to forecast time series data without requiring extensive knowledge in the field.

The library is based on the Generalized Additive Model (GAM) framework, which allows for the decomposition of time series data into several components, including trend, seasonality, and holidays. Prophet utilizes an algorithm that fits these components to historical data and generates predictions for future time periods.

### Key Features of Facebook Prophet

1. **Automatic Seasonality Detection:** Prophet has the ability to automatically detect and model various types of seasonality in the data, including daily, weekly, monthly, and yearly patterns. This makes it suitable for a wide range of time series applications.

2. **Flexibility in Model Customization:** Users can easily customize the model by adding additional regressors or specifying custom seasonality patterns. This allows for more granular control over the forecasting process.
3. **Accounting for Holidays:** Facebook Prophet can incorporate information about fixed and recurring holidays into the model. This allows for more accurate predictions, especially in industries where holidays strongly impact demand.
4. **Robustness to Missing Data:** Prophet is designed to handle missing values and outliers in the data. It can impute missing data points and provide reliable predictions even when there are gaps or irregularities in the time series.
5. **Interactive Visualization:** The library includes built-in tools for visualizing the historical data, the fitted model, and the forecasted values. This enables users to gain insights and adjust the parameters based on the visualization results.

## Getting Started with Facebook Prophet

Now that we understand the key features of Facebook Prophet, let's dive into the process of forecasting time series using this powerful tool.

### Data Preparation

The first step is to collect and prepare the historical time series data. This includes cleaning the data, handling missing values, and ensuring the data is in the correct format required by Prophet.

Facebook Prophet expects a dataframe with two columns: *ds* (*datetime*) and *y* (*numerical value*). The *ds* column represents the time points, while the *y* column represents the corresponding value for each time point.

```
import pandas as pd

# Load data
data = pd.read_csv('time_series_data.csv')

# Prepare data
data['ds'] = pd.to_datetime(data['date_column'])
data['y'] = data['value_column']
```

## Fitting and Forecasting

After preparing the data, we can proceed with fitting the Prophet model and generating forecasts for future time periods.

```
from fbprophet import Prophet

# Initialize model
model = Prophet()

# Fit the model
model.fit(data)

# Specify the desired number of future periods to forecast
future_periods = 365

# Generate the forecast
forecast = model.make_future_dataframe(periods=future_periods)
forecast = model.predict(forecast)
```

## Visualizing the Results

Finally, we can visualize the historical data, the fitted model, and the forecasted values.

```
import matplotlib.pyplot as plt

# Plot the historical data
model.plot(data)
plt.title('Historical Data')
plt.show()
```

```
# Plot the forecasted values
model.plot(forecast)
plt.title('Forecasted Values')
plt.show()
```

Forecasting time series data is a complex task that requires expertise in statistical modeling and domain knowledge. However, with the advent of tools like Facebook Prophet, the process has become more accessible to a wider audience, allowing analysts and data scientists to make accurate predictions without extensive programming skills.

Facebook Prophet's intuitive interface, automatic seasonality detection, and robustness to missing data make it a valuable tool for businesses and researchers alike. By harnessing the power of time series forecasting, organizations can gain a competitive advantage and make data-driven decisions with confidence.



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Create and improve high-quality automated forecasts for time series data that have strong seasonal effects, holidays, and additional regressors using Python

## **Key Features**

- Learn how to use the open-source forecasting tool Facebook Prophet to improve your forecasts
- Build a forecast and run diagnostics to understand forecast quality
- Fine-tune models to achieve high performance, and report that performance with concrete statistics

## **Book Description**

Prophet enables Python and R developers to build scalable time series forecasts. This book will help you to implement Prophet's cutting-edge forecasting techniques to model future data with higher accuracy and with very few lines of code.

You will begin by exploring the evolution of time series forecasting, from the basic early models to the advanced models of the present day. The book will demonstrate how to install and set up Prophet on your machine and build your first model with only a few lines of code. You'll then cover advanced features such as visualizing your forecasts, adding holidays, seasonality, and trend changepoints, handling outliers, and more, along with understanding why and how to modify each of the default parameters. Later chapters will show you how to optimize more complicated models with hyperparameter tuning and by adding additional regressors to the model. Finally, you'll learn how to run diagnostics to evaluate the performance of your models and see some useful features when running Prophet in production environments.

By the end of this Prophet book, you will be able to take a raw time series dataset and build advanced and accurate forecast models with concise, understandable, and repeatable code.

## **What you will learn**

- Gain an understanding of time series forecasting, including its history, development, and uses
- Understand how to install Prophet and its dependencies
- Build practical forecasting models from real datasets using Python
- Understand the Fourier series and learn how it models seasonality
- Decide when to use additive and when to use multiplicative seasonality
- Discover how to identify and deal with outliers in time series data
- Run diagnostics to evaluate and compare the performance of your models

## **Who this book is for**

This book is for data scientists, data analysts, machine learning engineers, software engineers, project managers, and business managers who want to build time series forecasts in Python. Working knowledge of Python and a basic understanding of forecasting principles and practices will be useful to apply the concepts covered in this book more easily.

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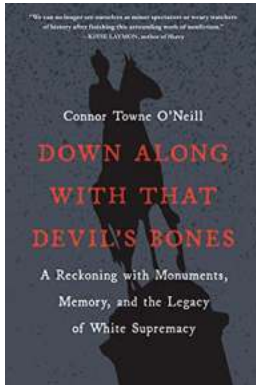
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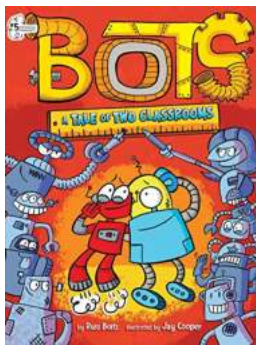
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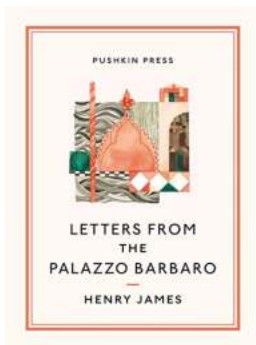
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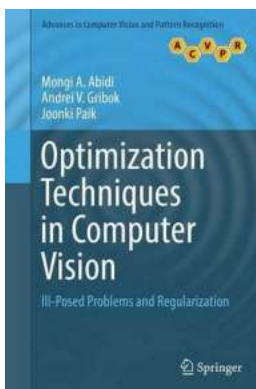
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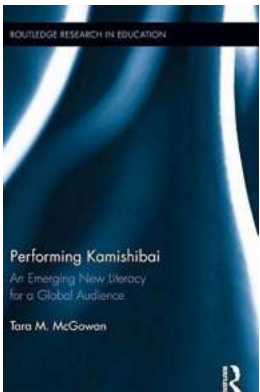
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