

Personal Finance with Python

Using pandas, Requests,
and Recurrent

Max Humber

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Personal Finance with Python: Using pandas, Requests, and Recurrent

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About the Author

Max Humber is a Data Engineer interested in improving finance with technology. He works for WealtheSimple and previously served as the first data scientist for the online lending platform Borrowell. He has spoken at Pycon, ODSC, PyData, useR, and BigDataX in Colombia, London, Berlin, Brussels, and Toronto.

About the Technical Reviewer



Michael Thomas has worked in software development for more than 20 years as an individual contributor, team lead, program manager, and vice president of engineering. Michael has more than 10 years of experience working with mobile devices. His current focus is in the medical sector, using mobile devices to accelerate information transfer between patients and healthcare providers.

Introduction

This book is about Python and personal finance and how you can effectively mix the two together. It is a crash course on how deal with data, how to build up financial formulas in code from scratch, and how to evaluate and think about money in your day-to-day life.

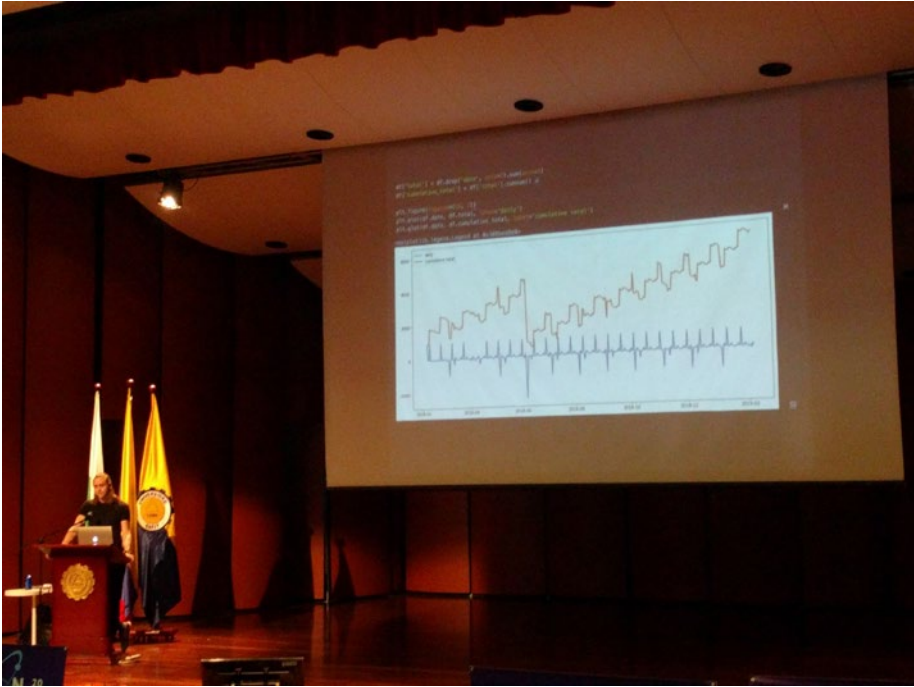
Although each chapter is driven by an idea in personal finance, this book is not an exhaustive compendium on the topic. I try to provide just enough theory in each chapter to get you going, but I made a conscious effort to abstract away and hide a lot of the math so that we don't get stuck in the weeds.

If I'm being completely honest with you (and myself), this book is my love letter to pandas,¹ the main data manipulation library in Python. pandas is a wonderful tool and has become the bedrock on top of which a lot (if not most) machine learning is built. If you get good at pandas (and this book should help!), you will be well positioned to dive into the world of machine learning. But if machine learning isn't your thing, don't worry, I promise that you can still get a lot of value out of this book.

The content of this book was inspired by a presentation I delivered in Medellín, Colombia, in 2018 entitled Personal Pynance. It has been adapted, refactored, stretched, extended, and polished for your enjoyment. I hope you enjoy it!

¹<https://pandas.pydata.org/>

INTRODUCTION



Me! Presenting Personal Pynance at Pycon, Colombia (Photo Credit: Moisés Vargas²)

What This Book Covers

This book covers the following topics.

Profit

You'll explore the idea of spending money to make money with a timely motivating example. You will learn about DataFrames, the basics of loading data in pandas, how to get Python to play nicely with Excel, how to

²<https://twitter.com/moisewv/status/962414647272976384>

think about and calculate net present value and internal rate return, and how to apply functions to data.

Convert

You'll learn how to convert currency with Python. You will learn how to query a third-party API, how to coerce API responses into something usable, how to manage secrets, how to handle errors, and how to create Python classes.

Amortize

You'll learn how to evaluate a buffet of loan options from different financial institutions. You will learn about how to calculate fixed-rate payments with numpy, how to build amortization schedules from scratch, how to build loops, and how to make those loops ultra-efficient and wicked quick.

Budget

You'll explore how to generate a budget that provides day-by-day cash flow resolution. You will learn how to deal with dates in Python, how to visualize data, how to use the recurrent library to parse English sentences, and how to work with the YAML file format.

Invest

You'll explore how to build a portfolio rebalancer. You will learn how to instantiate a portfolio, how to fetch stock quotes, how to update values in a DataFrame, and how to simulate order processing.

Spend

You'll explore how to forecast spending. You will learn how to use pandas and Prophet and how to use the past to generate values into the future. This chapter is a bit silly, but it provides a little window into the world of machine learning with Python and pandas.

Who This Book Is For

This book is for anyone interested in Python, personal finance, or how to combine the two! It is geared toward those who want to better understand how to manage money more effectively and toward those who just want to learn or improve their Python.

Although this book assumes some (minimal) familiarity with programming and the Python language, if you don't have any, don't worry! Everything is built up piece by piece, and the first chapters are slow enough to start. A background in finance is not required.

What You Need for This Book

To ensure that you can run all the code in the book, it is recommended that you install Python (3.6 or newer) with Anaconda. All the setup and configuration details can be found in [Chapter 1](#).

Code Examples

To get the most out of this book, you should actually run the code examples on your own machine as you follow along. Running the code, seeing how it works, and playing with it will help you to internalize everything that is presented.

Code that you should execute will look like this:

```
import pandas as pd
```

Code that generates output (like a print statement, table, or chart) will look similar to this, with its output:

```
ages = pd.DataFrame(data = {
    'name': ['max', 'sunny'],
    'age': [24, 22]
})
print(ages)
```

```
   age  name
0    24  max
1    22  sunny
```

Here's another input-output code example:

```
print(ages['name'])
```

```
0      max
1     sunny
Name: name, dtype: object
```

Reader Feedback

Feedback is always welcome. Let me know what you think about this book—what you liked or may have disliked.

To provide general feedback, simply send me an e-mail and mention the book title in the subject of your message:

max.humber@gmail.com

Acknowledgments

The following reviewers provided valuable feedback on the first draft of this book: David Tingle, Radovan Kavicky, Matthew Braymer-Hayes, Daniel Schissler, Zecca Lehn, Owen Jones, Jesus Rogel-Salazar, Thomas Koller, Burhan ul haq, Eija-Leena Koponen, Moisés Vargas Martínez, Francisco Pérez Cuadrado, David Asboth, and Costin Apostol. This book is far better than it might have been because of them.

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Finally, I'd like to dedicate this book to my parents, Kim and Rich. I wouldn't be where I am today without them.