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High Performance Python With  
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# Numba High Performance Python With Cuda Acceleration

*Get complete instructions for manipulating, processing, cleaning, and crunching datasets in Python. Updated for Python 3.6, the second edition of this hands-on guide is packed with practical case studies that show you how to solve a broad set of data analysis problems effectively. You'll learn the latest versions of pandas, NumPy, IPython, and Jupyter in the process. Written by Wes McKinney, the creator of the Python pandas project, this book is a practical, modern introduction to data science tools in Python. It's ideal for analysts new to Python and for Python programmers new to data*

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science and scientific computing. Data files and related material are available on GitHub. Use the IPython shell and Jupyter notebook for exploratory computing Learn basic and advanced features in NumPy (Numerical Python) Get started with data analysis tools in the pandas library Use flexible tools to load, clean, transform, merge, and reshape data Create informative visualizations with matplotlib Apply the pandas groupby facility to slice, dice, and summarize datasets Analyze and manipulate regular and irregular time series data Learn how to solve real-world data analysis problems with thorough, detailed examples

**INTRODUCTION TO AEROSOL MODELLING** Introduction to Aerosol Modelling: From Theory to Code An aerosol particle is defined as a solid

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*or liquid particle suspended in a carrier gas. Whilst we often treat scientific challenges in a siloed way, aerosol particles are of interest across many disciplines. For example, atmospheric aerosol particles are key determinants of air quality and climate change. Knowledge of aerosol physics and generation mechanisms is key to efficient fuel delivery and drug delivery to the lungs. Likewise, various manufacturing processes require optimal generation, delivery and removal of aerosol particles in a range of conditions. There is a natural tendency for the aerosol scientist to therefore work at the interface of the traditional academic subjects of physics, chemistry, biology, mathematics and computing. The impacts that aerosol particles have are linked to their evolving chemical*

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*and physical characteristics. Likewise, the chemical and physical characteristic of aerosol particles reflect their sources and subsequent processes they have been subject to. Computational models are not only essential for constructing evidence-based understanding of important aerosol processes, but also to predict change and impact. Whilst existing textbooks provide an overview of theoretical frameworks on which aerosol models are based, there is a significant gap in reference material that provide training in translating theory into code. The purpose of this book is to provide readers with exactly that. In following the content provided in this book, you will be able to reproduce models of key processes that can either be used in isolation or brought together to construct a*

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*demonstrator 0D box-model of a coupled gaseous-particulate system. You may be reading this book as an undergraduate, postgraduate, seasoned researcher in the private/public sector or as someone who wishes to better understand the pathways to aerosol model development. Wherever you position yourself, it is hoped that the tools you will learn through this book will provide you with the basis to develop your own platforms and to ensure the next generation of aerosol modellers are equipped with foundational skills to address future challenges in aerosol science.*

*For many researchers, Python is a first-class tool mainly because of its libraries for storing, manipulating, and gaining insight from data. Several resources exist for individual*

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*pieces of this data science stack, but only with the Python Data Science Handbook do you get them all—IPython, NumPy, Pandas, Matplotlib, Scikit-Learn, and other related tools. Working scientists and data crunchers familiar with reading and writing Python code will find this comprehensive desk reference ideal for tackling day-to-day issues: manipulating, transforming, and cleaning data; visualizing different types of data; and using data to build statistical or machine learning models. Quite simply, this is the must-have reference for scientific computing in Python. With this handbook, you'll learn how to use: IPython and Jupyter: provide computational environments for data scientists using Python NumPy: includes the ndarray for efficient*

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*storage and manipulation of dense data arrays in Python Pandas: features the DataFrame for efficient storage and manipulation of labeled/columnar data in Python Matplotlib: includes capabilities for a flexible range of data visualizations in Python Scikit-Learn: for efficient and clean Python implementations of the most important and established machine learning algorithms*

*A fast, easy-to-follow and clear tutorial to help you develop Parallel computing systems using Python. Along with explaining the fundamentals, the book will also introduce you to slightly advanced concepts and will help you in implementing these techniques in the real world. If you are an experienced Python programmer and are willing to utilize the available computing*

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*resources by parallelizing applications in a simple way, then this book is for you. You are required to have a basic knowledge of Python development to get the most of this book.*

*Theory, Algorithms, and Applications  
Bioinformatics with Python Cookbook  
Neural Information Processing  
How to Make Data Scientists  
Productive*

*Cython*

*Optimum-Path Forest*

**Python High  
PerformancePackt  
Publishing Ltd**

**The financial industry has  
adopted Python at a  
tremendous rate recently,  
with some of the largest**



**investment banks and hedge funds using it to build core trading and risk management systems. This hands-on guide helps both developers and quantitative analysts get started with Python, and guides you through the most important aspects of using Python for quantitative finance. Using practical examples through the book, author Yves Hilpisch also shows you how to develop a full-fledged framework for Monte Carlo simulation-based derivatives and risk analytics, based on a large, realistic case study.**

**Much of the book uses interactive IPython Notebooks, with topics that include: Fundamentals: Python data structures, NumPy array handling, time series analysis with pandas, visualization with matplotlib, high performance I/O operations with PyTables, date/time information handling, and selected best practices Financial topics: mathematical techniques with NumPy, SciPy and SymPy such as regression and optimization; stochastics for Monte Carlo**

**simulation, Value-at-Risk,  
and Credit-Value-at-Risk  
calculations; statistics for  
normality tests, mean-  
variance portfolio  
optimization, principal  
component analysis (PCA),  
and Bayesian regression  
Special topics: performance  
Python for financial  
algorithms, such as  
vectorization and  
parallelization, integrating  
Python with Excel, and  
building financial  
applications based on Web  
technologies  
Learn how to use Python to  
create efficient applications**

**About This Book Identify the bottlenecks in your applications and solve them using the best profiling techniques Write efficient numerical code in NumPy, Cython, and Pandas Adapt your programs to run on multiple processors and machines with parallel programming Who This Book Is For The book is aimed at Python developers who want to improve the performance of their application. Basic knowledge of Python is expected What You Will Learn Write efficient numerical code with the**

**NumPy and Pandas libraries  
Use Cython and Numba to  
achieve native performance  
Find bottlenecks in your  
Python code using profilers  
Write asynchronous code  
using Asyncio and RxPy Use  
Tensorflow and Theano for  
automatic parallelism in  
Python Set up and run  
distributed algorithms on a  
cluster using Dask and  
PySpark In Detail Python is a  
versatile language that has  
found applications in many  
industries. The clean syntax,  
rich standard library, and  
vast selection of third-party  
libraries make Python a**

**wildly popular language. Python High Performance is a practical guide that shows how to leverage the power of both native and third-party Python libraries to build robust applications. The book explains how to use various profilers to find performance bottlenecks and apply the correct algorithm to fix them. The reader will learn how to effectively use NumPy and Cython to speed up numerical code. The book explains concepts of concurrent programming and how to implement**

**robust and responsive applications using Reactive programming. Readers will learn how to write code for parallel architectures using Tensorflow and Theano, and use a cluster of computers for large-scale computations using technologies such as Dask and PySpark. By the end of the book, readers will have learned to achieve performance and scale from their Python applications. Style and approach A step-by-step practical guide filled with real-world use cases and examples**

**Success in data science**

**depends on the flexible and appropriate use of tools. That includes Python and R, two of the foundational programming languages in the field. This book guides data scientists from the Python and R communities along the path to becoming bilingual. By recognizing the strengths of both languages, you'll discover new ways to accomplish data science tasks and expand your skill set. Authors Rick Scavetta and Boyan Angelov explain the parallel structures of these languages and highlight where each one**



**excels, whether it's their linguistic features or the powers of their open source ecosystems. You'll learn how to use Python and R together in real-world settings and broaden your job opportunities as a bilingual data scientist. Learn Python and R from the perspective of your current language Understand the strengths and weaknesses of each language Identify use cases where one language is better suited than the other Understand the modern open source ecosystem available for**

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**both, including packages,  
frameworks, and workflows  
Learn how to integrate R  
and Python in a single  
workflow Follow a case  
study that demonstrates  
ways to use these languages  
together**

**Build high performance,  
concurrent, and multi-  
threaded apps with Python  
using proven design  
patterns**

**Learn Ruthlessly Effective  
Automation**

**The Art of Scientific Python  
An Introduction to Cloud-  
Based Machine Learning  
High Performance**

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## **Computing**

### **Mastering Python**

Get started with Python for data analysis and numerical computing in the Jupyter notebook About This Book Learn the basics of Python in the Jupyter Notebook Analyze and visualize data with pandas, NumPy, matplotlib, and seaborn Perform highly-efficient numerical computations with Numba, Cython, and ipyparallel Who This Book Is For This book targets students, teachers, researchers, engineers, analysts, journalists, hobbyists, and all data enthusiasts who are interested in analyzing and visualizing real-world datasets. If you are new to programming and

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data analysis, this book is exactly for you. If you're already familiar with another language or analysis software, you will also appreciate this introduction to the Python data analysis platform. Finally, there are more technical topics for advanced readers. No prior experience is required; this book contains everything you need to know.

What You Will Learn  
Install Anaconda and code in Python in the Jupyter Notebook  
Load and explore datasets interactively  
Perform complex data manipulations effectively with pandas  
Create engaging data visualizations with matplotlib and seaborn  
Simulate mathematical models with NumPy  
Visualize and process images interactively

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in the Jupyter Notebook with scikit-image Accelerate your code with Numba, Cython, and IPython.parallel Extend the Notebook interface with HTML, JavaScript, and D3 In Detail Python is a user-friendly and powerful programming language. IPython offers a convenient interface to the language and its analysis libraries, while the Jupyter Notebook is a rich environment well-adapted to data science and visualization. Together, these open source tools are widely used by beginners and experts around the world, and in a huge variety of fields and endeavors. This book is a beginner-friendly guide to the Python data analysis platform. After an introduction to the

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Python language, IPython, and the Jupyter Notebook, you will learn how to analyze and visualize data on real-world examples, how to create graphical user interfaces for image processing in the Notebook, and how to perform fast numerical computations for scientific simulations with NumPy, Numba, Cython, and ipyparallel. By the end of this book, you will be able to perform in-depth analyses of all sorts of data. Style and approach This is a hands-on beginner-friendly guide to analyze and visualize data on real-world examples with Python and the Jupyter Notebook. Use advanced features of Python to write high-quality, readable code and packages Key Features

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Extensively updated for Python 3.10 with new chapters on design patterns, scientific programming, machine learning, and interactive Python Shape your scripts using key concepts like concurrency, performance optimization, asyncio, and multiprocessing Learn how advanced Python features fit together to produce maintainable code Book Description Even if you find writing Python code easy, writing code that is efficient, maintainable, and reusable is not so straightforward. Many of Python's capabilities are underutilized even by more experienced programmers. Mastering Python, Second Edition, is an authoritative guide to understanding advanced

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Python programming so you can write the highest quality code. This new edition has been extensively revised and updated with exercises, four new chapters and updates up to Python 3.10. Revisit important basics, including Pythonic style and syntax and functional programming. Avoid common mistakes made by programmers of all experience levels. Make smart decisions about the best testing and debugging tools to use, optimize your code's performance across multiple machines and Python versions, and deploy often-forgotten Python features to your advantage. Get fully up to speed with asyncio and stretch the language even further by



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accessing C functions with simple Python calls. Finally, turn your new-and-improved code into packages and share them with the wider Python community. If you are a Python programmer wanting to improve your code quality and readability, this Python book will make you confident in writing high-quality scripts and taking on bigger challenges What you will learn Write beautiful Pythonic code and avoid common Python coding mistakes Apply the power of decorators, generators, coroutines, and metaclasses Use different testing systems like pytest, unittest, and doctest Track and optimize application performance for both memory and CPU usage Debug your

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applications with PDB,  
Werkzeug, and faulthandler  
Improve your performance  
through asyncio,  
multiprocessing, and distributed  
computing Explore popular  
libraries like Dask, NumPy,  
SciPy, pandas, TensorFlow, and  
scikit-learn Extend Python's  
capabilities with C/C++ libraries  
and system calls Who this book is  
for This book will benefit more  
experienced Python  
programmers who wish to  
upskill, serving as a reference for  
best practices and some of the  
more intricate Python  
techniques. Even if you have  
been using Python for years,  
chances are that you haven't yet  
encountered every topic  
discussed in this book. A good

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understanding of Python programming is necessary. Intended to anyone interested in numerical computing and data science: students, researchers, teachers, engineers, analysts, hobbyists... Basic knowledge of Python/NumPy is recommended. Some skills in mathematics will help you understand the theory behind the computational methods.

A practical guide to using modern software effectively in quantitative research in the social and natural sciences. This book offers a practical guide to the computational methods at the heart of most modern quantitative research. It will be essential reading for research assistants needing hands-on

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experience; students entering PhD programs in business, economics, and other social or natural sciences; and those seeking quantitative jobs in industry. No background in computer science is assumed; a learner need only have a computer with access to the Internet. Using the example as its principal pedagogical device, the book offers tried-and-true prototypes that illustrate many important computational tasks required in quantitative research. The best way to use the book is to read it at the computer keyboard and learn by doing. The book begins by introducing basic skills: how to use the operating system, how to organize data, and how to complete simple

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programming tasks. For its demonstrations, the book uses a UNIX-based operating system and a set of free software tools: the scripting language Python for programming tasks; the database management system SQLite; and the freely available R for statistical computing and graphics. The book goes on to describe particular tasks: analyzing data, implementing commonly used numerical and simulation methods, and creating extensions to Python to reduce cycle time. Finally, the book describes the use of LaTeX, a document markup language and preparation system.

BigDML 2019

ISC High Performance 2016

International Workshops,

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ExaComm, E-MuCoCoS, HPC-  
IODC, IXPUG, IWOPH, P<sup>3</sup>MA,  
VHPC, WOPSSS, Frankfurt,  
Germany, June 19–23, 2016,

Revised Selected Papers

Python High Performance

Elegant SciPy

Hands-On GPU Computing with  
Python

Scientific Computing and Data  
Science Applications with

Numpy, SciPy and Matplotlib

*The two-volume set LNCS 12043 and  
12044 constitutes revised selected  
papers from the 13th International  
Conference on Parallel Processing  
and Applied Mathematics, PPAM  
2019, held in Bialystok, Poland, in  
September 2019. The 91 regular  
papers presented in these volumes  
were selected from 161 submissions.*

*For regular tracks of the conference, 41 papers were selected from 89 submissions. The papers were organized in topical sections named as follows: Part I: numerical algorithms and parallel scientific computing; emerging HPC architectures; performance analysis and scheduling in HPC systems; environments and frameworks for parallel/distributed/cloud computing; applications of parallel computing; parallel non-numerical algorithms; soft computing with applications; special session on GPU computing; special session on parallel matrix factorizations. Part II: workshop on language-based parallel programming models (WLPP 2019); workshop on models algorithms and methodologies*

*for hybrid parallelism in new HPC systems; workshop on power and energy aspects of computations (PEAC 2019); special session on tools for energy efficient computing; workshop on scheduling for parallel computing (SPC 2019); workshop on applied high performance numerical algorithms for PDEs; minisymposium on HPC applications in physical sciences; minisymposium on high performance computing interval methods; workshop on complex collective systems. Chapters "Parallel adaptive cross approximation for the multi-trace formulation of scattering problems" and "A High-Order Discontinuous Galerkin Solver with Dynamic Adaptive Mesh Refinement to Simulate Cloud Formation*



*Processes" of LNCS 12043 are available open access under a Creative Commons Attribution 4.0 International License via [link.springer.com](http://link.springer.com).*

*"If you're an experienced Python programmer, High Performance Python will guide you through the various routes of code optimization. You'll learn how to use smarter algorithms and leverage peripheral technologies, such as numpy, cython, cpython, and various multi-threaded and multi-node strategies. There's a lack of good learning and reference material available if you want to learn Python for highly computational tasks. Because of it, fields from physics to biology and systems infrastructure to data science are*

*hitting barriers. They need the fast prototyping nature of Python, but too few people know how to wield it"--Publisher's description.*

*Learn how to use Python to create efficient applications*  
**About This Book\*** *Identify the bottlenecks in your applications and solve them using the best profiling techniques\* Write efficient numerical code in NumPy, Cython, and Pandas\* Adapt your programs to run on multiple processors and machines with parallel programming*  
**Who This Book Is For***The book is aimed at Python developers who want to improve the performance of their application. Basic knowledge of Python is expected*  
**What You Will Learn\*** *Write efficient numerical code with the*

*NumPy and Pandas libraries\* Use Cython and Numba to achieve native performance\* Find bottlenecks in your Python code using profilers\* Write asynchronous code using Asyncio and RxPy\* Use Tensorflow and Theano for automatic parallelism in Python\* Set up and run distributed algorithms on a cluster using Dask and PySpark*

*In Detail Python is a versatile language that has found applications in many industries. The clean syntax, rich standard library, and vast selection of third-party libraries make Python a wildly popular language. Python High Performance is a practical guide that shows how to leverage the power of both native and third-party Python libraries to build robust*

*applications. The book explains how to use various profilers to find performance bottlenecks and apply the correct algorithm to fix them. The reader will learn how to effectively use NumPy and Cython to speed up numerical code. The book explains concepts of concurrent programming and how to implement robust and responsive applications using Reactive programming. Readers will learn how to write code for parallel architectures using Tensorflow and Theano, and use a cluster of computers for large-scale computations using technologies such as Dask and PySpark. By the end of the book, readers will have learned to achieve performance and scale from their Python applications. Style and approach A step-by-step practical*

*guide filled with real-world use cases  
and examples*

*The seven-volume set of LNCS  
11301-11307, constitutes the  
proceedings of the 25th International  
Conference on Neural Information  
Processing, ICONIP 2018, held in  
Siem Reap, Cambodia, in December  
2018. The 401 full papers presented  
were carefully reviewed and selected  
from 575 submissions. The papers  
address the emerging topics of  
theoretical research, empirical studies,  
and applications of neural  
information processing techniques  
across different domains. The first  
volume, LNCS 11301, is organized in  
topical sections on deep neural  
networks, convolutional neural  
networks, recurrent neural networks,*

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*and spiking neural networks.*

*A Guide for Python Programmers*

*Effective Data Science Infrastructure*

*Learning Concurrency in Python*

*Write powerful and efficient code*

*using the full range of Python's*

*capabilities*

*Extend MATLAB with 300,000+*

*Modules from the Python Package*

*Index*

*High-performance Computing with*

*Python 3.x*

The financial industry has recently adopted Python at a tremendous rate, with some of the largest investment banks and hedge funds using it to build core trading and risk management systems.

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Updated for Python 3, the second edition of this hands-on book helps you get started with the language, guiding developers and quantitative analysts through Python libraries and tools for building financial applications and interactive financial analytics. Using practical examples throughout the book, author Yves Hilpisch also shows you how to develop a full-fledged framework for Monte Carlo simulation-based derivatives and risk analytics, based on a

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large, realistic case study. Much of the book uses interactive IPython Notebooks.

Leverage the numerical and mathematical modules in Python and its standard library as well as popular open source numerical Python packages like NumPy, SciPy, FiPy, matplotlib and more. This fully revised edition, updated with the latest details of each package and changes to Jupyter projects, demonstrates how to numerically compute solutions and mathematically model



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applications in big data, cloud computing, financial engineering, business management and more.

Numerical Python, Second Edition, presents many brand-new case study examples of applications in data science and statistics using Python, along with extensions to many previous examples. Each of these demonstrates the power of Python for rapid development and exploratory computing due to its simple and high-level syntax and multiple options for data analysis. After reading this book,

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readers will be familiar with many computing techniques including array-based and symbolic computing, visualization and numerical file I/O, equation solving, optimization, interpolation and integration, and domain-specific computational problems, such as differential equation solving, data analysis, statistical modeling and machine learning. What You'll Learn Work with vectors and matrices using NumPy Plot and visualize data with Matplotlib

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Perform data analysis tasks with Pandas and SciPy Review statistical modeling and machine learning with statsmodels and scikit-learn Optimize Python code using Numba and Cython Who This Book Is For Developers who want to understand how to use Python and its related ecosystem for numerical computing.

Explore GPU-enabled programmable environment for machine learning, scientific applications, and gaming using PuCUDA, PyOpenGL, and Anaconda Accelerate Key Features

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Understand effective synchronization strategies for faster processing using GPUs Write parallel processing scripts with PyCuda and PyOpenCL Learn to use the CUDA libraries like CuDNN for deep learning on GPUs Book Description GPUs are proving to be excellent general purpose-parallel computing solutions for high performance tasks such as deep learning and scientific computing. This book will be your guide to getting started with GPU computing. It will start with introducing GPU

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computing and explain the architecture and programming models for GPUs. You will learn, by example, how to perform GPU programming with Python, and you'll look at using integrations such as PyCUDA, PyOpenCL, CuPy and Numba with Anaconda for various tasks such as machine learning and data mining. Going further, you will get to grips with GPU work flows, management, and deployment using modern containerization solutions. Toward the end of the book, you will get familiar with the

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principles of distributed computing for training machine learning models and enhancing efficiency and performance. By the end of this book, you will be able to set up a GPU ecosystem for running complex applications and data models that demand great processing capabilities, and be able to efficiently manage memory to compute your application effectively and quickly. What you will learn Utilize Python libraries and frameworks for GPU acceleration Set up a GPU-enabled

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programmable machine  
learning environment on  
your system with Anaconda  
Deploy your machine  
learning system on cloud  
containers with  
illustrated examples  
Explore PyCUDA and  
PyOpenCL and compare them  
with platforms such as  
CUDA, OpenCL and ROCm.  
Perform data mining tasks  
with machine learning  
models on GPUs Extend your  
knowledge of GPU computing  
in scientific applications  
Who this book is for Data  
Scientist, Machine  
Learning enthusiasts and  
professionals who wants to

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get started with GPU computation and perform the complex tasks with low-latency. Intermediate knowledge of Python programming is assumed.

Optimum-Path Forest:

Theory, Algorithms, and

Applications was first

published in 2008 in its

supervised and

unsupervised versions with

applications in medicine

and image classification.

Since then, it has

expanded to a variety of

other applications such as

remote sensing, electrical

and petroleum engineering,

and biology. In recent



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years, multi-label and semi-supervised versions were also developed to handle video classification problems. The book presents the principles, algorithms and applications of Optimum-Path Forest, giving the theory and state-of-the-art as well as insights into future directions. Presents the first book on Optimum-path Forest Shows how it can be used with Deep Learning Gives a wide range of applications Includes the methods, underlying theory and applications of Optimum-

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Path Forest (OPF)

The Hitchhiker's Guide to  
Python

Analyze Big Financial Data

IPython Interactive

Computing and

Visualization Cookbook

Explore high-performance

parallel computing with

CUDA

Hands-On GPU Programming

with Python and CUDA

Python for MATLAB

Development

*Measure, optimize, and improve  
the performance of your Python  
code with this easy-to-follow guide*

*About This Book Master the do's  
and don'ts of Python performance  
programming Learn how to use*

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*exiting new tools that will help you improve your scripts A step-by-step, conceptual guide to teach you how to optimize and fine-tune your critical pieces of code Who This Book Is For If you're a Python developer looking to improve the speed of your scripts or simply wanting to take your skills to the next level, then this book is perfect for you. What You Will Learn Master code optimization step-by-step and learn how to use different tools Understand what a profiler is and how to read its output Interpret visual output from profiling tools and improve the performance of your script Use Cython to create fast applications using Python and C*

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*Take advantage of PyPy to improve performance of Python code Optimize number-crunching code with NumPy, Numba, Parakeet, and Pandas In Detail Simply knowing how to code is not enough; on mission-critical pieces of code, every bit of memory and every CPU cycle counts, and knowing how to squish every bit of processing power out of your code is a crucial and sought-after skill. Nowadays, Python is used for many scientific projects, and sometimes the calculations done in those projects require some serious fine-tuning. Profilers are tools designed to help you measure the performance of your code and help you during the*

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*optimization process, so knowing how to use them and read their output is very handy. This book starts from the basics and progressively moves on to more advanced topics. You'll learn everything from profiling all the way up to writing a real-life application and applying a full set of tools designed to improve it in different ways. In the middle, you'll stop to learn about the major profilers used in Python and about some graphic tools to help you make sense of their output. You'll then move from generic optimization techniques onto Python-specific ones, going over the main constructs of the language that will help you*

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*improve your speed without much of a change. Finally, the book covers some number-crunching-specific libraries and how to use them properly to get the best speed out of them. After reading this book, you will know how to take any Python code, profile it, find out where the bottlenecks are, and apply different techniques to remove them. Style and approach This easy-to-follow, practical guide will help you enhance your optimization skills by improving real-world code. The Hitchhiker's Guide to Python takes the journeyman Pythonista to true expertise. More than any other language, Python was created with the philosophy of*

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*simplicity and parsimony. Now 25 years old, Python has become the primary or secondary language (after SQL) for many business users. With popularity comes diversity—and possibly dilution. This guide, collaboratively written by over a hundred members of the Python community, describes best practices currently used by package and application developers. Unlike other books for this audience, The Hitchhiker's Guide is light on reusable code and heavier on design philosophy, directing the reader to excellent sources that already exist.*

*Effective Data Science Infrastructure: How to make data scientists more productive is a*

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*hands-on guide to assembling infrastructure for data science and machine learning applications. It reveals the processes used at Netflix and other data-driven companies to manage their cutting edge data infrastructure. In it, you'll master scalable techniques for data storage, computation, experiment tracking, and orchestration that are relevant to companies of all shapes and sizes. You'll learn how you can make data scientists more productive with your existing cloud infrastructure, a stack of open source software, and idiomatic Python.*

*Build real-world applications with Python 2.7, CUDA 9, and CUDA*



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*10. We suggest the use of Python 2.7 over Python 3.x, since Python 2.7 has stable support across all the libraries we use in this book.*

*Key Features Expand your background in GPU*

*programming—PyCUDA, scikit-cuda, and Nsight Effectively use CUDA libraries such as cuBLAS, cuFFT, and cuSolver Apply GPU programming to modern data science applications Book*

*Description Hands-On GPU*

*Programming with Python and CUDA hits the ground running: you'll start by learning how to apply Amdahl's Law, use a code profiler to identify bottlenecks in your Python code, and set up an appropriate GPU programming*

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*environment. You'll then see how to "query" the GPU's features and copy arrays of data to and from the GPU's own memory. As you make your way through the book, you'll launch code directly onto the GPU and write full blown GPU kernels and device functions in CUDA C. You'll get to grips with profiling GPU code effectively and fully test and debug your code using Nsight IDE. Next, you'll explore some of the more well-known NVIDIA libraries, such as cuFFT and cuBLAS. With a solid background in place, you will now apply your new-found knowledge to develop your very own GPU-based deep neural network from scratch. You'll then explore*

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*advanced topics, such as warp shuffling, dynamic parallelism, and PTX assembly. In the final chapter, you'll see some topics and applications related to GPU programming that you may wish to pursue, including AI, graphics, and blockchain. By the end of this book, you will be able to apply GPU programming to problems related to data science and high-performance computing. What you will learn*

*Launch GPU code directly from Python*

*Write effective and efficient GPU kernels and device functions*

*Use libraries such as cuFFT, cuBLAS, and cuSolver*

*Debug and profile your code with Nsight and Visual Profiler*

*Apply GPU programming*

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*to datascience problems Build a GPU-based deep neuralnetwork from scratch Explore advanced GPU hardware features, such as warp shuffling Who this book is for Hands-On GPU Programming with Python and CUDA is for developers and data scientists who want to learn the basics of effective GPU programming to improve performance using Python code. You should have an understanding of first-year college or university-level engineering mathematics and physics, and have some experience with Python as well as in any C-based programming language such as C, C++, Go, or Java.*

*Mastering Python High*

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*Performance*

*Python Data Science Handbook*

*25th International Conference,*

*ICONIP 2018, Siem Reap,*

*Cambodia, December 13-16, 2018,*

*Proceedings, Part I*

*Interfacing with C*

*Over 100 hands-on recipes to*

*sharpen your skills in high-*

*performance numerical computing*

*and data science in the Jupyter*

*Notebook, 2nd Edition*

*Essential Tools for Working with*

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Practically and deeply understand

concurrency in Python to write

efficient programs About This

Book Build highly efficient, robust,

and concurrent applications Work

through practical examples that

will help you address the

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challenges of writing concurrent code Improve the overall speed of execution in multiprocessor and multicore systems and keep them highly available Who This Book Is For This book is for Python developers who would like to get started with concurrent programming. Readers are expected to have a working knowledge of the Python language, as this book will build on these fundamentals concepts. What You Will Learn Explore the concept of threading and multiprocessing in Python Understand concurrency with threads Manage exceptions in child threads Handle the hardest part in a concurrent system — shared resources Build concurrent systems with Communicating

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Sequential Processes (CSP)

Maintain all concurrent systems and master them Apply reactive programming to build concurrent systems Use GPU to solve specific problems In Detail Python is a very high level, general purpose language that is utilized heavily in fields such as data science and research, as well as being one of the top choices for general purpose programming for programmers around the world. It features a wide number of powerful, high and low-level libraries and frameworks that complement its delightful syntax and enable Python programmers to create. This book introduces some of the most popular libraries and frameworks and goes in-depth into how you can

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leverage these libraries for your own high-concurrent, highly-performant Python programs. We'll cover the fundamental concepts of concurrency needed to be able to write your own concurrent and parallel software systems in Python. The book will guide you down the path to mastering Python concurrency, giving you all the necessary hardware and theoretical knowledge. We'll cover concepts such as debugging and exception handling as well as some of the most popular libraries and frameworks that allow you to create event-driven and reactive systems. By the end of the book, you'll have learned the techniques to write incredibly efficient concurrent systems that



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follow best practices. Style and approach This easy-to-follow guide teaches you new practices and techniques to optimize your code, and then moves toward more advanced ways to effectively write efficient Python code. Small and simple practical examples will help you test the concepts yourself, and you will be able to easily adapt them for any application.

Master Powerful Off-the-Shelf Business Solutions for AI and Machine Learning Pragmatic AI will help you solve real-world problems with contemporary machine learning, artificial intelligence, and cloud computing tools. Noah Gift demystifies all the concepts and tools you need to get results—even if you don't

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have a strong background in math or data science. Gift illuminates powerful off-the-shelf cloud offerings from Amazon, Google, and Microsoft, and demonstrates proven techniques using the Python data science ecosystem. His workflows and examples help you streamline and simplify every step, from deployment to production, and build exceptionally scalable solutions. As you learn how machine language (ML) solutions work, you'll gain a more intuitive understanding of what you can achieve with them and how to maximize their value. Building on these fundamentals, you'll walk step-by-step through building cloud-based AI/ML applications to address realistic issues in sports

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cloud AI solutions with Google Cloud Platform, including TPU, Colaboratory, and Datalab services Define Amazon Web Services cloud AI workflows, including spot instances, code pipelines, boto, and more Work with Microsoft Azure AI APIs Walk through building six real-world AI applications, from start to finish Register your book for convenient access to downloads, updates, and/or corrections as they become available. See inside book for details.

If you are either a computational biologist or a Python programmer, you will probably relate to the expression "explosive growth, exciting times". Python is arguably the main programming language for big data, and the

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deluge of data in biology, mostly from genomics and proteomics, makes bioinformatics one of the most exciting fields in data science. Using the hands-on recipes in this book, you'll be able to do practical research and analysis in computational biology with Python. We cover modern, next-generation sequencing libraries and explore real-world examples on how to handle real data. The main focus of the book is the practical application of bioinformatics, but we also cover modern programming techniques and frameworks to deal with the ever increasing deluge of bioinformatics data.

Interfacing with C is about interfacing personal computers using C. Anyone who is interested

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in ports, transducer interfacing, analog to digital conversion, convolution, filters or digital/analog conversion will benefit from reading Interfacing with C. Students will also find this a practical introduction to real-time programming with a generous collection of tried and tested programs. The pace of the book is such that the reader is encouraged to run the programs and experiment with C. The principles precede the applications in most cases in an attempt to provide genuine understanding and encourage further development. Readers will gain much from the hands-on experience the authors' approach provides, an approach designed to enable readers to climb steep

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learning curves with the minimum amount of assistance. The many programs included in the text provide the essential hands-on experience. Some of the programs inevitably become rather lengthy, so the source code used is available as a free download from the Newnes website. The aim of the book, however, is to give the reader enough confidence to rewrite and improve these programs. In the second edition Mike James has thoroughly updated all aspects relating to software, operating systems and graphical interfaces. He has also increased the scope of the book to include current forms of C++. Material on data acquisition has been thoroughly updated and the section on

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peripherals increased. A disk containing the source code for the listings in the book is available from 'Electronics World' magazine, tel. 020 8722 6054. A practical and painless way of becoming an expert C programmer New edition also covers C++ and the Windows environment Get up to speed with the essential maths needed for C without having to buy a university maths text!

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High Performance Python

*Learn to use IPython and Jupyter Notebook for your data analysis and visualization work. Key Features Leverage the Jupyter Notebook for interactive data science and visualization Become an expert in high-performance computing and visualization for data analysis and scientific modeling A comprehensive coverage of scientific computing through many hands-on, example-driven recipes with detailed, step-by-step explanations Book Description Python is*

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one of the leading open source platforms for data science and numerical computing. IPython and the associated Jupyter Notebook offer efficient interfaces to Python for data analysis and interactive visualization, and they constitute an ideal gateway to the platform. IPython Interactive Computing and Visualization Cookbook, Second Edition contains many ready-to-use, focused recipes for high-performance scientific computing and data analysis, from the latest

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*beautiful and powerful Python by using all of the features that Python 3.5 offers About This Book Become familiar with the most important and advanced parts of the Python code style Learn the trickier aspects of Python and put it in a structured context for deeper understanding of the language Offers an expert's-eye overview of how these advanced tasks fit together in Python as a whole along with practical examples Who This Book Is For Almost anyone can learn to write*

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*working script and create high quality code but they might lack a structured understanding of what it means to be 'Pythonic'. If you are a Python programmer who wants to code efficiently by getting the syntax and usage of a few intricate Python techniques exactly right, this book is for you.*

*What You Will Learn*

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- Get familiar with the different ways the*



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*decorators can be written in Understand the power of generators and coroutines without digressing into lambda calculus Create metaclasses and how it makes working with Python far easier Generate HTML documentation out of documents and code using Sphinx Learn how to track and optimize application performance, both memory and cpu Use the multiprocessing library, not just locally but also across multiple machines Get a basic understanding of packaging and creating your own*

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*libraries/applications In Detail Python is a dynamic programming language. It is known for its high readability and hence it is often the first language learned by new programmers. Python being multi-paradigm, it can be used to achieve the same thing in different ways and it is compatible across different platforms. Even if you find writing Python code easy, writing code that is efficient, easy to maintain, and reuse is not so straightforward. This book is an authoritative*

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*guide that will help you learn new advanced methods in a clear and contextualised way. It starts off by creating a project-specific environment using venv, introducing you to different Pythonic syntax and common pitfalls before moving on to cover the functional features in Python. It covers how to create different decorators, generators, and metaclasses. It also introduces you to functools.wraps and coroutines and how they work. Later on you will*

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*learn to use asyncio module for asynchronous clients and servers. You will also get familiar with different testing systems such as py.test, doctest, and unittest, and debugging tools such as Python debugger and faulthandler. You will learn to optimize application performance so that it works efficiently across multiple machines and Python versions. Finally, it will teach you how to access C functions with a simple Python call. By the end of the book, you will be able to write*

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*more advanced scripts and take on bigger challenges. Style and Approach This book is a comprehensive guide that covers advanced features of the Python language, and communicate them with an authoritative understanding of the underlying rationale for how, when, and why to use them.*

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*applications in the broad areas of big data and machine learning. It brings together the academia, researchers, developers and practitioners from scientific organizations and industry to share and disseminate recent research findings.*

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of the kernel using various tools. You will also learn how to optimize your programmer using Numba. You'll learn how to perform large-scale computations using Dask and implement distributed applications in Python; finally, you'll construct robust and responsive apps using Reactive programming. By the end, you will have gained a solid knowledge of the most common tools to get you started on HPC with Python."--Resource description page.  
Data Wrangling with

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Numerical Python*

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*Python and R for the  
Modern Data Scientist*

*From Theory to Code*

Build software that  
combines Python's  
expressivity with the  
performance and control  
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possible with Cython,  
the compiler and hybrid  
programming language  
used by foundational



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packages such as NumPy, and prominent in projects including Pandas, h5py, and scikits-learn. In this practical guide, you'll learn how to use Cython to improve Python's performance—up to 3000x—and to wrap C and C++ libraries in Python with ease. Author Kurt Smith takes you through Cython's capabilities, with sample code and in-depth practice exercises. If you're just starting with Cython, or want to go

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Pythonic interfaces to C

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Redis via pyredis,  
PostgreSQL via psycopg2,  
and MongoDB via pymongo  
Read and write file  
formats that are not  
natively understood by  
MATLAB, such as SQLite,  
YAML, and ini Who This  
Book Is For MATLAB  
developers who are new  
to Python and other  
developers with some  
prior experience with  
MATLAB, R, IDL, or  
Mathematica.

This book constitutes  
revised selected papers  
from 7 workshops that  
were held in conjunction

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with the ISC High Performance 2016 conference in Frankfurt, Germany, in June 2016. The 45 papers presented in this volume were carefully reviewed and selected for inclusion in this book. They stem from the following workshops: Workshop on Exascale Multi/Many Core Computing Systems, E-MuCoCoS; Second International Workshop on Communication Architectures at Extreme Scale, ExaComm; HPC I/O in the Data Center

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Workshop, HPC-IODC;  
International Workshop  
on OpenPOWER for HPC,  
IWOPH; Workshop on the  
Application Performance  
on Intel Xeon Phi -  
Being Prepared for KNL  
and Beyond, IXPUG;  
Workshop on Performance  
and Scalability of  
Storage Systems, WOPSSS;  
and International  
Workshop on Performance  
Portable Programming  
Models for Accelerators,  
P3MA.

Welcome to Scientific  
Python and its  
community. If you're a



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scientist who programs with Python, this practical guide not only teaches you the fundamental parts of SciPy and libraries related to it, but also gives you a taste for beautiful, easy-to-read code that you can use in practice. You'll learn how to write elegant code that's clear, concise, and efficient at executing the task at hand. Throughout the book, you'll work with examples from the wider scientific Python

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ecosystem, using code that illustrates principles outlined in the book. Using actual scientific data, you'll work on real-world problems with SciPy, NumPy, Pandas, scikit-image, and other Python libraries. Explore the NumPy array, the data structure that underlies numerical scientific computation Use quantile normalization to ensure that measurements fit a specific distribution Represent separate regions in an image with

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a Region Adjacency Graph  
Convert temporal or  
spatial data into  
frequency domain data  
with the Fast Fourier  
Transform Solve sparse  
matrix problems,  
including image  
segmentations, with  
SciPy's sparse module  
Perform linear algebra  
by using SciPy packages  
Explore image alignment  
(registration) with  
SciPy's optimize module  
Process large datasets  
with Python data  
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Looking for effective ways to "get stuff done" in Python? This is your guide.

Python foundations, including a brief

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introduction to the language How to automate text, write command-line tools, and automate the filesystem Linux utilities, package management, build systems, monitoring and instrumentation, and automated testing Cloud computing, infrastructure as code, Kubernetes, and serverless Machine learning operations and data engineering from a DevOps perspective Building, deploying, and operationalizing a machine learning project

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appropriate data structures Speed up matrix and vector computations Use tools to compile Python down to machine code Manage multiple I/O and computational operations concurrently Convert multiprocessing code to run on local or remote clusters Deploy code faster using tools like Docker Create distributed applications with clever design patterns to solve complex problems Key Features Set up and run distributed algorithms on a cluster using Dask and PySpark Master skills to accurately implement concurrency in your code Gain practical experience of Python design patterns with real-world examples Book Description This Learning Path shows you how to leverage the power of both native and third-party Python libraries for building



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your problems. This Learning Path includes content from the following Packt products: Python High Performance - Second Edition by Gabriele Lanaro Mastering Concurrency in Python by Quan Nguyen Mastering Python Design Patterns by Sakis Kasampalis What you will learn Use NumPy and pandas to import and manipulate datasets Achieve native performance with Cython and Numba Write asynchronous code using asyncio and RxPy Design highly scalable programs with application scaffolding Explore abstract methods to maintain data consistency Clone objects using the prototype pattern Use the adapter pattern to make incompatible interfaces compatible Employ the strategy pattern to dynamically choose

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an algorithm Who this book is for This Learning Path is specially designed for Python developers who want to build high-performance applications and learn about single core and multi-core programming, distributed concurrency, and Python design patterns. Some experience with Python programming language will help you get the most out of this Learning Path.

Pragmatic AI

Mastering Data-Driven Finance

Python for DevOps

13th International Conference, PPAM

2019, Bialystok, Poland, September

8–11, 2019, Revised Selected Papers,

Part II

Python High Performance, Second  
Edition

Introduction to Aerosol Modelling