Learning IPython for Interactive Computing and Data Visualization

Second Edition

Get started with Python for data analysis and numerical computing in the Jupyter notebook

Cyrille Rossant

Learning Ipython For Interactive Computing And Data Visualization

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Learning Ipython For Interactive Computing And Data Visualization:

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Interactive Computing and Visualization Cookbook Cyrille Rossant,2014-09-25 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 **Learning IPython for Interactive Computing and Data Visualization - Second Edition** Cyrille Rossant,2015 IPython provides a rich architecture for interactive computing and as a Python developer you can take advantage of this practical hands on guide to make yourself an expert Covers numerical computing data analysis and more Overview A practical step by step tutorial which will help you to replace the Python console with the powerful IPython command line interface Use the IPython notebook to modernize the way you interact with Python Perform highly efficient computations with NumPy and Pandas Optimize your code using parallel computing and Cython In Detail You already use Python as a scripting language but did you know it is also increasingly used for scientific computing and data analysis Interactive programming is essential in such exploratory tasks and IPython is the perfect tool for that Once you ve learnt it you won t be able to live without it Learning IPython for Interactive Computing and Data Visualization is a practical hands on example driven tutorial to considerably improve your productivity during interactive Python sessions and shows you how to effectively use IPython for interactive computing and data analysis This book covers all aspects of IPython from the highly powerful interactive Python console to the numerical and visualization features that are commonly associated with IPython You will learn how IPython lets you perform efficient vectorized computations through examples covering numerical simulations with NumPy data analysis with Pandas and visualization with Matplotlib You will also discover how IPython can be conveniently used to optimize your code using parallel computing and dynamic compilation in C with Cython Learning IPython for Interactive Computing and Data Visualization will allow you to optimize your productivity in interactive Python sessions What you will learn from this book Debug your code from the IPython console Benchmark and profile your code from IPython Perform efficient vectorized computations with NumPy Analyze data tables with Pandas Create visualizations with Matplotlib Parallelize your code easily with IPython Customize IPython and create your own magic commands Accelerate your Python code using dynamic C compilation with Cython Approach A practical hands on guide which focuses on interactive programming numerical computing and data analysis with IPython Who this book is written for This book is for Python developers who use Python as a scripting language or for software development and are interested in learning IPython for increasing their productivity during interactive sessions in the console Knowledge of Python is required whereas no knowledge of IPython is necessary **Learning Ipython for Interactive Computing and Data Visualization** Cyrille Rossant,2015-02-24 IPython provides a rich architecture for interactive computing and as a Python developer you can take advantage of this practical hands on guide to make yourself an expert Covers numerical computing data analysis and more Overview A practical step by step tutorial which will help you to replace the Python console with the powerful IPython

command line interface Use the IPython notebook to modernize the way you interact with Python Perform highly efficient computations with NumPy and Pandas Optimize your code using parallel computing and Cython In Detail You already use Python as a scripting language but did you know it is also increasingly used for scientific computing and data analysis Interactive programming is essential in such exploratory tasks and IPython is the perfect tool for that Once you ve learnt it you won t be able to live without it Learning IPython for Interactive Computing and Data Visualization is a practical hands on example driven tutorial to considerably improve your productivity during interactive Python sessions and shows you how to effectively use IPython for interactive computing and data analysis This book covers all aspects of IPython from the highly powerful interactive Python console to the numerical and visualization features that are commonly associated with IPython You will learn how IPython lets you perform efficient vectorized computations through examples covering numerical simulations with NumPy data analysis with Pandas and visualization with Matplotlib You will also discover how IPython can be conveniently used to optimize your code using parallel computing and dynamic compilation in C with Cython Learning IPython for Interactive Computing and Data Visualization will allow you to optimize your productivity in interactive Python sessions What you will learn from this book Debug your code from the IPython console Benchmark and profile your code from IPython Perform efficient vectorized computations with NumPy Analyze data tables with Pandas Create visualizations with Matplotlib Parallelize your code easily with IPython Customize IPython and create your own magic commands Accelerate your Python code using dynamic C compilation with Cython Approach A practical hands on guide which focuses on interactive programming numerical computing and data analysis with IPython Who this book is written for This book is for Python developers who use Python as a scripting language or for software development and are interested in learning IPython for increasing their productivity during interactive sessions in the console Knowledge of Python is required whereas no knowledge of IPython is necessary *IPython Interactive Computing and Visualization Cookbook, Second Edition* Cyrille Rossant,2018-01-31 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 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 IPython Jupyter features to the most advanced tricks to help you write better and faster code You will apply these state of the art methods to various real world examples illustrating topics in applied mathematics scientific modeling and machine learning The first part of the book

covers programming techniques code quality and reproducibility code optimization high performance computing through just in time compilation parallel computing and graphics card programming The second part tackles data science statistics machine learning signal and image processing dynamical systems and pure and applied mathematics What you will learn Master all features of the Jupyter Notebook Code better write high quality readable and well tested programs profile and optimize your code and conduct reproducible interactive computing experiments Visualize data and create interactive plots in the Jupyter Notebook Write blazingly fast Python programs with NumPy ctypes Numba Cython OpenMP GPU programming CUDA parallel IPython Dask and more Analyze data with Bayesian or frequentist statistics Pandas PyMC and R and learn from actual data through machine learning scikit learn Gain valuable insights into signals images and sounds with SciPy scikit image and OpenCV Simulate deterministic and stochastic dynamical systems in Python Familiarize yourself with math in Python using SymPy and Sage algebra analysis logic graphs geometry and probability theory Who this book is for This book is intended for anyone interested in numerical computing and data science students researchers teachers engineers analysts and hobbyists A basic knowledge of Python NumPy is recommended Some skills in mathematics will help you understand the theory behind the computational methods **Learning Predictive Analytics with Python** Ashish Kumar,2016-02-15 Gain practical insights into predictive modelling by implementing Predictive Analytics algorithms on public datasets with Python About This Book A step by step guide to predictive modeling including lots of tips tricks and best practices Get to grips with the basics of Predictive Analytics with Python Learn how to use the popular predictive modeling algorithms such as Linear Regression Decision Trees Logistic Regression and Clustering Who This Book Is For If you wish to learn how to implement Predictive Analytics algorithms using Python libraries then this is the book for you If you are familiar with coding in Python or some other programming statistical scripting language but have never used or read about Predictive Analytics algorithms this book will also help you The book will be beneficial to and can be read by any Data Science enthusiasts Some familiarity with Python will be useful to get the most out of this book but it is certainly not a prerequisite What You Will Learn Understand the statistical and mathematical concepts behind Predictive Analytics algorithms and implement Predictive Analytics algorithms using Python libraries Analyze the result parameters arising from the implementation of Predictive Analytics algorithms Write Python modules functions from scratch to execute segments or the whole of these algorithms Recognize and mitigate various contingencies and issues related to the implementation of Predictive Analytics algorithms Get to know various methods of importing cleaning sub setting merging joining concatenating exploring grouping and plotting data with pandas and numpy Create dummy datasets and simple mathematical simulations using the Python numpy and pandas libraries Understand the best practices while handling datasets in Python and creating predictive models out of them In Detail Social Media and the Internet of Things have resulted in an avalanche of data Data is powerful but not in its raw form It needs to be processed and modeled and Python is one of the most robust tools out there to

do so It has an array of packages for predictive modeling and a suite of IDEs to choose from Learning to predict who would win lose buy lie or die with Python is an indispensable skill set to have in this data age This book is your guide to getting started with Predictive Analytics using Python You will see how to process data and make predictive models from it We balance both statistical and mathematical concepts and implement them in Python using libraries such as pandas scikit learn and numpy You ll start by getting an understanding of the basics of predictive modeling then you will see how to cleanse your data of impurities and get it ready it for predictive modeling You will also learn more about the best predictive modeling algorithms such as Linear Regression Decision Trees and Logistic Regression Finally you will see the best practices in predictive modeling as well as the different applications of predictive modeling in the modern world Style and approach All the concepts in this book been explained and illustrated using a dataset and in a step by step manner The Python code snippet to implement a method or concept is followed by the output such as charts dataset heads pictures and so on The statistical concepts are explained in detail wherever required **Learning Cython Programming** Philip Herron,2016-02-22 Learn the fundamentals of Cython to extend the legacy of your applications About This Book Learn how to extend C applications with pure Python code Get more from Python you ll not only learn Cython you ll also unlock a greater understanding of how to harness Python Packed with tips and tricks that make Cython look easy dive into this accessible programming guide and find out what happens when you bring C and Python together Who This Book Is For This book is for developers who are familiar with the basics of C and Python programming and wish to learn Cython programming to extend their applications What You Will Learn Reuse Python logging in C Make an IRC bot out of your C application Extend an application so you have a web server for rest calls Practice Cython against your C code Discover tricks to work with Python ConfigParser in C Create Python bindings for native libraries Find out about threading and concurrency related to GIL Expand Terminal Multiplexer Tmux with Cython In Detail Cython is a hybrid programming language used to write C extensions for Python language Combining the practicality of Python and speed and ease of the C language it s an exciting language worth learning if you want to build fast applications with ease This new edition of Learning Cython Programming shows you how to get started taking you through the fundamentals so you can begin to experience its unique powers You ll find out how to get set up before exploring the relationship between Python and Cython You ll also look at debugging Cython before moving on to C constructs Caveat on C usage Python threading and GIL in Cython Finally you ll learn object initialization and compile time and gain a deeper insight into Python 3 which will help you not only become a confident Cython developer but a much more fluent Python developer too Style and approach This practical and a fast paced guide gives you all the information you need to start programming using Cython **Interactive Applications Using Matplotlib** Benjamin V. Root,2015-03-24 This book is intended for Python programmers who want to do more than just see their data Experience with GUI toolkits is not required so this book can be an excellent complement to other GUI programming

resources   *Python Game Programming By Example* Alejandro Rodas de Paz,Joseph Howse,2015-09-28 A pragmatic guide for developing your own games with Python About This Book Strengthen your fundamentals of game programming with Python language Seven hands on games to create 2D and 3D games rapidly from scratch Illustrative guide to explore the different GUI libraries for building your games Who This Book Is For If you have ever wanted to create casual games in Python and you would like to explore various GUI technologies that this language offers this is the book for you This title is intended for beginners to Python with little or no knowledge of game development and it covers step by step how to build seven different games from the well known Space Invaders to a classical 3D platformer What You Will Learn Take advantage of Python s clean syntax to build games quickly Discover distinct frameworks for developing graphical applications Implement non player characters NPCs with autonomous and seemingly intelligent behaviors Design and code some popular games like Pong and tower defense Compose maps and levels for your sprite based games in an easy manner Modularize and apply object oriented principles during the design of your games Exploit libraries like Chimpunk2D cocos2d and Tkinter Create natural user interfaces NUIs using a camera and computer vision algorithms to interpret the player s real world actions In Detail With a growing interest in learning to program game development is an appealing topic for getting started with coding From geometry to basic Artificial Intelligence algorithms there are plenty of concepts that can be applied in almost every game Python is a widely used general purpose high level programming language It provides constructs intended to enable clear programs on both a small and large scale It is the third most popular language whose grammatical syntax is not predominantly based on C Python is also very easy to code and is also highly flexible which is exactly what is required for game development The user friendliness of this language allows beginners to code games without too much effort or training Python also works with very little code and in most cases uses the use cases approach reserving lengthy explicit coding for outliers and exceptions making game development an achievable feat Python Game Programming by Example enables readers to develop cool and popular games in Python without having in depth programming knowledge of Python The book includes seven hands on projects developed with several well known Python packages as well as a comprehensive explanation about the theory and design of each game It will teach readers about the techniques of game design and coding of some popular games like Pong and tower defense Thereafter it will allow readers to add levels of complexities to make the games more fun and realistic using 3D At the end of the book you will have added several GUI libraries like Chimpunk2D cocos2d and Tkinter in your tool belt as well as a handful of recipes and algorithms for developing games with Python Style and approach This book is an example based guide that will teach you to build games using Python This book follows a step by step approach as it is aimed at beginners who would like to get started with basic game development By the end of this book you will be competent game developers with good knowledge of programming in Python   Python Business Intelligence Cookbook Robert Dempsey,2015-12-22 Leverage the computational power of Python with more than 60 recipes

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mathematical modules in Python and its Standard Library as well as popular open source numerical Python packages like NumPy FiPy matplotlib and more to numerically compute solutions and mathematically model applications in a number of areas like big data cloud computing financial engineering business management and more After reading and using this book you ll get some takeaway case study examples of applications that can be found in areas like business management big data cloud computing financial engineering i e options trading investment alternatives and even games Up until very recently Python was mostly regarded as just a web scripting language Well computational scientists and engineers have recently discovered the flexibility and power of Python to do more Big data analytics and cloud computing programmers are seeing Python s immense use Financial engineers are also now employing Python in their work Python seems to be evolving as a language that can even rival C Fortran and Pascal Delphi for numerical and mathematical computations **Regression Analysis with Python** Luca Massaron,Alberto Boschetti,2016-02-29 Learn the art of regression analysis with Python About This Book Become competent at implementing regression analysis in Python Solve some of the complex data science problems related to predicting outcomes Get to grips with various types of regression for effective data analysis Who This Book Is For The book targets Python developers with a basic understanding of data science statistics and math who want to learn how to do regression analysis on a dataset It is beneficial if you have some knowledge of statistics and data science What You Will Learn Format a dataset for regression and evaluate its performance Apply multiple linear regression to real world problems Learn to classify training points Create an observation matrix using different techniques of data analysis and cleaning Apply several techniques to decrease and eventually fix any overfitting problem Learn to scale linear models to a big dataset and deal with incremental data In Detail Regression is the process of learning relationships between inputs and continuous outputs from example data which enables predictions for novel inputs There are many kinds of regression algorithms and the aim of this book is to explain which is the right one to use for each set of problems and how to prepare real world data for it With this book you will learn to define a simple regression problem and evaluate its performance The book will help you understand how to properly parse a dataset clean it and create an output matrix optimally built for regression You will begin with a simple regression algorithm to solve some data science problems and then progress to more complex algorithms The book will enable you to use regression models to predict outcomes and take critical business decisions Through the book you will gain knowledge to use Python for building fast better linear models and to apply the results in Python or in any computer language you prefer Style and approach This is a practical tutorial based book You will be given an example problem and then supplied with the relevant code and how to walk through it The details are provided in a step by step manner followed by a thorough explanation of the math underlying the solution This approach will help you leverage your own data using the same techniques **Python Projects for Kids** Jessica Ingrassellino,2016-04-14 Unleash Python and take your small readers on an adventurous ride through the world of programming About This Book Learn to

start using Python for some simple programming tasks such as doing easy mathematical calculations Use logic and control loops to build a nice interesting game Get to grips with working with data and once you re comfortable with that you ll be introduced to Pygame which will help you wrap up the book with a cool game Who This Book Is For This book is for kids aged 10 and over This is book is intended for absolute beginners who lack any knowledge of computing or programming languages and want to get started in the world of programming What You Will Learn Start fiddling with Python s variables build functions and interact with users Build your own calculator using the Math Library Train Python to make logical decisions Work with moving 2D objects on screen Understand the Pygame Library and build your very own game Write a cool program to manage inventories in your backpack In Detail Kids are always the most fast paced and enthusiastic learners and are naturally willing to build stuff that looks like magic at the end when it works Programming can be one such magic Being able to write a program that works helps them feel they ve really achieved something Kids today are very tech savvy and cannot wait to enter the fast paced digital world Because Python is one of the most popular languages and has a syntax that is quite simple to understand even kids are eager to use it as a stepping stone to learning programming languages This book will cover projects that are simple and fun and teach kids how to write Python code that works The book will teach the basics of Python programming installation and so on and then will move on to projects A total of three projects with each and every step explained carefully without any assumption of previous experience Style and approach The book will take a light approach in guiding the little readers through the world of Python The main idea is to teach by example and let the readers have as much exercises to do so that they learn faster and can apply their own ideas to the existing examples The book should get them thinking by the end on where they can go next with such a powerful tool at their disposal *IPython Notebook Essentials* L. Felipe Martins,2014-11-21 If you are a professional student or educator who wants to learn to use IPython Notebook as a tool for technical and scientific computing visualization and data analysis this is the book for you This book will prove valuable for anyone that needs to do computations in an agile environment *Social Media Shaping e-Publishing and Academia* Nashrawan Taha,Rizik Al-Sayyed,Ja'far Alqatawna,Ali Rodan,2017-04-01 This book presents the current state of the art in the field of e publishing and social media particularly in the Arabic context The book discusses trends and challenges in the field of e publishing along with their implications for academic publishing information services e learning and other areas where electronic publishing is essential In particular it addresses 1 Applications of Social Media in Libraries and Information Centers 2 Use of Social Media and E publishing in E learning 3 Information Retrieval in Social Media and 4 Information Security in Social Media **Interactive Computing with Jupyter Notebook** Cyrille Rossant,2018 Python is 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 Interactive Computing with Jupyter Notebook contains many ready to use focused

recipes for high performance scientific computing and data analysis from the latest IPython Jupyter features to the most advanced tricks to help you write better and faster code This course covers programming techniques code quality and reproducibility code optimization high performance computing through just in time compilation parallel computing and graphics card programming In short you will master relatively advanced methods in interactive numerical computing high performance computing and data visualization Resource description page **Mastering Ipython 4.0** Thomas Bitterman,2016-05-30 Get to grips with the advanced concepts of interactive computing to make the most out of IPythonAbout This Book Most updated book on Interactive computing with IPython 4 0 Detailed example rich guide that lets you use the most advanced level interactive programming with IPython Get flexible interactive programming with IPython using this comprehensive guideWho This Book Is ForThis book is for IPython developers who want to make the most of IPython and perform advanced scientific computing with IPython utilizing the ease of interactive computing It is ideal for users who wish to learn about the interactive and parallel computing properties of IPython 4 0 along with its integration with third party tools and concepts such as testing and documenting results What You Will Learn Develop skills to use IPython for high performance computing HPC Understand the IPython interactive shell Use XeroMQ and MPI to pass messages Integrate third party tools like R Julia and JavaScript with IPython Visualize the data Acquire knowledge to test and document the data Get to grips with the recent developments in the Jupyter notebook systemIn DetailIPython is an interactive computational environment in which you can combine code execution rich text mathematics plots and rich media This book will get IPython developers up to date with the latest advancements in IPython and dive deep into interactive computing with IPython This an advanced guide on interactive and parallel computing with IPython will explore advanced visualizations and high performance computing with IPython in detail You will quickly brush up your knowledge of IPython kernels and wrapper kernels then we ll move to advanced concepts such as testing Sphinx JS events interactive work and the ZMQ cluster The book will cover topics such as IPython Console Lexer advanced configuration and third party tools By the end of this book you will be able to use IPython for interactive and parallel computing in a high performance computing environment Style and approachThis is a comprehensive guide to IPython for interactive exploratory and parallel computing It will let the IPython get up to date with the latest advancements in IPython and dive deeper into interactive computing with IPython

Computational Modeling and Visualization of Physical Systems with Python Jay Wang,2016-01-11 Computational Modeling by Jay Wang introduces computational modeling and visualization of physical systems that are commonly found in physics and related areas The authors begin with a framework that integrates model building algorithm development and data visualization for problem solving via scientific computing Through carefully selected problems methods and projects the reader is guided to learning and discovery by actively doing rather than just knowing physics

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