

Open Astronomy-2017 Google Summer of Code Application

Proposal for Casacore Testing

Personal Details

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Previous Contributions

Pull Request [#76](#) :Added Gaussian2d test

Pull Request [#81](#) :Added functionals.poly test

Pull Request [#75](#): fixed some typo error in docs

Personal Background

I am Shibasis Patel, a 2nd year undergraduate student in IIIT Bhubaneswar,India. I'm pursuing a degree in Computer Science and Engineering. I have taken course on

Programming in C, Engineering Mathematics, Data Structure using C, Object Oriented Programming using C++ , Discrete Mathematics, Design and Analysis of Algorithm, Theory of Computation, Systems Programming in my college. Apart from this I have taken some MOOCs to learn Basic and Advanced Python programming.

Programming Background

I have been programming from 2 years now. Now I am proficient with C++ and Python. I use Ubuntu 16.04(Xenial Xerus) as my primary machine with Sublime Text 3 because it is easy to use, extremely customizable and have lots of useful packages.

Favourite features of Python:

- High emphasis on code readability (PEP8) and DRY principles without sacrificing readability.
- I like how in python everything is an object. The usual suspects like ints, strings, lists and dictionaries are objects, as well as functions, classes and everything else. This provides the language with a lot more flexibility and power, that it's simply not available in other languages such as C++.
- Python can be used for a wide range of programming tasks, from little shell scripts to building a web applications to scientific uses. It may not be as good at any of those as a purpose-built programming language but it can do all of them, and do them well. This is why I appreciate the power of this interpreted dynamic language. I started to find the fun in programming because of Python.

As far as testing is concern, I have learnt it from some PyCon videos but I implemented it for the first time when I started contributing to this project.

I had my first experience with Boost.Python two weeks ago, when I talked with the mentors in the Gitter chat.

I have used git for around two years and got quite familiar with version management as well as resolving conflicts.

Project Proposal

Abstract

- Python is a flexible and extensible scientific programming platform. Now a days, scientific programmers prefer to use Python as it contains many in-built scientific

packages[1]. Initially, Casacore was implemented in C++, however having a casacore like tool in python will be handy for scientific programmers. Therefore attempts have been made to make a simpler Python binding using Boost.Python. Although, It attempts to maximize the convenience and flexibility without introducing a separate wrapping language. However, it presents the user with a high-level C++ interface for wrapping C++ classes and functions, managing much of the complexity behind-the-scene with static metaprogramming. This proved to be very easy and successful. But the codebase needs to be cleaner and several more tests need to be written.

- This project aims to improve Python-casacore infrastructure, making the codebase cleaner, modern, maintainable and adding more unit tests.

Significance

- Unit Tests ensure that the code still functions properly as the code base changes with code refactoring.
- Repeated code means having to change things in multiple places, which will increase project time, and increase possibility of errors.

Goals

1. Remove Duplicated code
 - Decorators can be used to remove redundancy
2. Abstract implementation details and internal complexity
 - Using properties decorator
 - Context managers
 - Magic methods
3. Achieving quality code
 - PEP 8
 - Docstrings (PEP 257) / Function Annotation (PEP 3107)
 - Tools:
 - Pycodestyle, Flake8, pylint, radon
 - coala
4. Unit Testing
 - I will follow a test driven approach and unit test specifications would be setup before development and made sure that all tests are passing the end of development. I will be using unittest module to test python-casacore and coverage.py to test code coverage.

Timeline(Tentative) and Deliverables

Week	Tasks
Community Bonding Period 6 May - 29 May	-- Discuss about the project with mentors, know the community.
Week 1 (May 30 - June 5)	-- Remove all existing Compiler warnings
Week 2 (June 6 - June 12)	-- Write tests and improve code quality for utils.py
Week 3 (June 13- June 19)	-- Write tests and improve code quality for tables.py
Week 4 (June 20 - June 26)	--Write tests and improve code quality for functionals.py
MidTerm Deliverables	-- Test Cases and improved pythonic code for utils.py, tables.py and images.py
Week 5 and week 6(June 27 - July 10)	-- Write tests and improve code quality for images.py
Week 7 (July 11 - July 17)	-- Write tests and improve code quality for coordinates.py
Week 8 and Week 9 (July 18 - July 31)	--Write tests and improve code quality for fittings.py

Week 10 and Week 11 (Aug 1- Aug 14)	-- Improve the incomplete documentations in the python-casacore docs. -- Maintaining OS X support
Week 12 (Aug 15 - Aug 21)	-- Finish up any pending work. --Buffer week
End Term Deliverables	--Improved pythonic code and tests for coordinates.py , functionals.py and fitting.py --Documentation of python-casacore.

Other Commitments:

Do you have any other commitments during the main GSoC time period? No, I don't have any work except GSoC. This means I can give 40-45 hrs/week for GSoC (More if required).

Do you have exams or classes that overlap with this period? No, I would be having Summer Vacation. So, I won't be having any classes or exams.

Do you plan to have any other jobs or internships during this period? No, I am not applying for any other internships for summer.

Do you have any other short term commitments during this period? None.

Have you applied with any other organizations? I am not applying for any other project except this.

What is your ideal approach to keeping everybody informed of your progress, problems, and questions over the course of the project?

In order to keep Casacore community update with my progress, I would maintain a blog. I would update the blog every week on Tuesday with my accomplishments for the previous week and targets for the next week.

Besides this, I would keep in touch with mentors over email and Skype.

Eligibility:

Yes, I am eligible to receive payments from Google. For any queries, clarification or further explanation, feel free to contact me at shibasishpatel@live.in

Extra Information

University Info

Name: International Institute of Information Technology, Bhubaneswar, India

Major: Computer Science and Engineering

Year: 2nd

Expected Graduation Year: 2019

Degree: B.Tech

Other Contact Info

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References

1. http://www.openwetware.org/wiki/Julius_B._Lucks/Projects/Python_All_A_Scientist_Needs
2. <http://fg.oisin.rc-harwell.ac.uk/scm/loggerhead/cctbx/old/download/1/bpl.pdf-20130124184140-mu1rdtxc70pfqanm-7004/bpl.pdf>
3. <https://github.com/casacore/python-casacore/blob/master/doc/259.pdf>

