

Short Description

This project is to add support for the numpy module in Boost.python, which is currently in the sandbox. Numpy is a very useful tool for the scientific and engineering community and users of the C++ - Python SIG have expressed desirability along with specific requirements out of this project. Completion of this project means more power to Boost.python users and a stronger base to add more support and features for scientific computation using Numpy in Boost.Python

Template :

== Personal Details ==

* Name: Ankit Daftery
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* Course: Electronics Engineering
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* Availability:

* How much time do you plan to spend on your GSoC?
GSoC coincides with Summer break for me, which means I am free to devote most of my time to GSoC. I can easily work for at least 30 hours a week.

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* What are your intended start and end dates?
I intend to start working by 20th May as I shall be clear of college commitments by then, and I can work upto 20th August, after which I shall tests in college and devoting too much time shall be difficult in the period August-September and during November.

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* What other factors affect your availability (exams, courses, moving, work, etc.)?
GSoC coincides with summer break, and I shall have college starting only near mid-July, after which I can still work for 20 hours a week. I have no exams during this period. I may work on a project for creating an individual Android application during the Summer, but nothing else that shall take up any substantial amount of time.

== Background Information ==

Educational background

I study Electronics Engineering and am in my third year at VJTI, Mumbai. I have had courses in signal processing, communications, and programming in C, C++, MATLAB and VHDL during the course of my study.

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Please summarize your programming background

I recently completed an Android application to easily share text and URLs between phone and desktops by simple hand gestures using Bluetooth.

Previous projects include writing a Firefox extension in Javascript to crawl search results, and extending Javascript in Adobe Acrobat for Invoicing.

I have also written small scripts in Python to implement a file parser to bridge data between devices, implement a Bluetooth server, and most recently a file renaming utility.

I have had extensive experience working with C while writing code for the AVR series of micro-controllers, and have written tutorials for the same. This includes "Horizon", a wearable hand gesture micro-controller based device to intuitively control computer actions.

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Please tell us a little about your programming interests.

I like writing code which interfaces devices or components. Automating daily tasks by writing scripts is also of interest.

I strongly believe in making interactions and interfaces simpler, and try to develop hardware and software solutions with that aim. Mobile application development and writing libraries and sample code so as to improve convenience ranks high on my priority list.

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Please tell us why you are interested in contributing to the Boost C++ Libraries.

The Boost libraries extend functionality and give a lot of power to the user, and my interests align with

this view.

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What is your interest in the project you are proposing?

I am proposing a project to improve support for NumPy arrays in Boost.python, to clean up code and improve documentation of the numpy branch in Boost.python

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Have you done any previous work in this area before or on similar projects?

No, I have not worked on this area before.

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What are your plans beyond this Summer of Code time frame for your proposed work?.

The third stage of my project involves adding additional functionality and features, depending on the availability of time. I would like to continue working on this goal, and once done, work with the Boost.python parent project as well.

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Please rate, from 0 to 5, your knowledge of the following languages, technologies, or tools:

- C++ 3/5
- C++ Standard Library 3/5
- Boost C++ Libraries 0
- Subversion 2

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What software development environments are you most familiar with ?

Eclipse, DevCpp , NP++, CodeBlocks, WinAVR

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What software documentation tool are you most familiar with ?

Doxygen

== Detailed Project Proposal ==

The project will be accomplished in three major stages, arranged according to priority.

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1. Integrate the numpy sandbox project into boost.python

This is the highest priority for this project, as expressed by the community. There are quite a few users of the boost python library who also use numpy, and a quick release will help the users as well as the library by enabling feedback on improvements needed. Currently, the boost numpy project is only in the sandbox and needs to be shipped as soon as possible.

This may further be broken up into three sub-tasks :

a. Change the build system to bjam

The current build system uses SCons for builds. This must be replaced with boost.build (bjam) , which is used by the rest of the boost libraries. If necessary, SCons based builds may be offered as an additional feature. This is most vital and the first step towards integration and compatibility.

b. Clean up code

The code in the sandbox will be cleaned up, to remove bugs, warnings and errors. Method of accessing the API and interface presented to the user may also be changed, depending on input and suggestions from the community. This has high priority too.

c. Adding new tests for better coverage of the API

Tests need to be added to ensure the API is covered, both robustly and sufficiently. The specific details about what tests are essential are to be determined while working on the library, based on the structure.

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2) Improve and add documentation

This has second highest priority but must be implemented before the project is ready to be integrated.

a. Examples are to be added along with the library so as to provide easy reference and make usability and implementation quicker.

b. Add inline documentation in the source files

c. Add documentation externally, similar to the existing system in boost.python. The suggested documentation system is Doxygen.

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3) Add new features

These are incremental features and may be implemented step by step once the integration of the cleaned up and documented code is complete.

a. The community has suggested that more data types need to be supported by the library in addition to ndarray and dtype. These additional data types are commonly used ones and are already supported by the Numpy - C API

b. Additional methods already implemented for ndarray data type in Numpy should be made available to the boost implementation of numpy. This will majorly involve porting existing code.

c. Currently, containers are used in templates, which impose restrictions on size, initialisations etc. These are suggested to be replaced by ranges of iterators instead, in order to make them more generic.

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