



AWKWARD-CPP AND PYBIND11

BY CHARLES ESCOTT

MENTORS: JIM PIVARSKI AND DAVID LANGE

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Jagged Array Structure

THE PROBLEM

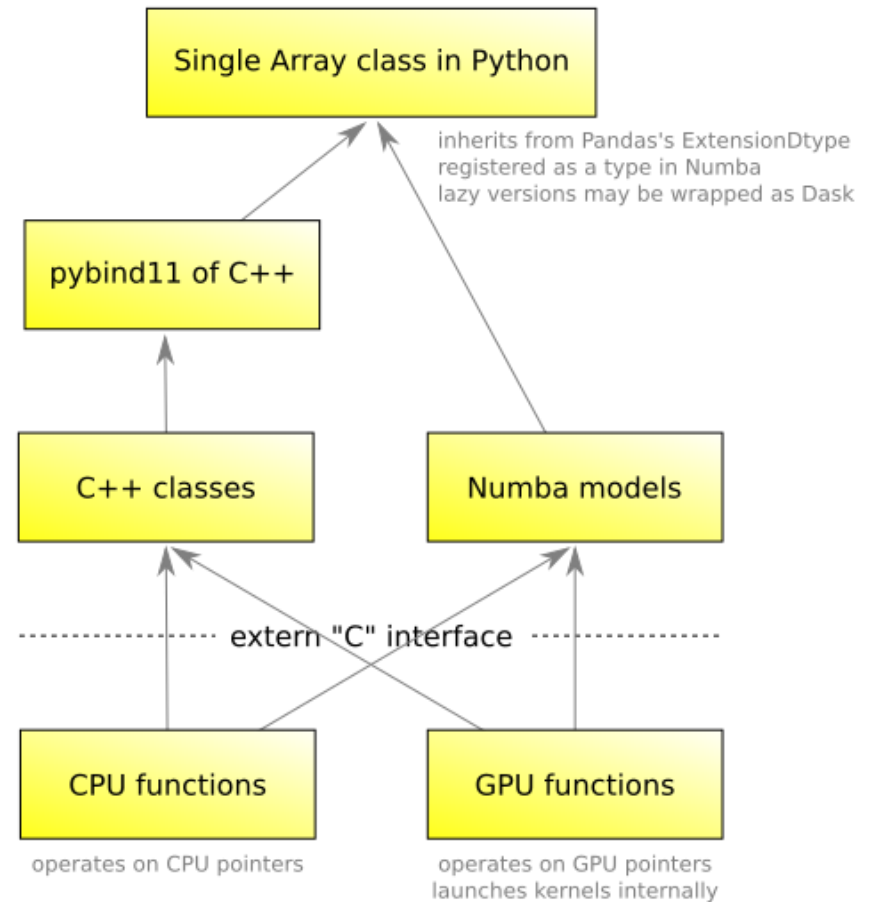
- Particle physics data is too complicated for normal coding libraries
- Awkward Arrays supports less conventional types/functions using Python
 - Easier to work with
 - JIT (just in time) compilation => slow to run

pybind11

THE SOLUTION

- Implement Awkward Arrays in C++!
 - Pre-compiled => usually much faster speeds
- Pybind11 allows C++ code to compile into Python binaries
- End product: a Python library that's pre-compiled, written in C++

NEW PROJECT ARCHITECTURE



Made by Jim Pivarski (thanks Jim, I'm stealing your diagram)

IMPLEMENTING C >> C++ >> PYTHON

- C is a bit more difficult than C++
 - No templates
 - No overloaded functions
 - No classes
 - No exceptions
 - No booleans
- Keeping C methods clean of memory management
- Ultimately, not too bad

“FINAL” PRODUCT

- A solid basis for Awkward 1.0 (the new architecture)
- Many hours and 5000+ lines of code worth of troubleshooting, research, and experience
- A JaggedArray class in C++/C which functions independently from awkward-array and contain ZERO Python code

The image features a dark blue gradient background with white, stylized circuit board traces in the corners. These traces consist of straight lines of varying lengths and angles, ending in small white circles, resembling electronic components or nodes on a circuit. The traces are located in the top-left, top-right, bottom-left, and bottom-right corners, framing the central text.

THANK YOU!