Melvyn Ian Drag

Curriculum Vitae

Highlights

- Python, C++, Scala, Hadoop Stack.
- Expertise in natural language processing.
- Solid knowledge of data structures and algorithms.
- Advanced knowledge of cutting-edge clustering algorithms and topological data analysis.
- Everyday linux user.
- Love unittesting.
- Suspicious of global variables.

Sample Programming Projects

Epithelium	Master's Thesis. Simulator of the development of epithelial tissue. Code solves a complicated system of differential equations to evolve the appearance of a tissue and drive the cells to an equilibrium configuration. Uses a number of libraries and programs to make simple animations.
NLTK	Read most of the library code and submitted bug fixes.
Kaggle Contests	Participant in Kaggle contests. Code is available on my github.
CRF	A machine learning classifier which produces very good predictions when given suitably preprocessed data. Written in C++, Python, and R, and makes calls to linear algebra libraries written in Fortran. Written while at Avlino Inc..
Heat Solver	PDE solver with many visualization options. Solves the heat equation in 1 and 2 dimensions. I presented this code as a tutorial at the PyOhio conference in 2014, and the video can be seen online. I still regularly get emails from people all over the US, Europe and South America using my code for their research or teaching.
Priority Queue Hospital	I hadn't had a reason to use a priority queue in a while, so I wrote a program in C++ and SDL which uses this data structure. There is a graphical presentation of a hospital waiting room with patients with a variety of illnesses. The patients continuously arrive and a priority queue structure has a 'doctor attend to the patient with the most pressing need'. Patients live and die at the mercy of the heap.
8 Color Network	Network analysis tool for studying the evolution of unstructured networks with local interactions. Default edge function is a smoothing operator that drives the colors of all nodes to one one color.
Python Chess	Implemented advanced moves such as pawn promotion in an unfinished game found on github.

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Assault Cube - MyMod — Modified version of a popular first person shooter. Added maps, changed physics, modified graphics, etc.

Relevant Work Experience

October 2015 - Present — **Lead Data Scientist**, Avlino, Inc., Holmdel, NJ.
Principal developer of machine learning software at a growing startup. Lead a team of junior employees, encouranging good software practices like automated testing, clean code writing, and use of version control with verbose commit messages. Code in Python, R, and C++ and use Hadoop, Spark, MapReduce, and other tools. Our software recently caused a strike at a major telecommunications company because it automated too many jobs.

August 2015 — **Instructor**, The Ohio State University, Columbus.
Taught two summer classes: *Essentials of Numerical Methods* and *Introduction to Python Programming*.

Jan 2015 - September 2015 — **Modeler/Engineer**, Battelle Memorial Institute, Columbus.
Development of powerful terrorism risk analysis tool in C++, Python and MPI for the Department of Homeland Security. Co-Developer of Excel-based risk tool with rich functionality provided through VBA macros. Simple system administration tasks. Regular user of Oracle / Postgres / Access DBs. Strong reference from accomplished statistician supervisor with whom I worked closely on several projects.

May 2014- September 2015 — **GRE Instructor, Marketing Agent**, The Princeton Review, Columbus.
Highly rated instructor. Presenter at marketing events.

Fall 2014 — **Calculus Recitation Instructor**, The Ohio State University, Columbus.
Highly rated instructor.

Fall 2008 - Spring 2013 — **Mathematics Tutor**, New Jersey City University, Hudson County Community College, Jersey City.
Tutored all levels of undergraduate mathematics

Fall 2008 - Spring 2013 — **Private Mathematics Tutor**, New Jersey.
Tutored high school and college students on a one on one basis.

Education

Continuing — **Coursera and Udacity**, *Online*, Taken courses in English, Spanish, and Portuguese in Fourier Analysis, CSS, HTML5, Javascript, Machine Learning, Hadoop, Statistical Mechanics, etc..

Summer 2015 — **Workshop and Tutorial on PETSc**, *Argonne National Lab*, Learn to use the PETSc library for solving partial differential equations.

2013–2015 — **Master of Mathematical Science: Computational Science.**, *The Ohio State University*, Analytical and numerical methods for PDEs, parallel computing, advanced algorithms. Master's thesis: Epithelial tissue simulation. Investigation of pros and cons of various implementations of a model. Exploration of parallelization strategies.

2008-2012 — **BA Mathematics**, *New Jersey City University*, Undergraduate mathematics degree with classes in Abstract Algebra, Differential Equations, Number Theory, Vector Calculus, and other fundamental mathematical subjects, Several credits short of double major in Spanish.

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Summer 2010 **Study Abroad**, *Universidad San Francisco de Quito, Ecuador*, Summer classes in chemistry and Spanish composition.

Academic Awards

2015 Rhodes Graduate Fellowship for Computational Scientists, OSU

Summer 2014 Travel grant from OSU to attend Scipy conference in Austin (scientific computing in Python conference)

2013-2014 Graduate Fellowship, OSU

2012 Grossnickle Scholarship, NJCU. For the senior with the highest GPA

2008-2012 Presidential Scholarship (Full Tuition), NJCU

2011 12th place out of approximately 100 at the Garden State Undergraduate Mathematics Contest

Computer skills

Languages Python, C++, Scala, bash

Version Control git, SVN

Other tech Hadoop Stack, Windows, Redhat, Debian.

Other This isn't an exhaustive list. Just use whatever tool is good for the job.

Recent Presentations

2016 Avlino. "Implementing Log Linear Models."

2015 OSU and NJCU. "Implementing the Conjugate Gradient Method in Python: A Tutorial."

2015 Battelle. "Finite Difference Methods for Modeling Diffusion."

2015 Battelle. "Epithelial Tissue Simulation."

2014 PyOhio conference. "Solving the Heat Equation in Python".

2014 Columbus Code Camp. "Soft Error Vulnerability in Sparse Matrix Vector Products".

2014 OSU. "A Tour of Linear Algebra Libraries in C++ and Python".

2014 Python Monthly Meeting. "Cache efficient Python".

Languages

English Mothertongue

Spanish Fluent

Portuguese, Italian Reading and Listening Proficiency.

Interests

- Foreign languages with interesting movies and radio programs and rich literatures.
- Dog training.

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