Zachary Winoker

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Education:

University of Southern California, MS in Computer Science 09/2015 – 05/2016
University of Southern California, MA in Physics 09/2013 – 12/2015
Brown University, ScB with Honors in Mathematical Physics 09/2009 – 05/2013

Programming Experience:

Proficient Languages: Python, C++
Experience with: Javascript, R, HTML, MySQL, Matlab, PHP, C, Java, Fortran

Machine Learning, AI, and Data Mining Projects:

- Researched an algorithm for classification of short texts. Used convolutional neural networks, word2vec, Sci-kit Learn, NumPy, SciPy, and Apache Spark for implementation and testing.
- Implemented and tested a system in Python for training stock-price-predicting neural networks in parallel on AWS EC2 clusters.
- Developed a recursive algorithm for content-based file type detection that utilizes k-means clustering with byte-frequency signature methods.
- Built a platform for testing minute-level stock trading algorithms in C++. Price data is retrieved and stored using an R script, MySQL, and the Google Finance API.
- Implemented a parser in Java for Apache Tika that performs Named Entity Recognition using NLTK, OpenNLP, and Stanford CoreNLP.
- Wrote a first-order predicate logic inference engine in Python that builds knowledge bases and queries them using backward chaining.

Web Projects:

- SkyStats
  – Currently developing a web app for visualizing competition skydiving data.
  – Django backend with D3.js for visualizations.
- dailyskydive.com
  – Created a subscription service that emails users new competition skydiving sequences every day.
  – Built in Flask (a Python framework), Bootstrap, Javascript, and jQuery. Over 200 users subscribed.

Research/Lab Work:

PhD Researcher 01/2014 – 05/2016
University of Southern California Condensed Matter Theory Group

- Designed, ran, and analyzed cold-temperature simulations of two-dimensional materials on USC's High Performance Computing Cluster.
- Collaborated with the University of Bremen Institute for Theoretical Physics to study superconductivity in doped monolayer MoS2.
- Used simulations written in Fortran, OpenMPI, OpenMP, and R.

Undergraduate Researcher 01/2012 – 05/2013
Brown University Liquid Crystal Theory Group

- Designed and implemented liquid crystal simulations in C++.
- Implemented an algorithm that finds topological defects in low-temperature materials.
- Tested multiple approaches to creating mathematically novel structures in liquid crystals.
- Presented the results of this study as my undergraduate thesis topic. See zackwinoker.com/thesis