Arvind S. Rao, PhD

Contact Information

********@****.com**
Mainz, Germany

website: **rao.im**
Citizenship: United States of America

Education

The University of Iowa, Iowa City, IA — May 2010
Ph.D., Mathematics
Dissertation: "Weak solutions to a Monge-Ampère type equation on Kähler surfaces"
Area: Geometric Analysis, Differential Geometry

Georgia Institute of Technology, Atlanta, GA — May 2002
B.S., Electrical Engineering

Industrial Positions

Senior Software Engineer — **HERE GmbH**
Frankfurt am Main, Deutschland — February 2016 – Present

I work on the address search team. Our product is a geocoder. My duties range from data engineering and data mining topics to development on the main service.

Data Scientist — **Riviera Partners**
San Francisco, CA — February 2013 – September 2015

At Riviera I was charged with implementing a candidate to job matching system. To further evolve the matching system, I applied statistical machine learning techniques to understand its performance. I was also responsible for the development of candidate scoring and matching methodologies. I completely refactored the existing candidate scoring service, leading to a 20 fold speed up. Additionally, I was completely embedded in the software engineering team, working directly on the main application, implementing the matching feature, maintaining and extending the search function (elasticsearch), as well as bug fixing.

Technical Skills Developed:

- Javascript, Ruby, Python, Pandas, SQL (PostgresSQL, Microsoft SQL, etc.), BASH.
- data cleaning, normalization, and modeling.

Software Engineer Contractor — **Ark.com**
San Francisco, CA — October 2012 – January 2013

Ark.com is a YC alumnus, and for the short time I was there I worked on a research and development project regarding social network entity resolution. We were specifically interested in applying techinques from computer vision to this problem. Not long after I joined, this effort was halted, but I did implement scripts for image histogram comparison (used pyOpenCV), and I curated a set of images for testing/exploration.

Technical Skills Developed:

- Gained experience using GitHub, participating in the code review process, and generally working on a software development team.
- Wrote web crawlers to acquire data from social networks. From which, I learning about web architectures, and how to use proxies to crawl the social web fast.

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Research and Teaching Experiences

Postdoctoral Researcher — **University of Pennsylvania**
Philadelphia, PA — Section of Biomedical Image Analysis
2010 – 2012

I developed a suite of mathematical contrast measures measures for 3D diffusion MRI. The application of which is to better classify pathologies of neurodegenerative diseases. Statistical analysis was done with these measure to find significantly different brain regions, within a population of patients and normal subjects. These measures are clinically relevant and outperform comparator measures. Additionally, I used machine learning techniques to aid assessment of group difference within a population represented by brain connectivity graphs.

Technical Skills Developed:

- Implemented experiments and methods in C++, MATLAB, MAPLE, and PYTHON.
- C++ (experienced with VXL/VNL, ITK, VTK, and Boost libraries (only spherical harmonic functions).
- Wrote BASH and PYTHON scripts for interaction with distributed compute cluster and image processing tasks.

Graduate Teaching Assistant — **University of Iowa**
Iowa City, IA — 2003 – 2009

- Course instructor for Algebra II, during fall semester of 2006.
- Led two discussion sections, and each met biweekly. Wrote and graded quizzes. Also graded homework assignments.
- Assisted students of Engineering Calculus II with Mathematica assignments.
- Provided one-on-one tutoring for students enrolled in University of Iowa mathematics courses ranging from Algebra I to Multivariate Calculus.
- Wrote solutions to homework assignments for Differential Geometry of Curves and Surfaces (Fall 2006, Spring 2008) and Real & Complex Analysis II (Spring 2008).

Skills

Projects – on github.
Software – Sublime, Git, RubyMine, LaTeX, and Microsoft Office Suite.
Experienced with Ubuntu Linux, Max OS, and Windows OS.

Publications

1. Arvind Rao, "Weak Solutions to a Monge-Ampère Type Equation on Kähler Surfaces." PhD Dissertation, University of Iowa, 2010.
2. Arvind Rao, Alex R. Smith, Robert Schultz, Timothy P.L. Roberts, and Ragini Verma, "Peak Geodesic Concentration: A Measure of WM Complexity", Proceedings of MMBIA 2012.
3. Arvind Rao, Madhura Ingalhalikar, Alex R. Smith, Timothy P.L. Roberts, and Ragini Verma, "Statistical Analysis on the GEMS-Manifold of Connectivity Graphs", Proceedings of MICCAI 2012 (submitted).
4. Arvind Rao, Alex Smith, Robert Schultz, Timothy Roberts, and Ragini Verma, "Geodesic Concentration: A Measure of Diffusion Concentration", (submitted to Computers in Biomedicine)

Selected Conferences and Presentations

IEEE Workshop on Mathematical Methods in Biomedical Image Analysis — January 2012
Breckenridge, CO

- Poster presentation of, "Peak Geodesic Concentration: A Measure of WM Complexity", which is based on a postdoctoral research project of mine.

Geometric Partial Differential Equations — February 2009 – May 2009
Institute for Advanced Study, Princeton, NJ

- While in residence, I wrote my dissertation, presented a paper in an advanced topics PDE courses, and attended seminars.

Differential Geometry Seminar — September 2006 and 2007
University of Iowa, Iowa City, IA

- Two presentations on global estimates for a Monge-Ampère type equation, my dissertation research project.
- Three presentations about the Calabi Conjecture based on lectures notes by Yum-Tong Sui.
- Four presentations based on the John Lee and Thomas Parker exposition of the Yamabe Problem.

Fellowships and Service

- Member of the University of Pennsylvania Biomedical Postdoc Community Service Committee, May 2011 - Present.
- NSF−VIGRE Traineeship, Spring Semester 2009.
- University of Iowa Graduate College Summer Fellowship, Summer Semester 2008.
- Volunteered at Iowa high school mathematics competition, hosted by the University of Iowa Mathematics Department, during the spring of 2006 and 2007.