Vanamala Venkataswamy

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Research Interest

Job Scheduling, Reinforcement Learning, Cloud Computing, Distributed Storage.

Applied Machine Learning: Deep Reinforcement Learning for job scheduling in data-centers powered by renewable energy sources, a.k.a Green Data-centers.

Education

Ph.D., Computer Science. University of Virginia (UVa), Charlottesville, VA. **GPA 3.9/4.0**

Advisor: Prof. Andrew Grimshaw. 2016-Present

M.S., Computer Science. University of Southern California (USC), Los Angeles, CA. 2009-2010

B.E., Information Technology. Visvesvaraya Technological University, India. 2000-2004

Research and Professional Experience

TOMORROW'S PROFESSOR TODAY (TPT), UVA **AUG 2020 - AUG -2021**

- Currently attending workshops and seminars designed to facilitate the transition from student to academic professional. The program focuses on improving preparedness primarily in teaching at the college level, with emphases in professional development and adjustment to a university career.

SYSTEM SOFTWARE INTERN, LANCIUM INC. **MAY 2019 - AUG -2019**

- Configured Lancium's cloud backend system for accepting jobs from users and scheduling jobs to matching resources in the data center.
- Developed scheduler software to match users' job requests' to available matching GPU resources.
- Assisted with the beta testing and release of Lancium's cloud backend software.
- Assisted with troubleshooting users' jobs and maintaining the cloud backend.

PROGRAMMER ANALYST, UVA, CHARLOTTESVILLE, VA. **2011- 2016**

- Developed grid command-line tools and web services for GenesisII software.
- Developed framework for unit testing and regression testing for GenesisII software.
- Administration and Maintenance of Cross Campus Grid (XCG) and XSEDE grid spanning multiple institutions and supercomputing facilities nationwide.
- Interacted with grid users (users from UVa and other institutions) to troubleshoot issues while using grid resources.

PROGRAMMER ANALYST-2, INFORMATION SCIENCES INSTITUTE (ISI), LOS ANGELES, CA. **2010-2011**

- Developed test cases for Globus Online, a bulk data movement service used in a distributed environment, using Amazon EC2 instances. Developed test cases for single and multi-user environments transferring large amounts of data between endpoints.
- Benchmarked file transfer protocols GridFTP and FXP (File eXchange Protocol). Conducted performance analysis of these protocols to determine the best parameters for various file sizes (small, medium, and large files).

STUDENT PROGRAMMER, ISI (USC), LOS ANGELES, CA. **JUNE 2010 - AUG 2010**

- Testing Globus.org data transfer solution (CLI interface) using Python.

MEMBER TECHNICAL STAFF-2, CDAC, BANGALORE, INDIA. **2005-2008**

Message Passing Interface:

- Feasibility study for porting the 32-bit CMPI code to 64-bit to support 64-bit architecture/ applications. Implemented and tested 64-bit CMPI for TCP/IP and VIA (Virtual Interface Architecture) communication protocols.
- Integrated CMS (Cluster Management System) (an alternative to default module) to support job submission to LoadLeveller.

Parallel File System (PFS):

- Designed and implemented PFS using NFS3 protocol and MPICH for Communication to support AIX, LINUX, and SUN OS platforms. Implemented multithreading in the IO server for better IO performance.
- Implemented and tested locking using NLM protocol using POSIX threads to support IO request processing in parallel.

Storage Solutions for Garuda Grid:

- Conducted a detailed study of Nirvana Group's SRB (Storage Resource broker), setup, and Garuda data grid maintenance using SRB.
- Studied iRODS and created a testbed to explore the possibilities of having both iRODS and SRB on Garuda Grid.

STUDENT INTERN, CDAC, BANGALORE, INDIA. **JAN 2004- MAY 2004**

- Profiling and optimization of MPI communication calls.

Teaching

GRADUATE TEACHING ASSISTANT, UVA. **2016-2018, 2020-2021**

- Held office hours, discussion sessions, graded homework, and exams for undergraduate level Computer Architecture course..
- Prepared lecture slides and taught Operating Systems to graduate and undergraduate level students.
- Held office hours, graded homework, and exams for graduate and undergraduate level Operating Systems courses.
- Mentored two undergraduate and one graduate student interns while working for Lancium Inc.

Publications

- **Vanamala Venkataswamy**, Andrew Grimshaw. Scheduling in Data Centers Running on Renewable Energy with Deep Reinforcement Learning. MLCS workshop at Super Computing 2020.
- **Vanamala Venkataswamy**, Andrew Grimshaw. Pratikriti: A Data Replication Service in the GFFS. University of Virginia, 2019.
- Grimshaw Andrew, **Venkataswamy Vanamala**, Performance of the Global Federated File System (GFFS), University of Virginia Dataverse, 2018.
- Ian T. Foster, Josh Boverhof, Ann Chervenak, Lisa Childers, Annette Deschoen, Gabriele Garzoglio, Dan Gunter, Burt Holzman, Gopi K, Raj Kettimuthu, Jack Kordas, Miron Livny, Stuart Martin, Parag M Hashilkar, Zachary Miller, Taghrid Samak, Mei-hui Su, Steven Tuecke, **Vanamala Venkataswamy**, Craig Ward, Cathrin Weiss. Reliable high-performance data transfer via Globus Online Accomplishments of the Center for Enabling Distributed Petascale Science.
- Allen, B., Bresnahan, J., Childers, L., Foster, I., Kandaswamy, G., Kettimuthu, R., Kordas, J., Link, M., Martin, S., Pickett, K. and Tuecke, S. Globus Online: Radical Simplification of Data Movement via SaaS. Communications of the ACM, Feb 2012. **(Acknowledged contributor).**
- Bryce Allen, John Bresnahan, Lisa Childers, Ian Foster, Gopi Kandaswamy, Raj Kettimuthu, Jack Kordas, Mike Link, Stuart Martin, Karl Pickett, and Steven Tuecke. Software as a Service for Data Scientists. Communications of the ACM, Feb 2012. **(Acknowledged contributor).**
- D. Prabu, **V. Vanamala** , Sanjeeb Kumar Deka, R. Sridharan, Rao BB Prahlada, N Mohanram. Design and Implementation of a High Performance MPI for Large Scale Computing System. ITNG, Las Vegas, USA. 2007.

Presentations

Renewable Energy Aware Job Scheduling in Green Data Centers. Student research short presentation at CAPWIC. 2021
Invited Talk: Research Poster Presentation and GESC UVERS, UVa. 2021
Pratikriti: Data transfer sharing and transfer. Invited talk at VICO (Virginia Initiative on Cosmic Origins). NRAO (National Radio Astronomy Observatory), UVa. 2018

Awards

Received Scholarship to attend CAPWIC conference. 2021
NYU Tandon Faculty First Look Scholar. 2021
Graduate Research Assistantship, Lancium Inc. 2019-2020

Professional Services

- Invited Panelist for MLCS'20 workshop "Use of Machine Learning in the Computing Systems Domain" hosted at Super Computing. 2020
- Participated in UVa Engineering Dean search committee meeting to provide input to the committee leading the search for the next UVA Engineering dean . 2020
- Demo on using GFFS for data sharing and collaboration for Mekong Water initiative (a project sponsored by U.S department of state). 2019
- GradSWE (Society of Women Engineers), CS representative. 2018
- UVa booth coordinator and presenter at Super Computing (SC) conference. 2013-2015
- Presenter at Open Grid Forum (OGF) conference at UVa. 2013

- Participated in USC Viterbi School of Engineering Dean's Office Focus Group to provide insight on meeting educational needs of Engineering curriculum, projects and internships to prepare students for industry. 2009
- Conducted workshops and tutorials for Parallel Programming and Grid Computing in CDAC. 2008

Volunteering

- Judge for the Virginia State Science and Engineering Fair (VSSEF) - System Software Track. 2021
  Volunteered at the Charlottesville Girls GeekDay@UVa. 2016
- Volunteered at the UVa Open House program to welcome incoming graduate students. 2015
- Event coordinator for CDAC annual family day. 2007
- C-Smile coordinator at CDAC: Collected donations to furnish the class rooms with with study desks for rural primary (elementary) school. India. 2006