Ying Lu

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Career Objective

A full-time software engineer position to utilize my abilities in computer science and optimization, to develop software applications that meet user demands.

Education

Rensselaer Polytechnic Institute — Aug 2011 – May 2016
Ph.D. Computer Science, GPA: **3.95/4.0** — *Troy, NY*
Courses: Computer Algorithms, Machine Learning, Robotics 2, Parallel Computing, Operating System

University of Science and Technology of China — Aug 2007 – Jun 2011
B.S. Mechanical Engineering, GPA: **3.78/4.0** — *Hefei, China*
Courses: C/C++, FORTRAN programming, Data Structure, Database System, Calculus, Linear Algebra

Work Experience

Open Source Robotics Foundation — Jan 2015 – Aug 2015
Software Engineer Intern — *Mountain View, CA*
Mainly worked on the multi physics engine of Gazebo:
- Built a standard interface for solvers from different physics engines to solve constraint problem with friction.
- Implemented a CUDA GPU solver based on *quickstep* solver.
- Contributed parallel solver results to the DARPA milestone report.
- Participated in the DRC Final Haptix demo and built a physics model for Tower of Hanoi Haptix game.
- Integrated a Coulomb cone friction model to Gazebo simulator and helped with torsional friction model.

Work as a team, the detailed contribution:
- Consistently made pull requests (bug fix and new features) to *default* branch, following team's coding style standard.
- Implemented unit/integration/regression tests for different cases, using Google C++ testing Framework.
- Addressed reviewers' comments and helped with review on other team members' pull requests.
- Participated actively in squash day event to help with Gazebo/ROS bug fix and issue solution.
- Familiarized with product release procedure, such as feature freeze, code freeze.

Bloomberg L.P. — May 2014 – Aug 2014
Software Engineer Intern — *New York City, NY*
Worked with ticker plant team under Software Infrastructure:
- Built a database for ticker plant synchronization status worldwide.
- Created a request/response service for user to either write or access sync status in the database.
- Implemented a user interface for the sync monitor with searching, filtering and sorting features.
- Modified the back-end data model to support dynamic update on the front-end UI monitor.

Rensselaer Polytechnic Institute — Aug 2013 – Dec 2013
Head Teaching Assistant — *Troy, NY*
Promoted to head TA and took charge of weekly lab for course *Introduction to Algorithms*.

Rensselaer Polytechnic Institute — Jan 2012 – present
Research Assistant — *Troy, NY*
- Comparison of numerical solvers of the Complementarity Problem:
  - Reformulated the physical constraints into a series of non-smooth, nonlinear equations.
  - Utilize the nonlinear optimization theories to minimize an objective function subject to complementarity constraints.
- Data Collection for benchmarking:
  - Collect physics engine data from simulators such as *Bullet, ODE, Algoryx* as benchmark problems.
  - Stored the complete data collection using HDF5 in our *BPMD* database.
- Physics Engine RPI Simulator:
  - Implemented solution algorithms and the dynamics module for RPI Simulator.
  - Built different formulation of dynamics models for users in both academia and industry.
- MPI-based simulation of multibody dynamics:
  - Used the Boost MPI to communicate between processors by sending multibody information as a class.
  - Evaluated the performance of various solvers with different number of processors, utilizing strong scaling analysis.

Technical Projects

Rensselaer Polytechnic Institute Jan 2012 – Jan 2015
Ph.D. Student *Troy, NY*

- Machine Learning Projects:
  - Studied supervised/reinforcement/unsupervised learning and the feasibility of learning.
  - Implemented the linear regression and logistic regression, with regularization metrics, to training data and verified the linear model with testing data set.
  - Implemented and compared the k-Nearest Neighbours(k-NN) model, Radial Basis Functions(RBF) model, Neural Network model and Support Vector Machines (SVM) model to practical problem: handwritten digit recognition from US postal service zip code database.
- Object identification using ROS and OpenCV for feature matching:
  - Participated in the NASA sample return challenge as a member in team Rockie.
  - Interfaced the Robotics Operating System (ROS) with OpenCV to use the feature matching algorithms.
  - Learned the SIFT and SURF algorithms for geometry matching in identification target objects.
- Parallel matrix multiplication with large size on the IBM Blue Gene/L:
  - Compared performance on IBM Blue Gene/L with the performance on Linux Multiprocessor system.
  - Analysed the time each processor spent on execution and communication.
- Simulated the page replacement algorithm of computer operating system:
  - Used the working set policy and practical one which considers the dirty pages.
  - Compared working set policy versus the least recently used policy.
- Simplified simulation of the computer system:
  - Simulated both the interactive and parallel processes in the computer system.
  - For given processes and multiprogramming levels, computed the CPU utilization and disk utilization as well as the average waiting time of the processes.
  - Analysed how to enhance the system by addition such as cache, memory, disks or replacement of faster disks.

Publications

- **Y. Lu**, J.C.Trinkle, Comparison of Multibody Dynamics Solver Performance: Synthetic Versus Realistic Data, ASME International Design and Engineering Technical Conferences (IDETC), 2015
- **Y. Lu**, J.C.Trinkle, On the Convergence of Fixed-point Iteration in Solving Complementarity Problems Arising in Robot Locomotion and Manipulation, IROS, 2014
- **Y. Lu**, J.William, C. Lacoursiere and J.C.Trinkle, A Framework for Problem Standardization and Algorithm Comparison in Multibody System. ASME IDETC, 2014
- **Y. Lu**, C. Lacoursiere, J. Williams, and J.C. Trinkle. Standard Interface for Data Analysis of Solvers in Multibody Dynamics, CanCNSM, 2013
- These are 4 of my **10** papers, please see more of the publications on my homepage.

Conferences

- Informs 2015 Annual Meeting, Philadelphia, 2015
- Grace Hopper Conference for Women in Computing, 2013-2015
- 22nd International Symposium on Mathematical Programming,Pittsburgh, 2015
- DARPA Robotics Challenge, Finals, Pomona, 2015
- ROS-Industrial Consortium Americas Annual Meeting, Chicago, 2015
- Workshop: Computational Contact Mechanics: Advances and Frontiers in Modelling Contact, Banff, 2014
- National Robotics Initiative PI's meeting, Washington, 2013

Skills

Languages: C++, C, Python, JavaScript, FORTRAN, JAVA, PHP, HTML, MATLAB, RUBY

Operating Systems: Linux, Mac, Windows

Tools: vim, git, mercurial, subversion, Jenkins, IPython Notebook, LaTex, waffle IO

Honors

- Grace Hopper Scholarship for Women in Computing, 2013 - 2015
- Graduate Student Leadership Award, 2012
- Cyrus Tang Scholarship, 2007 - 2011