

Levi Cai

Education

University of Pennsylvania Philadelphia, PA Sept. 2008 to Dec. 2015
Candidate Master of Science in Engineering in Robotics, expected Dec. 2015, GPA: 3.93/4.0
Bachelor of Science in Engineering in Computer Science, Minor in Mathematics, 2012, GPA: 3.35/4.0

Academic

Research Assistant Univ. of Pennsylvania: GRASP Summer to Fall 2015

- Investigating heuristics for multi-robot path planning algorithms (M*) for non-holonomic robots with MATLAB, C++, and ROS
- Investigating heuristics to improve planning speed for the Fast Marching Method
- M* implementation acknowledgement in S. Tang and V. Kumar, "A Complete Algorithm for Generating Safe Trajectories for Multi-Robot Teams". ISRR 2015.
- Supervised by Dr. Daniel Lee

Senior Design Thesis Univ. of Pennsylvania: GRASP Modlab 2011 to 2012

- Investigated relations between citations and sentence context in research papers using bag-of-words along with NLP techniques such as regression, LDA, etc., on a team of four, presented at poster session
- Supervised by Prof. Lyle Ungar

Research Assistant Univ. of Pennsylvania: GRASP Modlab Summer 2009 to 2012

- Developed software tools for CKBots (Connector-Kinetic robots) used by members of the lab using Python, C, OpenCV, CMUSphinx, and ROS
- Supervised by Prof. Mark Yim

Research Assistant Univ. of Pennsylvania: Rachleff Scholars Summer 2010

- Developed simple spike train and mutual information-based acoustic recognition algorithm
- Presentation at the SUNFEST & Rachleff Scholars Symposium 2010
- Supervised by Dr. Daniel Lee, funded by Rachleff Scholars Program

Research Assistant Univ. of Colorado, Boulder: Intel. in Action Lab Summer 2007/2008

- Optimized MATLAB code for the DARPA LAGR project (Learning Applied to Ground Robots)
- Individually built an entire mobile robot platform for use in future lab research
- Supervised by Prof. Gregory Grudic, funded by NSF Undergraduate Research Grant

Teaching

Teaching Assistant for Machine Learning Univ. of Pennsylvania Fall 2015

- Created assignments and held office hours for grad-level course CIS520 (Intro. To Machine Learning)

Extreme Blue Internship Technical Mentor IBM Summer 2013

- Lead technical mentor for a 4-student summer internship team, organized and pitched project to higher management, set goals and deadlines, mentored students in technical skills and career development

Teaching Assistant for Intro. to AI Univ. of Pennsylvania Spring 2012

- Created assignments, tests, and projects for grad-level course CIS521 (Intro. to Artificial Intelligence)

Professional

Full-stack Engineer MasterStreet (startup) 2013 to 2014

- Built search engine for professional development classes using Ruby on Rails, ElasticSearch, and AWS

Software Engineer IBM 2012 to 2013

- Developed server management mobile app using Dojo/Cordova/Javascript for iOS/BB/Android platforms

Software Engineer Intern IBM Summer 2011

- Developed remote power control features for IBM Flex Servers on iOS/BB/Android mobile devices using Dojo/Cordova

Service

- FIRST Robotics Mentor** NCSSM 2013
- Programming and Computer Vision mentor for Team 900 in Durham, NC
- Summer Mentorship Program: Instructor** Univ. of Pennsylvania: Engineering Summer 2009
- Taught a full-time 6-week Intro. to Engineering/Robotics course for ten 11-12th graders
- Robotics Instructor** FACTS Middle School in Philadelphia Spring 2009
- Taught basic robotics principals using Lego Mindstorms to middle school students 2hrs/wk. in preparation for FIRST Lego League Competition

Awards and Honors

- Univ. of Pennsylvania Rachleff Scholar** Highly Selective Research Program 2008 to 2012
- IBM T.J. Watson Scholarship Recipient** 2008 to 2012

Technical Extracurriculars

- FSAE Race Car Electrical Team Lead** Penn Formula SAE 2008 to 2012
- Designed and constructed the electrical system and made major contributions to the software system for a competitive Formula-style race car. 1 of 4 core members. Team placed 18th/108 at the 2011 Formula SAE competition.
- RoboCup SPL Vision Team Lead** UPennalizers: RoboCup SPL 2009 to 2012
- Wrote scripts for line and horizon detection in vision tasks for use on Nao robot platform. Led small group of undergraduates to optimize algorithms, detection rates, and testing. Quarter-Finalist/24 teams at the 2010 International RoboCup Standard Platform League Competition.

Recent Project Experience

- Multi-robot Path Planning** Spring 2015
- CAPT algorithm based on Turpin et al. in MATLAB for assignment and planning, simulated on quadrotors
 - P-ClearPath algorithm based on Guy et al. in CUDA for GPU-based, large-scale, parallel collision avoidance of holonomic robots
- Localization/Planning for Robots** Spring 2015
- SLAM based on particle filters for a humanoid robot in MATLAB
 - Kalman Filter, EKF and UKF variants, KF/EKF for quadrotor and UKF for simple IMU
 - A* with minimum-snap trajectory generation and PID controller tested on real quadrotor

Additional Skills

- Programming Languages** C/C++, ROS, CUDA, Java, MATLAB/MEX, Python, Ruby, HTML/CSS/JavaScript
- Software** Eagle PCB CAD, SolidWorks, Adobe Illustrator