Dennis Wai San Leandro, CA
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Objective: Obtaining a full-time position as a roboticist, with an emphasis in kinematics and control

Education:
M.S. Mechanical Engineering University of California Berkeley | GPA 3.929 Expected: 2017
B.S. Mechanical Engineering University of California Berkeley | GPA 3.817 2013

Professional Experience

Software Intern JPL's Mobility and Robotic Systems in Section 347, Pasadena, CA **May 2013 – Aug 2015**

Mars Sample Transfer Testbed (MSTT) for Mars Sample Return and Comet Surface Sampling and Return (CSSR)

- Primary Robotic 6 DOF Arm operator for MSTT on both SRL and Fetch Rover platform and responsible for demonstrating robustness in computer-vision assisted sample tube pick up in a broad spectrum of regolith
- Refurbished Pluto Fetch Rover by renovating mobility software based on a simple vehicle model as well as adding support for rotating rover in place as drive-by-joystick
- Incorporated collision detection software (Bullet) for non-convex geometries in workspace analysis software as a data-driven approach to inform the Sample Retrieval and Launch (SRL) rover design
- Developed C/C++ kinematic workspace analysis software to determine workspace accessibility for a 5 / 6 DOF robotic arm. Results from this work led the Mars Program Office to adopt an adaptive sample cache architecture

Mechatronics Graduate Researcher with Professor Tomizuka, UC Berkeley **May 2011 –Present**

- Applied optimal control in motion planning for robust precision tracking in free space optical communications
- Developed software in Arduino and LabVIEW to manage a wireless sensor network for human motion tracking
- Created and designed via Eagle various controller PCBs for Tailbot, a robot with inertial assisted control by an active tail inspired by lizards, which was a featured robot on the front page of *Nature*

Pioneers in Engineering (PiE) Advisor, UC Berkeley **May 2011 – Present**

- CEO for the nonprofit Pioneers in Engineering 501©3 Foundation, which promotes STEM education through an exciting, mentorship based process. Administrator for an annual scholarship for high school students
- Organized the inaugural and well-received Robots vs Dinosaur Science Festival, a 100+ event, complete with 8 novel science activities in cooperation with Lawrence Hall of Science in Berkeley, CA

Projects (see portfolio at denniswai.com)

Vision-assisted Block Manipulation with Baxter for EE125, UC Berkeley

- Combined ROS ARTag vision tracking with ROS MoveIt on a Baxter platform to stack toy blocks

Line Following NATCAR for EE192, UC Berkeley

- Programmed a controller in C for a line-following car, with line-scan feedback, that placed 6th at NATCAR

Networked Swarm Robotics for ME102B, UC Berkeley

- Designed/manufactured electrical hardware (motor controller, XBee comms) for a swarm robot network

Ball on a Plate for ME135, UC Berkeley

- Used LabVIEW to implement LQR and PID control to stabilize a ball on a 2 axis plate

Conference Publications

- Joonbum Bae; Haninger, K.; Wai, D.; Garcia, X.; Tomizuka, M., "A network-based monitoring system for rehabilitation," Advanced Intelligent Mechatronics (AIM), 2012 IEEE/ASME Interna- tional Conference on , vol., no., pp.232,237, 11-14 July 2012 IEEE Link
- Paul Backes; Wai, D et al. "Sampling System Concepts for a Touch-and-Go Architecture Comet Surface Sample Return Mission." American Institute of Aeronautics and Astronautics (AIAA), AIAA SPACE 2014 Conference and Exposition June 2014 AIAA Link
- Yizhou Wang; Wai, D.; Tomizuka, M., "Steady-state Marginalized Particle Filter for Attitude Estimation" Dynamic Systems and Control Conference (DSCC) July 2014 ASME Link
- Kyle Edelberg; Wai, D; Reid, J; Kulczycki, E; Backes, P. "Workspace and Reachability Analysis of a Robotic Arm for Sample Cache Retrieval from a Mars Rover" American Institute of Aeronautics and Astronautics (AIAA), AIAA SPACE 2015 Conference and Exposition Sept 2015 AIAA Link
- Ryan McCormick; Wai, D et al. "Robotic Gripper Design and Testing for Potential Mars Sample Return" International Planetary Probe Workshop (IPPW)

Skills

Software skills: MATLAB/Octave, LabVIEW, Python, C, bash, Docker, Git/Github, Linux, HTML/CSS, PHP
ME/EE skills: EAGLE, PCB layout/manufacturing, forward/inverse kinematics, modern/classical controls, laser cutting, Solidworks
Other skills: Trombone, marimba, fluid Cantonese