Randolph C. Voorhies

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Education

Ph.D. in Computer Science
In Progress
University of Southern California
GPA: 3.930

M.S. in Computer Science - Intelligent Robotics
August 2009
University of Southern California
GPA: 3.910

B.S. in Computer Engineering & Computer Science
December 2006
University of Southern California
GPA: 3.497

Technical Skills

Programming Languages
C++ (11) · C · Python · MATLAB · Javascript · GLSL · Perl · Spin

Software Libraries
Boost · ZeroC Ice · Eigen · OpenCV · ROS · Qt · Thrust · Arduino

Electrical Engineering Tools
Altium Designer · Cadsoft Eagle · Surface Mount Assembly

Engineering Abilities
Image Processing · Robotic Perception & Localization · Distributed Systems · Circuit Board Design · Mechanical Design

Experience

NASA / Jet Propulsion Laboratory
Fall 2013 - Fall 2014
Graduate Research Assistant in Larry Matthies' Computer Vision/Robotics Group
- Currently researching the integration of light polarization measurements into 3D reconstruction algorithms.

USC Computer Science Department
Fall 2007 - Spring 2015
Graduate Research Assistant in Laurent Itti's iLab
- Designed and implemented a plane detection algorithm for LiDAR point clouds, as well as a SLAM solution using detected planes.
- Created NRT, a C++ modular programming framework for distributed image processing and robotics.
- Implemented tracking and object recognition systems for DARPA's Neovision2 project.
- Created a distributed visual attention and anomaly detection system for DARPA's Cognitive Technologies Threat Warning System (CT2WS) project.
- Performed circuit design, assembly, and embedded programming for Beobot2.0, iLab's next generation 16-core mobile robot.

NASA / Jet Propulsion Laboratory
Summer 2012
Intern in the Computer Vision for Surface Applications Group
- Tuned and optimized a vision based monocular stabilization system for use in a quadrotor.
- Built an extensible framework for managing JPL's fleet of quadrotors in ROS.
- Ported a Rapidly Exploring Random Tree path planner for use on the quadrotors.
- Wrote an efficient Alpha/Beta filter to integrate and smooth quadrotor velocity and IMU data.

South Pasadena Educational Foundation
Summers 2007 - 2011
Teacher Trainer
- Designed a robotics curriculum to be taught to middle school students.
- Provided weekly training sessions for teachers.

USC Computer Science Department
Fall 2007 - 2009
CS445 Introduction to Robotics Lab Assistant
- Designed and taught curricula for weekly three-hour lab sessions.
- Designed and built a custom robotics controller board based on a 600Mhz Overo processor.
- Built a software architecture and library to help the students cross-compile and upload code, as well as libraries for motion control, data acquisition, image processing, and communication.

Microsoft
Summer 2004
Intern in the Security Division
- Developed security database migration tools in C#.

Publications

Performance Evaluation of Neuromorphic-Vision Object Recognition Algorithms
Rangachar Kasturi*, Dmitry Goldgof, Rajmadhan Ekambaram, Gill Pratt, Eric Krotkov, Douglas Hackett, Qinfen Zheng, Yang Ran, Rajeev Sharma, Mark Anderson, Mark Alan Peot, Mario Aguilar, Deepak Khosla, Yang Chen, Kyungnam Kim, Lior Elazary, Randolph Voorhies, Daniel Parks, Laurent Itti
Proc. International Conference on Pattern Recognition (ICPR) 2014

Finding Planes in LiDAR Point Clouds for Real-Time Registration
Randolph C. Voorhies*, Shane Grant*, Laurent Itti
Proc. IEEE/RSH International Conference on Intelligent Robots and Systems (IROS) 2013

An Autonomous Manipulation System based on Force Control and Optimization

Ludovic Righetti, Mrinal Kalakrishnan, Peter Pastor, Jonathan Binney, Jonathan Kelly, Randolph C. Voorhies, Gaurav Sukhatme, Stefan Schaal
Autonomous Robots 2013

Neuromorphic Bayesian Surprise for Far-Range Event Detection
(Winner of the Best Student Paper Award)
Randolph C. Voorhies, Lior Elazary, Laurent Itti
Proc. IEEE International Conference on Advanced Video and Signal Surveillance (AVSS) 2012

Centralized Server Environment for Educational Robotics
Randolph Voorhies, Christian Siagian, Lior Elazary, Laurent Itti
Proc. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2009

Application of a Bottom-Up Visual Surprise Model for Event Detection in Dynamic Natural Scenes
Randolph Voorhies, Lior Elazary, Laurent Itti
Vision Science Society Annual Meeting (VSS) 2010

Beobot 2.0: Cluster Architecture for Mobile Robotics
Christian Siagian, Chin-Kai Chang, Randolph Voorhies, Laurent Itti
Journal of Field Robotics (JFR) 2010

Honors

Member Phi Kappa Phi · Co-Chair of the "Education Robotics" session for IROS 2009