

Sujitha Catherine Martin

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Technical Skills

- *Core competencies:* Machine learning, computer vision, signal and image processing, multimodal fusion, distributed and synchronized multimodal-multisensory testbed design (smart cars)
- *Programming:* C++ [moderate], MATLAB [strong], Python [moderate]
- *Software Packages:* OpenCV, MATLAB, VLfeat
- *Learning/inference:* Random forest, support vector machine, clustering, pictorial structures, regression techniques, neural networks
- *Scientific Writing:* LaTeX
- *Best Practices:* Subversion

Education

- **Doctor of Philosophy, Electrical and Computer Engineering** 2016
 University of California, San Diego (UCSD), La Jolla, CA
 Thesis: *Vision-based, Multi-cue Driver Models for Intelligent Vehicles*
 Advisor: Mohan M. Trivedi
- **Bachelors of Science, Electrical Engineering** 2010
 California Institute of Technology (Caltech), Pasadena, CA
 One term study abroad at the University of Cambridge, UK
- **High School Diploma** 2006
 Cerritos High School, Cerritos, CA
 Valedictorian (ranked 1st in the graduating class)

Professional Experience

- **Postdoctoral Researcher**, University of California, San Diego 2016-Present
 Understanding, representing, modeling and predicting driver behavior to help improve safety of highly automated vehicles.
- **Graduate Student Researcher**, University of California, San Diego 2010-2016
 - [Data Collection]: Instrumented vehicle testbeds for synchronous capture of camera array, radars, lidars, GPS, CAN bus, etc., and collected data from naturalistic, on-road driving.
 - [Semantic-level Perception]: head pose from geometrical correspondence mapping; continuous vertical gaze surrogate measure for gaze, blink and fatigue detection; data driven, user independent gaze zone estimator; hand localization from motion analysis.
 - [Multi-sensor Fusion]: Formulated, designed, implemented and evaluated,
 - A multimodal vision based framework for recognizing in-vehicle activities (e.g. interaction with radio) and anticipating maneuvers at intersections from the complex coordination of head, eyes and hands.
 - An attention estimation framework via simultaneous analysis of viewer and view.
 - [Behavior modeling]: Developed and evaluated a machine vision based framework for modeling driver's gaze behavior to predict ego-vehicle maneuvers.
 - [Performance evaluation]: Designed the Vision for Intelligent Vehicles & Applications (VIVA) challenge for faces to benchmark existing vision approaches on challenging real-world driving conditions; includes data collection, annotation and dissemination.
 - [Data Mining]: Defined and implemented quantitative measures of vocabularies often used by data reductionists when labeling videos of looking at the driver, leading to automatic critical event extraction and semantic drive reports.
 - [Privacy Protection]: Designed, implemented and conducted case studies on de-identification filters to protect identity of drivers but preserve information for driver's gaze estimation.
- **Summer Intern**, Synaptics 2011
 Explored 3-D sensing technologies, developed depth-based hand gesture recognition software, mapped gesture recognition system to user interaction scenarios and conducted usability study on the cost and benefits of performing hand gestures for scrolling through documents.
- **Summer Intern**, Jet Propulsion Laboratory (JPL), Caltech 2010

- Compared interference mitigation methods for communication systems in a MARS Orbiter.
- **Summer Undergraduate Researcher**, Indian Institute of Technology, Madras, India 2009
Compared interference mitigation methods for cell-edge under varying signal to noise ratios
- **Summer Undergraduate Researcher**, Jet Propulsion Laboratory, Caltech 2008
Developed online remote tracking of multiple GPS trackers on-board of in-situ instruments
- **Summer Undergraduate Researcher**, Caltech 2007
Designed pressure sensors on printed circuit board (PCB) and a miniaturized control system using high speed ARM processor to control flow into micro-fluidic chips.

Select Publications

- **S. Martin** and M. M. Trivedi, "Gaze Fixations and Dynamics for Behavior Modeling and Prediction of On-Road Driving Maneuvers," IEEE Intelligent Vehicles Symposium, 2017.
- K. Yuen, **S. Martin** and M. M. Trivedi, "Looking at Faces in a Vehicle: A Deep CNN Based Approach and Evaluation," IAPR International Conference on Pattern Recognition, 2016.
- **S. Martin**, A. Rangesh and M. M. Trivedi, "Preparatory Coordination of Head, Eyes and Hands at Stop Controlled Intersections," IAPR International Conference on Pattern Recognition, 2016.
- E. Ohn-Bar, A. Tawari, **S. Martin** and M. M. Trivedi, "On Surveillance for Safety Critical Events: In-Vehicle Video Networks for Predictive Driver Assistance Systems," Computer Vision and Image Understanding, 2015.
- A. Tawari, **S. Martin** and M. M. Trivedi, "Continuous Head Movement Estimator (CoHMET) for Driver Assistance: Issues, Algorithms and On-road Evaluations," IEEE Transactions on Intelligent Transportation Systems, 2014.
- **S. Martin**, A. Tawari and M. M. Trivedi, "Towards Privacy Protecting Safety Systems for Naturalistic Driving Videos," IEEE Transactions on Intelligent Transportation Systems, 2014.
- A. Tawari, A. Møgelmoose, **S. Martin**, T. Moeslund, and M. M. Trivedi, "Attention Estimation by Simultaneous Analysis of Viewer and View," IEEE Intelligent Transportation Systems Conference, 2014.
- **S. Martin**, E. Ohn-Bar, A. Tawari, and M. M. Trivedi, "Understanding Head and Hand Activities and Coordination in Naturalistic Driving Videos," IEEE Intelligent Vehicles Symposium, 2014.
- **S. Martin**, C. Tran, M. M. Trivedi, "Optical flow based Head Movement and Gesture Analyzer (OHMeGA)," IAPR International Conference on Pattern Recognition, 2012.

Awards and Honors

- Rising Stars, Carnegie Mellon University, Pittsburgh, PA, 2016.
- IAPR travel award, International Conference on Pattern Recognition (ICPR), Mexico, 2016
- NSF travel award, IEEE Computer Vision and Pattern Recognition (CVPR) Workshop on The Future of Datasets in Vision, Boston, MA, 2015.
- Finalist in Best Industry Related Paper Award (BIRPA), ICPR, Stockholm, Sweden, 2014.
- ECE Graduate School Department Fellowship, UCSD, La Jolla, CA, 2010-11.
- NASA Tech Brief Award for new technology report, JPL, Caltech, Pasadena, CA, 2009.
- Summer Undergraduate Research Fellowship, JPL, Caltech, Pasadena, CA, 2008.
- Summer Undergraduate Research Fellowship, Caltech, Pasadena, CA, 2007.
- Robert C. Byrd Honors Scholarship, Cerritos High School, Cerritos, CA, 2006.

Professional Activities

- **Session Co-chair**, "SLAM and Visual Odometry," IEEE Intelligent Vehicles Symposium, 2017.
- **Associate Editor** (Workshops), IEEE Intelligent Vehicles Symposium, 2017.
- **Rising Stars** workshop for women electrical and computer engineers and computer scientists for pursuing a career path in academia hosted by Carnegie Mellon University, PA, 2016.
- **Ph.D. Networking** event for pursuing an industrial career path in a research environment sponsored and hosted by GE Global Research, NY, 2015.
- **Program Committee**, Workshop on Automatic Traffic Surveillance, CVPR, Las Vegas, 2016.
- **Organizing Chair**, Vision for Intelligent Vehicles & Applications: Workshop and Challenges in IEEE Intelligent Vehicles Symposium, Seoul, South Korea, 2015 and Gothenburg, Sweden, 2016.

Referees

- Professor Mohan M. Trivedi, Distinguished Professor, UCSD, CA, USA

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