

Mithun George Jacob

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Education

Doctor of Philosophy, Industrial Engineering, July 2014

CGPA: 3.88/4.0

School of Industrial Engineering, Purdue University, West Lafayette, IN

Advisor: Prof. Juan P. Wachs

Thesis: “*Optimal Modality Selection for Multimodal Human-Machine Systems using RIMAG*”

Relevant Courses: Theoretical Foundations of Optimization, Nonlinear Programming, Pattern Recognition

Master of Science in Engineering, Robotics, August 2009

GRASP Lab, School of Computer & Information Science, University of Pennsylvania, Philadelphia, PA

Advisor: Prof. Jianbo Shi

Thesis: “*Segmentation and Recognition in Driving Videos*”

Relevant Courses: Computer Vision, Advanced Robotics, Machine Learning, Convex Optimization, Algorithms

Bachelor of Technology, Mechanical Engineering, May 2007

School of Mechanical and Building Sciences, VIT University, India

Advisor: Prof. V.G. Sridhar

Thesis: “*Automated vision inspection system for a water bottling industry*”

Work Experience

X, the Moonshot Factory, Senior Software Engineer, Mountain View, CA

Nov 2018 — present

Mapping and localization at [The Everyday Robot Project](#).

Bosch Research and Technology Center, Palo Alto, CA

Senior Expert

Sep 2018 — Nov 2018

Lead Scientist

Jan 2018 — Sep 2018

Product owner of mapping and localization in the [Bosch-Daimler automated driving project](#).

Senior Research Scientist

Aug 2016 — Dec 2017

Research Scientist 2

Jan 2016 — Jul 2016

Research Scientist

Jul 2014 — Dec 2015

Precision localization and mapping for urban autonomous driving.

Technicolor Corporate Research, Research Engineer Intern, Princeton, NJ

Aug 2009 — Aug 2010

Video compression through homography-based motion compensating transformation encoding. Also implemented feature matching with SSE2 optimization.

Thomson (Technicolor) Corporate Research, Summer Intern, Princeton, NJ

Summer 2008

Improved compression for low-bit rate mobile video content by tracking and enhancing objects of interest in soccer videos through grass and field-line detection, cluster-based hyperparameter optimization of ball tracking and camera motion estimation.

Academic Research

ISAT (Intelligent Systems and Assistive Technologies) Laboratory, Purdue University

- Developed a novel methodology to generate Pareto-optimal lexicons for cooperative, multimodal human-robot task completion.
- Developed a sterile, touchless, gesture-based MRI navigation system utilizing contextual cues in the operating room. A novel gesture training algorithm was developed for the interface.

GRASP (General Robotics, Automation, Sensing and Perception) Lab, University of Pennsylvania

- Designed an accurate RANSAC-based pose estimation algorithm for calibrated stereo videos of a car driving in an urban environment under the assumption of dominant pixel flow by ego-motion.
- Investigated algorithms for segmentation and recognition of driving videos learned visual cues in noisy 3D reconstructions of street scenes from calibrated stereo videos.

Technical Skills

Languages: C++, MATLAB, Python

Development environments: Linux, Windows

Misc: ROS, OpenCV, Eigen, PCL

Selected Publications

- Lorenz Wellhausen, **Mithun George Jacob**, “[Map-optimized Probabilistic Traffic Rules](#)” in the 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 9-14, Daejeon, Korea.
- **Mithun George Jacob**, Juan P. Wachs, “[Optimal Modality Selection for Cooperative Human-Robot Task Completion](#)” in the IEEE Transactions on Cybernetics, vol. 46, no. 12, pp. 3388-3400, Dec. 2016 (published online in Dec. 2015).
- **Mithun George Jacob**, Juan P. Wachs, “[Context-based hand gesture recognition for the operating room](#)” in Pattern Recognition Letters, June 2013.
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, “[Surgical Instrument Handling and Retrieval in the Operating Room with a Multimodal Robotic Assistant](#)” in the Proceedings of the 2013 IEEE International Conference on Robotics and Automation (ICRA), May 6-10 2013, Karlsruhe, Germany.
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, A. George Akingba, “[Collaboration with a Robotic Scrub Nurse](#)” in Commun. ACM (CACM) 56(5): 68-75 (2013).
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, “[Gestonurse: a multimodal robotic scrub nurse](#)” in Proceedings of the Seventh Annual ACM/IEEE International Conference on Human-Robot Interaction (HRI), Boston, MA, 2012, pp. 153 —154.
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, “[A Gesture Driven Robotic Scrub Nurse](#)” In Proceedings of the 2011 IEEE International Conference on Systems, Man, and Cybernetics (SMC), pp. 2039-2044.

Selected Patents

- **Mithun George Jacob**, Sitaram Bhagavathy, “[Motion compensating transformation for video coding](#)”, Patent PCT/US2012/020888 pending, January 2012.
- Jesus Barcons-Palau, Sitaram Bhagavathy, Joan Llach, **Mithun George Jacob**, “[Segmenting grass regions and playfield in sports videos](#)”, Patent PCT/US2010/000004 pending, April 2010.
- **Mithun George Jacob**, Sitaram Bhagavathy, Jesus Barcons-Palau, Joan Llach, “[Detection of field lines in sport videos](#)”, Patent PCT/US2010/000032 pending, July 2010.

Selected Awards

- 2016 Innovation Award — Bosch Research and Technology Center, July 2016, Palo Alto
- 2014 Outstanding Graduate Student Research Award — College of Engineering, April 2014, Purdue University
- 2012 & 2013 Best Poster Award — Industrial Engineering Research Symposium, Purdue University
- Best Student Paper Finalist and awarded Student Travel Grant — 2011 IEEE International Conference on Systems, Man, and Cybernetics (SMC), September 2011, Anchorage, Alaska.
- First place in Panacea (C++ Debugging & Programming) at, ISTE Confluence 2004, India