Zachary Taylor

Personal Details

Birth Date	14th July 1989
Citizenship	New Zealand

Education

2008–2011	**Bachelor of Engineering (Mechatronics)**, *University of Canterbury*, Christchurch, New Zealand, *1st Class Honours*.
2012–Present	**Doctor of Philosophy**, *ACFR, University of Sydney*, Sydney, Australia. Currently in progress, planned date of thesis submission- 15 September 2015

Research

Area	Automatic Markerless Calibration of Multi-modal Sensor Systems
Supervisors	Juan Nieto (Primary) and David Johnson (Associate)
Description	The research performed during my PhD has been primarily concerned with the extrinsic calibration of multi-modal sensors in a robust and automatic manner, without any special markers or other aids. My work has focused on cameras, 3D lidar and GPS/INS sensors. The calibration operates by examining the motion observed by the individual sensors, and when the sensors have overlapping fields of view also makes use of the appearance of the surroundings. The methods developed consider the accuracy of the sensor readings and provide an estimate of the resulting calibration's variance. The outcome of this research will enable the deployment of mobile multi-sensor perception systems to the service of non-expert users.

Programming Languages

Matlab	During my PhD I have made extensive use of Matlab. Furthermore I have published several useful functions to the ***Mathworks File Exchange***
C	My undergraduate degree involved multiple C courses. During my PhD studies I have tutored C programming for the undergraduate Mechatronics course at USyd. I have also used C in combination with Matlab for my own research
Java, C++, Cuda	I have attended courses in these languages and have some experience using them in projects
Python, Ruby, C#	Self-taught languages I have used for small personal projects

16 Myrtle Street, Chippendale – 2008 Sydney – NSW, Australia
+61 401 990 126 • *z.taylor@acfr.usyd.edu.au*
www.zjtaylor.com

Publications

Conferences

1 Zachary Taylor and Juan Nieto. ***Motion-based calibration of multi-modal sensor arrays***. *International Conference on Robotics and Automation*, 2015.

2 Zachary Taylor, Juan Nieto, and David Johnson. ***Automatic calibration of multi-modal sensor systems using a gradient orientation measure***. *International Conference on Intelligent Robots and Systems*, 2013.

3 Zachary Taylor and Juan Nieto. ***A mutual information approach to automatic calibration of camera and lidar in natural environments***. In *the Australian Conference on Robotics and Automation*, 2012.

4 R J Murphy, S Schneider, Z Taylor, and J Nieto. ***Mapping clay minerals in an open-pit mine using hyperspectral imagery and automated feature extraction***. *Vertical Geology Conference*, 2014.

5 Calvin Hung, Juan Nieto, and Zachary Taylor. ***Orchard fruit segmentation using multi-spectral feature learning***. *International Conference on Intelligent Robots and Systems*, 2013.

Journals

6 Zachary Taylor, Juan Nieto, and David Johnson. ***Multi-modal sensor calibration using a gradient orientation measure***. *Journal of Field Robotics*, 2014.

7 Richard J Murphy, Zachary Taylor, Sven Schneider, and Juan Nieto. Mapping clay minerals in an open-pit mine using hyperspectral and LiDAR data. *European Journal of Remote Sensing (to appear)*, 2015.

Workshops

8 Zachary Taylor and Juan Nieto. ***Gradient based multi-modal sensor calibration***. *International Conference on Robotics and Automation: Modelling, Estimation, Perception and Control of All Terrain Mobile Robots Workshop*, 2014.

9 Zachary Taylor and Juan Nieto. ***Parameterless automatic extrinsic calibration of vehicle mounted lidar-camera systems***. *International Conference on Robotics and Automation: Long Term Autonomy Workshop*, 2014.

10 James P. Underwood, Mark Calleija, Zachary Taylor, Calvin Hung, Juan Nieto, Robert Fitch and Salah Sukkarieh. ***Real-time target detection and steerable spray for vegetable crops***. *International Conference on Robotics and Automation: Workshop on Robotics in Agriculture*, 2015.

In Preparation

11 Zachary Taylor and Juan Nieto. Motion-based calibration of multi-modal sensor array extrinsics and timing synchronization. *IEEE Transactions on Robotics (Intended Journal, currently unsubmitted)*, 2015.

16 Myrtle Street, Chippendale – 2008 Sydney – NSW, Australia
+61 401 990 126 • z.taylor@acfr.usyd.edu.au
www.zjtaylor.com

Scholarships and Awards

- ***Australian Postgraduate Award Scholarship*** (2013–Present)
- ***RTCMA Scholarship*** (2012–Present)
- ***Peter Nicol Russell Postgraduate Scholarship*** (2013–2014)

Other Experience

- Attended the ***Sydney Machine Learning Summer School 2015***
- I have presented at ICRA 2015, ICRA 2014 and IROS 2013.
- Tutored Mechatronics and C Programming undergraduate courses
- Attended and presented at a range of internal seminars and reading groups

Other Contributions

- All code used in my research has been made publically avaliable through ***my website***
- Published a small ***lidar and hyperspectral image dataset*** online
- Implemented a simple ***camera-robotic arm calibration toolbox*** and placed it online.

Interests

Running	Currently my main hobby, I have done two marathons and half a dozen shorter races in the last few years
Scuba Diving	PADI Advanced Open Water Diver and PADI Enriched Air Diver
Rock Climbing	

Online information

Google Scholar	`https://scholar.google.com.au/citations?user=XusVh60AAAAJ`
Research Gate	`https://www.researchgate.net/profile/Zachary_Taylor3`
Personal Website	`http://www.zjtaylor.com`
Github	`https://github.com/ZacharyTaylor`
Mathworks	`http://www.mathworks.com/matlabcentral/profile/authors/3383185-zachary-taylor`

16 Myrtle Street, Chippendale – 2008 Sydney – NSW, Australia
+61 401 990 126 • z.taylor@acfr.usyd.edu.au
www.zjtaylor.com