ÁLVARO PARRA

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EDUCATION AND QUALIFICATIONS

Aug 2016 PhD Computer and Mathematical Sciences
The University of Adelaide, Australia · *Dean's Commendation of Doctoral Thesis Excellence*

2011 MSc Computer Science
Universidad de Chile, Chile · *Highest Distinction*

2008 Computer Science Engineer
Universidad de Chile, Chile · *Highest Distinction*

2007 BSc Eng. Major in Computer Science
Universidad de Chile, Chile · *Distinction*

WORK EXPERIENCE

April 2018 – Present Postdoc, School of Computer Science, The University of Adelaide
Main topics: SLAM, quasi-convex optimisation, rotation averaging. I have been working and promoting L-infinity optimisation applied to SLAM (L-infinity SLAM). I am currently working on semantic SLAM.

May 2016 – April 2018 Postdoc, School of Computer Science, The University of Adelaide
I investigated on (1) methods to safely remove outliers for robust point cloud registration, and (2) consensus set maximisation and LP-type methods.

May 2009 – Sep 2011 Assistant Engineer, ALGES
I worked on geostatistical simulation algorithms.
Website: www.alges.uchile.cl

May 2007 – Aug 2009 Game Developer, CMM, Universidad de Chile
I worked as a programmer for an educational video-game.

Jan-May 2009 Software Developer, CMM, Universidad de Chile
I developed the graphical user interface and the client-server communication solution for the crew scheduling system of the train company FCAB S.A.
Website: www.cmm.uchile.cl

Aug 2008 – Mar 2009 Research Assistant, Dept. of Mining Eng., Universidad de Chile
I researched on geostatistical simulation algorithms based on texture synthesis.

Mar 2006 – Oct 2008 Software Developer, Tastets Systems
Member of the development team of a Chilean leader GPS company.
Website: redd.cl

Jul 2006 – Dec 2006 Internship, Sixbell Nekotec Solutions
I worked developing an internal system for personnel selection and recruitment.
Website: www.sixbell.cl

Jan 2006 – Feb 2006 Summer Intern, Tastets Systems
I developed a notification and messaging system for fleets. I also tested GPS devices for the fleet control system.
Website: redd.cl

TEACHING EXPERIENCE

Systems Programming
: Partial lecturing: Semester 1 2018.

Introduction to Geometric Algorithms
: Partial lecturing: Semester 2 2017.

Algorithm Design and Data Structure
: Tutoring: Semester 1 2013.

Introduction to Programming
: Practical Supervising: Semester 1 2013.

Object Oriented Programming
: Practical Supervising: Semester 2 2012, Semester 2 2013.

RESEARCH INTERESTS

I am interested in geometric problems and optimisation methods in computer vision. During my current postdoc, I have been researching on optimisations methods for SLAM (simultaneous localisation and mapping) and rotation averaging problems. I am particularly interested in optimisation methods that provide optimality guarantees; for example, I have recently proposed L-infinity SLAM, which finds the global solution after rotations are efficiently estimated trough rotation averaging.

I am also interested in problems related to rotations in computer vision. During my PhD and my first postdoc, I worked on solving rotation search in difficult input data, e.g., highly outlier-corrupted correspondences, a low overlapping region between point clouds. Such challenging data frequently occurs in real-life applications, e.g., mining, robotics. Currently, I am interested in estimating rotations between views with a low baseline, which occurs for cameras with slow-motion or pure rotational motion. In such a situation, most monocular SLAM systems struggle as traditional methods requires some baseline between views.

Other computer vision interests include robust estimation, 3D point cloud registration, structure from motion, 3D reconstruction, and localisation.

AWARDS

1. First place in the Satellite Pose Estimation Challenge held by the European Space Agency (July 2019).
2. Dean's Commendation of Doctoral Thesis Excellence (August 2016).
3. CONICYT-Becas Chile scholarship for Doctoral studies.

TECHNICAL SKILLS

My main tools are C++ and MATLAB. I also have experience in other programming languages including C, Python, Java and Perl.

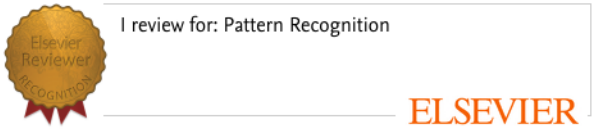
I have experience using clusters.

CONFERENCE ACTIVITIES

1. Program Committee member for the 34th AAAI Conference on Artificial Intelligence (AAAI-20).

REVIEWER

1. International Journal of Computer Vision (IJCV)
2. IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
3. IEEE Transactions on Geoscience and Remote Sensing (TGRS)
4. EURASIP Journal on Advances in Signal Processing (JASP)
5. ISPRS Journal of Photogrammetry and Remote Sensing (P&RS)
6. Pattern Recognition
7. IEEE Access
8. IEEE International Conference on Robotics and Automation (ICRA)
9. IEEE Robotics and Automation Letters (RA-L)
10. British Machine Vision Conference (BMVC)
11. IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)
12. IEEE Winter Conference on Applications of Computer Vision (WACV)
13. Asian Conference on Computer Vision (ACCV)
14. European Conference on Computer Vision (ECCV)
15. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)



PUBLICATIONS

COMPUTER VISION PUBLICATIONS

1. Álvaro Parra, Shin-Fang Chng, Tat-Jun Chin, Anders Eriksson and Ian Reid: Rotation Coordinate Descent for Fast Globally Optimal Rotation Averaging. In IEEE Computer Vision and Pattern Recognition (CVPR) 2021.
2. Daqi Liu, Álvaro Parra and Tat-Jun Chin: Spatiotemporal Registration for Event-based Visual Odometry. In IEEE Computer Vision and Pattern Recognition (CVPR) 2021.
3. Chee-Kheng Chng, Álvaro Parra, Tat-Jun Chin, Yasir Latif: Monocular Rotational Odometry with Incremental Rotation Averaging and Loop Closure. In The International Conference on Digital Image Computing: Techniques and Applications (DICTA), 2020.
4. Daqi Liu, Álvaro Parra and Tat-Jun Chin: Globally Optimal Contrast Maximisation for Event-based Motion Estimation. In IEEE Computer Vision and Pattern Recognition (CVPR) 2020.
5. Bo Chen, Tat-Jun Chin, Álvaro Parra, Jiewei Cao and Nan Li: End-to-End Learnable Geometric Vision by Backpropagating PnP Optimization. In IEEE Computer Vision and Pattern Recognition (CVPR) 2020.
6. Bo Chen, Jiewei Cao, Álvaro Parra, Tat-Jun Chin: Satellite pose estimation with deep landmark regression and nonlinear pose refinement. In International Conference on Computer Vision - Workshop on Recovering 6D Object Pose (ICCVW) 2019.
7. Álvaro Parra, Tat-Jun Chin, Frank Neumann, Tobias Friedrich, Maximilian Katzmann: A practical maximum clique algorithm for matching with pairwise constraints. arXiv:1902.01534 - 2019.
8. Álvaro Parra, Tat-Jun Chin, Anders Eriksson, Ian Reid: Visual SLAM: Why bundle adjust?. In International Conference on Robotics and Automation (ICRA) 2019.
9. Álvaro Parra, Tat-Jun Chin: Guaranteed outlier removal for point cloud registration with correspondences. In IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2018.
10. Zhipeng Cai, Tat-Jun Chin, Álvaro Parra, Konrad Schindler (2018): Practical optimal registration of terrestrial LiDAR scan pairs. In ISPRS Journal of Photogrammetry and Remote Sensing (P&RS), 2018.
11. Álvaro Parra: Robust rotation search in computer vision. PhD Thesis, 2016.
12. Álvaro Parra, Tat-Jun Chin, Anders Eriksson, Hongdong Li, David Suter: Fast rotation search with stereographic projections for 3D registration. In IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2016.
13. Álvaro Parra and Tat-Jun Chin: Guaranteed outlier removal for rotation search. In International Conference on Computer Vision (ICCV), 2015.
14. Álvaro Parra, Tat-Jun Chin and David Suter: Fast rotation search with stereographic projections for 3D registration. In IEEE Computer Vision and Pattern Recognition (CVPR), 2014.
15. Tat-Jun Chin, Álvaro Parra, Michael S. Brown and David Suter: Fast rotation search for real-time interactive point cloud registration. In ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D), 2014.

OTHER PUBLICATIONS

16. Álvaro Parra: Adaptación de algoritmo de síntesis de texturas para simulación geoestadística de múltiples puntos condicionada. Master Thesis. 2011.

17. Álvaro Parra, Julián M. Ortiz: Adapting a texture synthesis algorithm for conditional multiple point geostatistical simulation. Stochastic Environmental Research and Risk Assessment 25(8): 1001-1111 (2011).

18. Álvaro Parra, Julián M. Ortiz: Multiple-Point conditional unilateral simulation for categorical variables. 4th International Conference on Mining Innovation 2010: 413-422.

19. Álvaro Parra, Julián M. Ortiz, Conditional Multiple-Point simulation with a texture synthesis algorithm, Annual Conference of the International Association for Mathematical Geosciences, 2009.