

# PALAMANDADIGE BASURA CHINATH FERNANDO

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## Current Position

- Research Fellow at the Australian National University Canberra and a researcher at the Australian Research Councils Centre of Excellence Robotic Vision.
- Project leader for SR1: “Understanding Human and Robot Actions and Interactions“ at the Australian Research Councils Centre of Excellence Robotic Vision.

## Education

- 2011 - 2015 : Ph.D Doctor in Electrical Engineering. PSI-VISICS, Electrical Engineering Dept, KU Leuven, Belgium (Supervisor Prof. Tinne Tuytelaars).
- 2009 - 2011 : M.Sc. Colour In Informatics and Media Technology, European Master, University Jean Monnet, Saint-Etienne, France.
- 2003 - 2007 : B.Sc. (Hons), Computer Science and Engineering, University of Moratuwa, Sri Lanka.

## Work Experience

- Research Fellow, The ARC Centre of Excellence Robotic Vision, The Australian National University, Australia - July-2015 to now.
- Research Assistant, Electrical Engineering Dept. (ESAT), KU Leuven, Belgium - Oct-2011 to March-2015.
- Intern at Laboratoire Hubert Curien, UMR CNRS, Saint-Etienne, France - Jan-2011 to June-2011.
- Senior Software Engineer, John Keells Computer Services, Colombo, Sri Lanka - Sept-2008 to July-2009.
- Senior Software Engineer, Virtusa, Colombo, Sri Lanka - Apr-2008 to Sept-2008.
- Software Engineer, Virtusa, Colombo, Sri Lanka - Sept-2007 to Sept-2008.
- Software Intern, Virtusa, Colombo, Sri Lanka - 2006.

## Publications

### Book chapters

1. Fernando, B.; Aljundi, R.; Emonet, R.; Habrard, A.; Sebban, M. & Tuytelaars, T. (2017), Unsupervised Domain Adaptation based on Subspace Alignment, Editors: Csurka, G.; Domain Adaptation in Computer Vision Applications; Springer International Publishing.

### Journals : 3 IJCV, 3 TPAMI, 1 PR, 1 PRL, 1 CVIU, 1 IOVS

1. Bilen, H.; Fernando, B.; Gavves, E. & Vedaldi, A. (2017), Action Recognition with Dynamic Image Networks, IEEE Transactions on Pattern Analysis and Machine Intelligence **TPAMI**, vol. PP, no. 99, pp. 1-1. doi: 10.1109/TPAMI.2017.2769085.
2. Fernando, B. & Gould, S. (2017), 'Discriminatively Learned Hierarchical Rank Pooling Networks', International Journal of Computer Vision (**IJCV**) 124(3), 335-355 - DOI. 10.1007/s11263-017-1030-x .
3. Fernando, B.; Gavves, E.; Oramas, J.; Ghodrati, A. & Tuytelaars, T. (2016), 'Rank Pooling for Action Recognition', IEEE Transactions on Pattern Analysis and Machine Intelligence, **TPAMI**, 39(4), 773-787.

4. Saha, S. K., Xiao, D., Fernando, B., Tay-Kearney, M. L., An, D., & Kanagasigam, Y. (2017). Deep Learning Based Decision Support System for Automated Diagnosis of Age-related Macular Degeneration (AMD). *Investigative Ophthalmology & Visual Science*, 58(8), 25-25. [*Impact Factor: 3.303*]
5. Fernando, B.; Tommasi, T. & Tuytelaars, T. (2015), 'Location recognition over large time lags', *Computer Vision and Image Understanding (CVIU)* 139, 21–28.
6. Fernando, B.; Tommasi, T. & Tuytelaars, T. (2015), 'Joint cross-domain classification and subspace learning for unsupervised adaptation', *Pattern Recognition Letters* 65, 60–66.
7. Fernando, B.; Fromont, E. & Tuytelaars, T. (2014), 'Mining mid-level features for image classification', *International Journal of Computer Vision (IJCV)* 108(3), 186–203.
8. Gavves, E.; Fernando, B.; Snoek, C. G.; Smeulders, A. W. & Tuytelaars, T. (2014), 'Local alignments for fine-grained categorization', *International Journal of Computer Vision (IJCV)* 111(2), 191–212.
9. Fernando, B.; Fromont, E.; Muselet, D. & Sebban, M. (2012), 'Supervised learning of Gaussian mixture models for visual vocabulary generation', *Pattern Recognition* 45(2), 897–907.
10. Harandi, M. & Fernando, B. (2017), Generalized BackPropagation, Etude De Cas: Orthogonality, *IEEE Transactions on Pattern Analysis and Machine Intelligence (Under review)* **TPAMI**, 1-14.

**International Conferences: CVPR 8, ICCV 6, ECCV 2, ICML 1, EMNLP 1, ICIP 1**

1. Aliakbarian, M. S., Saleh, F., Salzmann, M., Fernando, B., Petersson, L., & Andersson, L. (2017). Encouraging LSTMs to Anticipate Actions Very Early. in 'IEEE International Conference on Computer Vision **ICCV** 2017'.
2. Fernando, B., Bilen, H., Gavves, E., & Gould, S. (2016). Self-Supervised Video Representation Learning With Odd-One-Out Networks. in 'IEEE International Conference on Computer Vision and Pattern Recognition **CVPR** 2017'.
3. Cruz, R. S., Fernando, B., Cherian, A., & Gould, S. (2017). DeepPermNet: Visual Permutation Learning. in 'IEEE International Conference on Computer Vision and Pattern Recognition **CVPR** 2017'.
4. Cherian, A., Fernando, B., Harandi, M., & Gould, S. (2017). Generalized rank pooling for activity recognition. in 'IEEE International Conference on Computer Vision and Pattern Recognition **CVPR** 2017'.
5. Anderson, P., Fernando, B., Johnson, M., & Gould, S. (2017). Zero-Shot Image Captioning with Constrained Beam Search, To appear in Conference on Empirical Methods in Natural Language Processing, 2017 **EMNLP** 2017'.
6. Anderson, P., Fernando, B., Johnson, M., & Gould, S. (2016). SPICE: Semantic Propositional Image Caption Evaluation, in 'European Conference on Computer Vision **ECCV** 2016'.
7. Fernando, B. & Gould, S. (2016) Learning End-to-end Video Classification with Rank-Pooling, in 'International Conference on Machine Learning **ICML** 2016'.
8. Bilen, H.; Fernando, B.; Gavves, E.; Vedaldi, A. & Gould, S. (2016), Dynamic Image Networks for Action Recognition, in 'IEEE International Conference on Computer Vision and Pattern Recognition **CVPR** 2016'.
9. Fernando, B.; Anderson, P.; Hutter, M. & Gould, S. (2016), Discriminative Hierarchical Rank Pooling for Activity Recognition, in 'IEEE International Conference on Computer Vision and Pattern Recognition **CVPR** 2016'.
10. Fernando, B.; Gavves, E.; Oramas, J.; Ghodrati, A. & Tuytelaars, T. (2015), Modeling video evolution for action recognition, in 'IEEE International Conference on Computer Vision and Pattern Recognition **CVPR** 2015'.
11. Fernando, B.; Gavves, E.; Muselet, D. & Tuytelaars, T. (2015), Learning to rank based on subsequences, in 'IEEE International Conference on Computer Vision **ICCV** 2015'.

12. Jia, X.; Gavves, S.; Fernando, B. & Tuytelaars, T. (2015), Guided long-short term memory for image caption generation, in 'IEEE International Conference on Computer Vision **ICCV** 2015'.
13. Rematas, K.; Fernando, B.; Dellaert, F. & Tuytelaars, T. (2015), Dataset Fingerprints: Exploring Image Collections Through Data Mining, in 'Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition **CVPR** 2015', pp. 4867–4875.
14. Fernando, B.; Muselet, D.; Khan, R. & Tuytelaars, T. (2014), Color features for dating historical color images, in 'IEEE International Conference on Image Processing **ICIP** 2014'.
15. Aly, R.; Arandjelovic, R.; Chatfield, K.; Douze, M.; Fernando, B.; Harchaoui, Z.; McGuinness, K.; O'Conner, N. E.; Oneata, D.; Parkhi, O. M. & others (2013), The AXES submissions at TrecVid 2013, in 'TrecVid'.
16. Aly, R.; Arandjelovic, R.; Chatfield, K.; Douze, M.; Fernando, B.; Harchaoui, Z.; McGuinness, K.; O'Connore, N.; Oneata, D.; Parkhi, O. M. & others (2013), AXES at TRECVID 2013, in 'TRECVID', NIST, .
17. Fernando, B.; Habrard, A.; Sebban, M. & Tuytelaars, T. (2013), Unsupervised Visual Domain Adaptation Using Subspace Alignment, in 'IEEE International Conference on Computer Vision **ICCV** 2013'.
18. Fernando, B. & Tuytelaars, T. (2013), Mining Multiple Queries for Image Retrieval: On-the-fly learning of an Object-specific Mid-level Representation, in 'IEEE International Conference on Computer Vision **ICCV** 2013'.
19. Gavves, E.; Fernando, B.; Snoek, C.; Smeulders, A. & Tuytelaars, T. (2013), Fine-Grained Categorization by Alignments, in 'IEEE International Conference on Computer Vision **ICCV** 2013'.
20. Rematas, K.; Fernando, B.; Tommasi, T. & Tuytelaars, T. (2013), Does Evolution cause a Domain Shift?, in 'IEEE International Conference on Computer Vision **ICCV 2013 Workshop VisDA**'.
21. Aly, R.; McGuinness, K.; Chen, S.; O'Connor, N. E.; Chatfield, K.; Parkhi, O.; Arandjelovic, R.; Zisserman, A.; Fernando, B.; Tuytelaars, T. & others (2012), AXES at TRECVID 2012: KIS, INS, and MED, in '**TRECVID**'.
22. Aly, R.; McGuinness, K.; Chen, S.; O'Conner, N.; Chatfield, K.; Parkhi, O.; Arandjelovic, R.; Zisserman, A.; Fernando, B.; Tuytelaars, T. & others (2012), AXES at TRECVID 2012, in '**TRECVID**'.
23. Fernando, B.; Fromont, E.; Muselet, D. & Sebban, M. (2012), Discriminative Feature Fusion for Image Classification, in 'IEEE International Conference on Computer Vision and Pattern Recognition **CVPR** 2012'.
24. Fernando, B.; Fromont, E. & Tuytelaars, T. (2012), Effective Use of Frequent Itemset Mining for Image Classification, in 'European Conference of Computer Vision 2012 ( **ECCV** 12)'.

### Professional Activities

- Organizing CVPR 2017 workshop titled *Brave New Ideas for Motion and Spatio-Temporal Representations*.
- Organising ECCV 2016 workshop titled *Brave New Ideas For Motion Representations*.
- Program committee member of *Robotic Vision RVSS 2016 Summer School*.
- Co-chairing the CVPR 2016 oral and spotlight session on *Learning and CNN Architectures*.
- Associate Editor for ICRA 2018.
- Reviewer for:

CVPR 2013, 2015, 2016, 2017 reviewer

ICCV 2013, 2017 reviewer

ECCV 2014, 2016 reviewer

NIPS 2016, 2017 reviewer  
TPAMI: IEEE Transactions on Pattern Analysis and Machine Intelligence  
IJCV: International Journal of Computer Vision  
CVIU: Computer vision and image understanding journal  
PR: Pattern Recognition Journal  
PRL: Pattern Recognition Letters Journal  
Machine Learning Journal  
IEEE Transactions on Neural Networks and Learning Systems  
IEEE Transactions on Multimedia

### Research Interests

- Visual representation learning and deep learning.
- Visual recognition and analysis.
- Pattern recognition and data mining.
- Statistical machine learning.
- Computer vision.

### Research Experience

- Human action recognition (CVPR15, CVPR16, CVPR17, ICCV17 ,TPAMI, IJCV17)
- Action detection (CVPR17)
- Unsupervised feature learning (CVPR17)
- Deep learning (ICML16, CVPR16, CVPR17, ICCV17)
- Domain adaptation (ICCV13, CVIU16, PRL16)
- Transfer learning (ICCV13, CVIU16, PRL16)
- Supervised ranking (ICCV15)
- Bi-level optimization (ICML16, CVPR16)
- Feature fusion (CVPR12)
- Dictionary learning (Pattern Recognition)
- Mid-level feature learning (ECCV12, ICCV13, IJCV)
- Fine-grained object class categorisation (ICCV13, IJCV)
- Image retrieval (ICCV13)

### Research Projects

- Member of Australian Research Councils Centre of Excellence Robotic Vision - <http://roboticvision.org/>, Project Leader SR1 : Understanding Human and Robot Actions and Interactions
- Member of EU-FP7 project AXES (2012-2015) - <http://www.axes-project.eu/>
- Member of BeeldCanon project (2011-2012) - <http://staff.science.uva.nl/~gavves/beeldcanon/html/>
- Contributor of ERC project Cognimund - <http://homes.esat.kuleuven.be/~tuytelaa/cognimund.html>
- Contributor of Pascal 2 Network of Excellence

### Research profile

Google scholar <https://scholar.google.com.au/citations?user=GyvseMkAAAAJ&hl=en>  
ORCID <https://orcid.org/0000-0002-6920-9916>

## **Programming & Software Engineering Skills**

Matlab, Python.  
MatConvNet, Tensorflow.  
Java, Java EE.  
OO Design and Software Architectures design.

## **Honours and Awards**

Post doctoral research fellowship, The Australian National University 2015-2018.  
PhD research fellowship KU Leuven, Belgium 2011-2015.  
Ranked First in European Master CIMET cohort 2009-2011.  
Erasmus Mundus Scholarship (42000 Euro) 2009-2011.  
Dean's list several times during 2003-2007 University of Moratuwa Sri Lanka.  
Mahapola Scholarship 2003-2007.

## **Student Supervision**

1. 2016-2019 - PhD thesis chair and co-advisor - Mohammad Sadegh Aliakbarian (ANU) - Human action anticipation - ICCV 2017 paper accepted.
2. 2015-2018 - PhD thesis co-advisor - Rodrigo Santa Cruz (ANU) - Self-supervised deep learning - paper accepted at CVPR 17.
3. 2015-2018 - PhD thesis co-advisor - Peter Anderson (ANU) - Vision and Language - paper accepted at ECCV 16, and EMNLP 17.
4. 2017-2020 - PhD thesis co-advisor - Zachary Jiang (ANU) - Kernelized deep learning .
5. 2016-2019 - PhD thesis co-advisor - Samitha Herath (ANU) - Deep transfer learning methods.
6. 2016-2019 - PhD thesis co-advisor - Cristian Rodriguez Opazo (ANU) - Deep content generation.
7. 2016 - Supervise project for COMP2560 - Studies in Advanced Computing R&D - Mathew Brown - Paper submitted to CVPR 2017.
8. 2017 - Supervise 12 unit project for ENGN4712 - Engineering Research and Development Project - Tengda Han - Video object segmentation.
9. 2017 - Supervise 12 unit project for ENGN4200 - Individual Project - Yuge (Jimmy Shi) - Video action prediction.
10. 2013 : Learning object categories from the web - Alberto Dominguez (Master thesis KU Leuven).

## **Teaching Activities**

2017 Semester 2 : ENGN8536: Advanced Topics in Mechatronics Systems (Deep Learning)  
2017 Semester 1 : ENGN4528: Computer Vision at ANU  
2016 Semester 2 : ENGN8536: Advanced Topics in Mechatronics Systems (Deep Learning)  
2016 Semester 1 : ENGN4528: Computer Vision at ANU  
Tutorial on Action recognition and semantic vision at Robotic Vision Summer School RVSS 2017  
2015 Spring : H09J2A: Pattern Recognition and Image Interpretation (TA) at KU Leuven  
2014 Spring : H09J2A: Pattern Recognition and Image Interpretation (TA) at KU Leuven  
2013 Spring : H09J2A: Pattern Recognition and Image Interpretation (TA) at KU Leuven

## **Seminar/Talks**

- May 24, 2016 - Rank pooling and variants for action and activity recognition - ACRV The Australian National University
- March 17, 2016 - Action and Activity Recognition Research at ANU - Australian Centre for Visual Technologies, The University of Adelaide, Australia

- July 15, 2015 - Effective Image and Video Representations - Australian Centre for Robotic Vision, The Australian National University, Australia
- March 30, 2015 - Image Representations for Improving Object Recognition - VISICS Lab, Leuven, Belgium
- Dec 12, 2013 - Unsupervised Visual Domain Adaptation Using Subspace Alignment - VISICS Lab, Leuven, Belgium
- May 15, 2012 - Discriminative Feature Fusion for Image Classification - VISICS Lab, Leuven, Belgium
- Nov 22, 2012 - Learning mid-level features for image retrieval - Hubert-Curien Lab, Saint Etienne, France
- Dec 04, 2012 - Learning mid-level features for classification and retrieval - Intelligent Systems Lab, Amsterdam
- Dec 12, 2013 - Mining Multiple Queries for Image Retrieval: On-the-fly learning of an Object-specific Mid-level Representation - VISICS Lab, Leuven, Belgium