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Robotics Institute. Carnegie Mellon University.
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Research Interests **Human Sensing:** Modeling and understanding human behavior (i.e. expression, emotion, activity) from sensory data (e.g. video, motion capture, audio). This work is motivated by applications in the fields of human health, computer graphics, machine vision, biometrics, and human-machine interface. I lead the Human Sensing Laboratory at CMU, for more information see ([http : //www.humansensing.cs.cmu.edu](http://www.humansensing.cs.cmu.edu)).

Component Analysis (CA): Kernel PCA, Normalized Cuts, Multidimensional Scaling are a set of algebraic techniques that decompose a signal into relevant components optimal for modeling, clustering, or visualization. I am interested in using CA methods to efficiently and robustly learn models from large amounts of high dimensional data. The theoretical focus of my work is to develop a unification theory and generalizations for many component analysis methods. I lead the Component Analysis Laboratory at CMU, for more information see ([http : //ca.cs.cmu.edu](http://ca.cs.cmu.edu)).

Computer Vision: Visual learning (e.g., object recognition, activity recognition). Particularly interested in face image analysis, including but not limited to facial feature tracking, face recognition, facial expression analysis, face de-identification, and 3D face modeling.

Education LA SALLE SCHOOL OF ENGINEERING Barcelona, Spain
1997-2002 **Ph.D. Electrical Engineering**

LA SALLE SCHOOL OF ENGINEERING Barcelona, Spain
1995-1996 **M.S. Electrical Engineering and Computer Sciences**

LA SALLE SCHOOL OF ENGINEERING Barcelona, Spain
1991-1994 **Bachelor of Electric Engineering and Computer Sciences**

Experience CARNEGIE MELLON UNIVERSITY, Pittsburgh, Pennsylvania
07/2011-present

Associate Research Professor at the Robotics Institute.
Adjunct Professor at Electrical and Computer Engineering Department (since 2009).
Affiliated Faculty at Machine Learning Department (since 2013).

CARNEGIE MELLON UNIVERSITY, Pittsburgh, Pennsylvania
07/2005-06/2011
Assistant Research Professor at the Robotics Institute.

CARNEGIE MELLON UNIVERSITY, Pittsburgh, Pennsylvania
01/2003-06/2005
Visiting Research Scientist.

GATSBY COMPUTATIONAL NEUROSCIENCE UNIT, London, UK
09/2002-12/2002

Visiting Scientist.

CARNEGIE MELLON UNIVERSITY,
07/2002-08/2002

Pittsburgh, Pennsylvania

Visiting Research Scientist.

LA SALLE SCHOOL OF ENGINEERING,
1995–Present

Barcelona, Spain

Adjunct Professor, (02/2002-present).

Associate Professor, (2000-2002) Department of communications and signal theory.

Assistant Professor, (1995-1999) Department of communications and signal theory.

BROWN UNIVERSITY,
02/2002-06/2002

Providence, Rhode Island

Post-doctoral researcher working on statistical modeling of neural data.

BROWN UNIVERSITY,
02/2001-09/2001

Providence, Rhode Island

Visiting researcher working on visual learning and statistical modeling of neural coding.

BROWN UNIVERSITY,
07/2000-08/2000

Providence, Rhode Island

Visiting researcher working on robust subspace learning.

XEROX PALO ALTO RESEARCH CENTER,
06/1999-08/1999

Palo Alto, CA

Summer intern working on robust subspace learning.

INSTITUTE FOR ADVANCED COMPUTER STUDIES,
01/1999-05/1999

College Park, MD

Research visitor developing Bayesian techniques for appearance based tracking of rigid and non-rigid objects.

QUEEN MARY AND WESTFIELD COLLEGE,
07/1997-09/1997

London, England

Research visitor working on an appearance-based face tracking system.

Computer Skills

Programming Languages: C, C++.

Operating Systems: UNIX, Windows.

Mathematical Computation: Matlab, Maple, Mathematica.

Languages

Bilingual **Spanish-Catalan**. Fluent both written and spoken **English**.

Awards

Best Demo Award at IEEE Automatic Face and Gesture Recognition 2015.

Best Student Paper Award at IEEE Conference on Computer Vision and Pattern Recognition 2012.

Cooliest Faculty of the Year at the Robotics Institute 2008.

50 Finest of Pittsburgh 2008. Raised \$2, 200 dollars for Cystic Fibrosis.

Catalonian BE 2000 Grant, Fellowship, 6/2000–8/2000, \$2,500.

Catalonian BE 2001 Grant, Fellowship, 2/2001–7/2001, \$7,500.

Consulting

Intuit. 03/2008 - 08/2008
Disney. 04/2011 - 07/2011
Tandent Vision. 04/2011 - 07/2012
Allergan. 10/2014-present

**Board
of Directors**

Machine Perception Technologies

**Professional
Services**

Program Chair or Organizer:

- Program Chair, Workshop on Computer Vision for Autonomous Driving, ICCV 2013.
- Tutorial on “Human Sensing”, PAVIS school on Computer Vision and Pattern Recognition, Geneva, October 2012. (15 hours).
- Tutorial on “Facial Expression Analysis”, CVPR 2012, in conjunction with Looking at People, Providence, June 2012. (1 hour).
- Tutorial on “Component Analysis for Human Sensing”, AERFAI Summer School on Pattern recognition in Multimodal Interaction, Spain, Vigo June 2012. (4 hours)
- Organize tutorial on “Component Analysis for Computer Vision and Pattern Recognition”, summer school in Australia 2011. (4 hours)
- Local Area Chair for International Conference on Computer Vision 2011.
- Workshop Chair in the International Conference on Machine Intelligence 2011.
- Workshop Chair in the International Conference on Multi-modal Interfaces 2011.
- Co-chair of a special seminar on “Probabilistic Methods for Perceiving, Learning and Reasoning about Everyday Activities”, Germany, June 2010.
- Publicity Chair for Face and Gesture 2008.
- Organize tutorial “Component Analysis for Pattern Recognition”, International Conference on Pattern Recognition, August 2008.
- Organize tutorial “Extended linear and multi-linear methods for multimodal signal processing”, International Conference on Multimedia and Expo, May 2007.
- Organize tutorial on “Component Analysis for Computer Vision”, European Conference on Computer Vision 2006.
- Co-organize tutorial on “Linear and Multilinear (Tensor) Methods for Vision, Graphics, and Signal Processing”, Computer Vision and Pattern Recognition, June 2006.
- Co-organize 1st workshop on “Component Analysis Methods for Classification, Clustering, Modeling and Estimation Problems in Computer Vision”, jointly with IEEE Computer Vision and Pattern Recognition, June 2007.
- Co-organize workshop on “Learning, Representation and Context for Human Sensing in Video”, jointly with IEEE Computer Vision and Pattern Recognition, June 2006.

Area Chair:

- Area Chair for IEEE Automatic Face and Gesture Recognition 2017.
- Area Chair for European Conference on Computer Vision 2016.
- Area Chair for IEEE Computer Vision and Pattern Recognition 2016.
- Area Chair for IEEE Automatic Face and Gesture Recognition 2015.
- Area Chair for European Conference on Computer Vision 2014.
- Area Chair for IEEE Computer Vision and Pattern Recognition 2014.
- Area Chair for IEEE Automatic Face and Gesture Recognition 2013.
- Area Chair for Asian Conference on Computer Vision 2012.
- Area Chair for IEEE Automatic Face and Gesture Recognition 2011.
- Area Chair for International Conference on Computer Vision 2011.
- Area Chair for IEEE Computer Vision and Pattern Recognition 2010.

Program Committee Member, Conferences:

- IEEE Computer Vision and Pattern Recognition (2003-2015).
- IEEE International Conference on Computer Vision (2005, 2007, 2009, 2011, 2013, 2015).
- IEEE Winter conference on Applications and Computer Vision, 2014.
- ICRA (2011, 2012, 2015).
- AAAI 2015.
- International Conference on Biometrics, (2014, 2015).
- The 18th International Symposium on Wearable Computers 2014.
- European Conference on Computer Vision (2002, 2004, 2006, 2008, 2010, 2012).
- Neural Information Processing Systems (2004, 2010, 2011, 2013, 2014).
- 22nd IEEE International Symposium on Robot and Human Interactive Communication 2013
- IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems 2012.
- International Conference on Multimodal Interfaces (2012).
- Biometrics: Theory, Applications and Systems 2013.
- SIGGRAPH (2002, 2011, 2012, 2013).
- SIGGRAPH Asia (2011).
- Eurographics (2012).
- ACM Multimedia (2011, 2012).
- International Conference on Machine Learning (2007).
- International Conference on Automatic Face and Gesture Recognition (2002, 2008).
- International Conference on Pattern Recognition (2008, 2010, 2012).
- IEEE International Conference on Image Processing (2003, 2007).
- IEEE International Conference on Multimedia and Expo (2002).
- Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA) (2011, 2013).

- Indian Conference on Vision, Graphics, and Image Processing (2012).

Program Committee Member, Workshop:

- IEEE Workshop On Analysis and Modeling of Faces and Gestures, Boston, June 2015
- 1st Workshop on User-Centred Computer Vision, Singapore, November 2014.
- 2^{on} Workshop VISART: Where Computer Vision Meets Art, Zurich 2014.
- 5th workshop on Human Behavior Understanding, 2014
- ChaLearn Workshop on Looking at People 2014
- 4th International Workshop on Human Behavior Understanding, Barcelona, October 2013
- 2^{on} International Workshop on Context Based Affect Recognition CBAR, Geneva 2013
- 3rd Workshop on Gesture Recognition, Sydney, December 2013.
- 1st ACM MM Workshop on Multimedia Indexing and Information Retrieval for Healthcare, October 2013.
- 3rd International Workshop on Human Behavior Understanding, July 2013.
- AAI-13 Robotics (Robotics Track), July 2013.
- IEEE Workshop on the Applications of Computer Vision, January 2013.
- Workshop on User-Centred Computer Vision, January 2013.
- 2^{on} Workshop on Context Based Affect Recognition, held in conjunction with SocialCom, October 2012.
- 2^{on} International Workshop on Benchmarking Facial Image Analysis Technologies (BeFIT), October 2012.
- 2^{on} Workshop on Egocentric Vision, Providence, June 2012.
- 2^{on} Workshop on Gesture Recognition (CVPR), Providence, June 2012.
- VISART: Where Computer Vision Meets Art, October 2012.
- 2^{on} International Audio/Visual Emotion Challenge and Workshop, October 2012.
- IEEE Workshop on the Applications of Computer Vision, January 2012.
- Workshop on Human Computer Interaction in Computer Vision, November 2011.
- Machine Learning for Affective Computing (MLAC), October 2011.
- 2^{on} International Workshop on Sign, Gesture and Activity, November 2011
- 1st International Audio/Visual Emotion Challenge and Workshop, October 2011.
- 4th IEEE Workshop on Human Communicative Behavior Analysis, June 2011.
- 16th Vision, Modeling, and Visualization (VMV11) Workshop, October 2011.
- 6th IEEE Workshop on Human Computer Interaction: Real-Time Vision Aspects of Natural User Interfaces, November 2011.
- 3rd Workshop on Use of Context in Video Processing, November 2011.
- 1st Workshop on Benchmarking Facial Image Analysis Technologies, November 2011.
- Workshop on Gesture Recognition, June 2011.

- Workshop on Facial Expression Recognition and Analysis Challenge (FERA2011), March 2011.
- Workshop on Person-Oriented Vision (POV), January 2011.
- Workshop on Sign, Gesture and Activity, September 2010.
- Workshop on Subspace Methods, November 2010.
- 3rd IEEE Workshop on Human Communicative Behavior Analysis, June 2010.
- Workshop on Computer Vision for Human-Robot Interaction, June 2010.
- Workshop on Structured Models in Computer Vision, June 2010.
- Workshop on Analysis and Modeling of Faces and Gestures, June 2010.
- 1st International Workshop on Situational Awareness for Autonomous and Mobile Platforms, May 2010.
- 2^{on} workshop on the Use of Context in Vision Processing (UCVP), November 2009.
- 2^{on} IEEE International Workshop on Subspace Methods, September 2009.
- Workshop on e-Heritage and Digital Art Preservation, September 2009.
- IEEE Workshop on Applications of Computer Vision, December 2009.
- 2^{on} IEEE Workshop on CVPR for Human Communicative Behavior Analysis, September 2009.
- 1st International Workshop on Online Pattern Recognition and Machine Learning Techniques for Computer Vision Applications, January 2008.
- Computer Vision for Biomedical Image Applications: Current Techniques and Future Trends, October 2005.
- Workshop on Statistical Learning in Computer Vision at ECCV, May 2004.
- Enabling Technologies for Homeland Security Conference at Great Lakes Photonics Symposium, June 2004.

Doctoral Consortium:

- IEEE Computer Vision and Pattern Recognition (2010, 2011, 2012, 2013)
- IEEE Automatic Face and Gesture Recognition (2011, 2015)

Other committees:

- Best paper award AFGR 2013.
- Judge for the ChaLearn Gesture Challenge. June 2012.

University Services

Chair of the admissions committee for the professional M.S. on Computer Vision 2014.

Faculty Senate for RI (2010-2011).

Graduate admission committee for RI (2007-2008, 2008-2009, 2009-2010).

Hiring committee for RI (2006-2007).

Contact person for the CMU Talentia program.

Co-responsible of the CMU-Portugal program at the Robotics Institute.

Editorial Associate Editor on IEEE Transactions on Pattern Analysis and Machine Intelligence (Feb. 2012-Feb. 2016)

IEEE Transactions on Image Processing, special issue on Human Emotion Analysis

Reviewing **Reviewed journal papers for:**

IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) (47), IEEE Transactions on Affective Computing (4), Pattern Recognition (10), International Journal of Computer Vision (13), Image and Vision Computing (4), IEEE Trans. SMC- Part B (3), Computer Vision and Image Understanding (3), IEEE Transactions on Information Forensics and Security (2), IEEE Transactions on Neural Networks (4), Data Mining and Knowledge Discovery (2), Journal of Machine Learning Research (2), Elvevia (2), Neurocomputing (1), Neural Computation (1), Artificial Intelligence (1), Image Communication Journal (1), Journal of Pattern Recognition and Artificial Intelligence (1), Journal of Computational and Graphical Statistics (1).

Reviewed several chapters on *Adaptive Blind Signal and Image Processing*. John Wiley and Sons. 2002. Reviewed Vision Based Interaction. Morgan and ClayPool Publishers. 2013.

Foreword for book "Multi-modal challenges in gesture recognition", S. Escalera, V. Athitsos and I. Guyon (Eds).

Reviewed grant application for:

- National Science Foundation 2014.
- National Science Foundation 2013.
- Comunicaciones y Electronica del Fondo para la Investigacin Cientfica y Tecnologica (FONCYT). Argentina agency, 2012.
- National Science Foundation, IIS-2012.
- National Science Foundation, CDI-2009.
- European Projects. Objective 1.5 Internet and 3D media, 2009.
- Israel Science Foundation 2008, 2009.
- Agencia de Gestio i Ajuts Universitaris i de Recerca (AGUR), Catalonia Research Agency (2005, 2007).

Reviewed promotions: Six cases.

Reference letters: 127 (different people).

Grants and Gifts

Principal Investigator. "Facial Technology for the Car Environment", Toyota, 09/1/2015-01/31/2017.

Co-Principal Investigator. "SCH: EXP: Monitoring Motor Symptoms in Parkinson's Disease with Wearable Devices", National Science Foundation, 9/1/2016-7/31/2019.

Principal Investigator. "RI:Small: Supervised Descent Method and its applications to Computer Vision (and beyond)", Robust Intelligence program (NSF), 09/1/2016-09/1/2019.

Principal Investigator. “STTR Phase I: Wearable System for Mining Parkinson’s Disease Symptom States in an Ambulatory Setting”, NSF, STTR, 01/1/2016-08/1/2017.

Principal Investigator. “Deep Semantic Component Analysis”, Google Research Award.

Co-Principal Investigator. “SCH: INT: Collaborative Research: Learning and Sensory-based Engagement, Arousal and Self-Efficacy (EASE) modeling for Adaptive Web-Empowerment Trauma Treatment”, National Science Foundation, 9/1/2014-7/31/2018.

Principal Investigator. “Advanced Driver Monitoring System”, TRAFFIC 21, 01/1/2016-01/1/2017.

Principal Investigator. “Vital Responder: Towards a Wearable Vital Signs, Ambiance Sensing and Location Monitoring Product for First Response Professionals”, ERI- CMU/Portugal Program, 09/1/2014-08/31/2019.

Co-Principal Investigator. “Modeling the Dynamics of Communication and Development”, National Institutes of Health R01 GM105004, 8/1/2013-7/31/2017.

Principal Investigator. Gift from Sony 2015.

Principal Investigator. “Automated Identity Masking”, DTFH61-14-C-00001, Federal Highway Administration, 04/1/2014-04/31/2015.

Co-Principal Investigator. “Solve it or Ignore it? The Challenge of Alignment Distortion and Creating Next Generation Automatic Facial Expression Detection”, Australian Research Council (ARC).

Co-Principal Investigator. “A Wearable System for Home-monitoring of Chronic Movement Disorders: Cost-effective Solution to Frequent Clinic Visits”, \$270K, Highmark, 07/1/2013-81/01/2015.

Gift from Adobe, \$10K, October 2013.

Principal Investigator. “Activity Recognition from Kinect”, \$150K, Samsung, 04/1/2013-12/31/2013.

Principal Investigator. “Human Pose and Motion Behavior Pattern Analysis”, \$135K, Samsung, 04/1/2012-12/31/2012.

Principal Investigator. “RI:Small: Clustering, Classification and Alignment of Time Series for Human Sensing”, \$450K, Robust Intelligence program (NSF), 09/1/2011-09/1/2014.

Co-Principal Investigator. “GM-CMU Vehicular Information Technology Collaborative Research Lab”, General Motors, \$90K/year, 01/01/2009-01/01/2014.

Co-Principal Investigator (PI: Jeff Cohn). “Automatic Facial Image Analysis”, NIMH RO1 NH096951, 04/1/2012-04/30/2017.

Principal Investigator. “Grand Challenge Data Collection”, Quality of Life Technology Center (PI: Takeo Kanade), ERC, NSF, 04/1/2008-04/30/2012.

Co-Investigator (PI: Alex Hauptmann). “Multimedia Event Detection (ALADDIN)”, IARPA, 04/1/2011-04/30/2012.

Gift from Personal Health Recording for Quality of Life, \$100K, December 2011.

Co-Principal Investigator. “Automated Methods to support the detection of depression in dementia”, NIH: 1RC1MH090021-01, \$998,721, 09/1/2009-09/1/2011..

Co-Principal Investigator. “CPS-Medium: Monitoring Human Performance with Wearable Accelerometers”, NSF:0931595, \$1,206,078, 10/1/2009-10/1/2012.

Gift from The Humane Society of the United States, \$60K, January 2009.

Principal Investigator. “Nano-Optic based Multi-Spectral CMOS Image Sensor Development”, ClairPixel, \$150K, 05/1/2009-04/30/2012.

Co-Investigator. “Facial Expression Analysis by Computer Processing”, National Institute of Mental Health, 04/1/2007-04/30/2011.

Co-Principal Investigator and PI at CMU (PI-Jeff Cohn, Upitt). “Automatic Facial Expression Recognition System”, Technology Support Working Group, \$375K, 03/1/2009-03/1/2010.

Co-Principal Investigator and PI at CMU. “Machine Learning Approaches to Hot Flash Detection”, American Federation for Aging Research, \$25K, 10/1/2008-6/1/2009.

Principal Investigator. “Computer Assisted System to Increase Speed and Reliability of Manual FACS coding”, Reallear, LLC and HSA, \$900K, 8/1/2007-8/1/2009.

Principal Investigator. “FACENORM: Normalization Plug-In For Improved Face Recognition of Non-Cooperative Individuals”, National Institute of Justice, \$250K, 7/1/2006-7/1/2007.

Gift from Department of Orthopaedic Surgery, \$10K, September 2005.

Co-Principal Investigator. “The Virtual Announcer”. Spanish PROFIT Grant, \$30K, 09/01/2003-09/01/2004.

Co-Principal Investigator. “A Vision-based Driver Fatigue Detection”, Spanish PROFIT Grant, \$15K, 09/01/2003-09/01/2004.

Books

F. De la Torre.

Component Analysis.

Gerard Medioni’s and Sven Dickinson’s computer vision series. Morgan and Claypool 2011. In preparation.

Book Chapters

- [1] M. Hoai and F. De la Torre. “Structured Prediction for Event Detection”, MIT Press volume on Advanced Structured Prediction, 2014.
- [2] J. F. Cohn and F. De la Torre(In press). “Automated face analysis for affective computing”, In R. A. Calvo, S. K. D’Mello, J. Gratch and A. Kappas (Eds.), Handbook of affective computing. New York, NY: Oxford.
- [3] F. De la Torre and J. F. Cohn,“Facial Expression Analysis”, Guide to Visual Analysis of Humans: Looking at People. Springer 2011.

- [4] F. De la Torre, "A Unification of Component Analysis Methods", *Handbook of Pattern Recognition and Computer Vision*, 4th edition, pp. 3-22, C. H. Chen (Ed.). World Scientific Publishing Co, October 2009.
- [5] R. Gross, L. Sweeney, J. Cohn, F. De la Torre and S. Baker, "Face De-Identification", *Protecting Privacy in Video Surveillance*, pp. 129-146, Senior, Andrew (Ed.), Springer, April 2009.
- [6] F. De la Torre and T. Kanade, "Discriminative Cluster Analysis". *Theory and Novel Applications of Machine Learning*, pp. 69-80, M. Er and Y. Zhou (Eds), January 2009.
- [7] E. Garcia-Cuesta, F. De la Torre, and A. J. de Castro. "Machine Learning Approaches for the Inversion of the Radiative Transfer Equation". *Advances in Computational Algorithms and Data Analysis Series: Lecture Notes in Electrical Engineering*, S. Ao, B. Rieger and S. Chen (Editors), Vol. 14, Springer 2008.

Journal Papers (under review)

- [8] X. Xiong and F. De la Torre, "Supervised Descent Method and its applications to Computer Vision", *under review in Pattern Analysis and Machine Intelligence*.
- [9] J. Zeng, W.-S. Chu, F. De la Torre, J. F. Cohn, and Z. Xiong, "Confidence Preserving Machine for Facial Action Unit Detection", *under review in Image and Vision Computing*.

Journal Papers

- [10] W.-S. Chu, F. De la Torre and J. F. Cohn, "Selective Transfer Machine for Personalized Facial Action Unit Detection", *Accepted in Pattern Analysis and Machine Intelligence*, 2016.
- [11] F. Zhou, and F. De la Torre. "Spatio-temporal Matching for Human Detection in Video", *accepted in Pattern Analysis and Machine Intelligence*, 2016.
- [12] F. Zhou, and F. De la Torre. "Factorized Graph Matching", *accepted in in Pattern Analysis and Machine Intelligence*, 2016.
- [13] L. Leon, W.-S. Chu, F. De la Torre and J. F. Cohn, "Cascade of Tasks for Facial Expression Analysis", *Accepted for publication in Computer Vision and Image Understanding*, 2016.
- [14] K. Zhao, W. -S. Chu, F. De la Torre, J. F. Cohn, H. Zhang, "Joint Patch and Multi-label Learning for Facial Action Unit and Holistic Expression Recognition", *Accepted in IEEE Transactions on Image Processing*, vol. 25, no. 8, pp. 3931-3946, August 2016
- [15] J. Zhao, L. Wang, R. Cabral, and F. De la Torre, "Feature and Region Selection for Visual Learning", *Accepted in IEEE Transactions on Image Processing*, , vol. 25, no. 3, pp. 1084-1094, March 2016 .
- [16] F. Zhou and F. De la Torre. "Canonical Time Warping", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 38, no. 2, pp. 279-294, 2016

- [17] D. Huang, R. S. Cabral, and F. De la Torre, "Robust Regression", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 38, no. 2, pp. 363-375, 2016.
- [18] R. S. Cabral, F. De la Torre, J. P. Costeira and A. Bernardino. "Matrix Completion for Weakly-supervised Multi-label Image Classification", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 37, no. 1, pp. 121-135, 2015.
- [19] J. Carlson, S. Das, F. De la Torre, J. Hodgins "Assessment Of Movement Patterns During Intubation Between Novice And Experienced Providers Using Mobile Sensors: A Preliminary, Proof Of Concept Study", *BioMed Research International*, 2015
- [20] F. Vicente, Z. Huang, X. Xiong, F. De la Torre, W. Zhang and D. Levi, "Driver Gaze Tracking and Eyes Off the Road Detection System", *IEEE Intelligent Transportation Systems Transactions and Magazine*, vol. 16, no. 4, pp. 2014-2027, 2015.
- [21] K. Abou-Moustafa, F. De la Torre, and P. F. Ferrie. "Pareto models for discriminative multiclass linear dimensionality reduction", *Pattern Recognition*, vol. 48, no. 5, pp. 1863-1877, 2015.
- [22] J. M. Girard, J. F. Cohn, and F. De la Torre. "Estimating smile intensity: A better way", *Pattern Recognition Letters*, Vol. 66, pp. 13-21, 2015.
- [23] Learning discriminative localization from weakly labeled data M. Hoai, L. Torresani, F. De la Torre, and C. Rother *Pattern Recognition*, 47(3), 1523-1534, 2014.
- [24] A. Frisch, S. Das, J. C. Reynolds, F. De la Torre, J. K. Hodgins, and J. N. Carlson. "Analysis of smart phone video footage classifies chest compression rate during simulated CPR", *The American Journal of Emergency Medicine* Vol. 32, pp. 1125-1147, 2014.
- [25] J. M. Girard, J. F. Cohn, L. Z. Jeni, M. A. Sayette and F. De la Torre. "Spontaneous facial expression in unscripted social interactions can be measured automatically", *Behavior Research Methods*, in press.
- [26] J. N Carlson, S. Das, F. De la Torre, A. Frisch, F. Guyette, J. Hodgins, and D. M. Yealy "A Novel Video Analysis System for Glottic Detection During Tracheal Intubation", *American journal of emergency medicine*, 2014.
- [27] M. H. Nguyen and F. De la Torre. "Max-Margin Early Event Detector", *International Journal of Computer Vision*, 107(2), 191-202, 2014.
- [28] M. H. Nguyen, L. Torresani, F. De la Torre, and C. Rother. "Weakly supervised discriminative localization and classification: a joint learning process", *Pattern Recognition*, 47(3), 1523-1534, 2014
- [29] L. Igual, X. Perez, S. Escalera, C. Angulo, F. De la Torre, "Continuous Generalized Procrustes Analysis", *Pattern Recognition*, 47(1), 659-671, 2014.
- [30] M. Kim and F. De la Torre. "Multiple Instance Learning via Gaussian Processes", *Data Mining and Knowledge Discovery (DMKD)*, 28(4), 1078-1106, 2014.

- [31] Y. Tian, L. Sigal, F. De la Torre and Y. Jia. “Canonical Locality Preserving Latent Variable Model for Discriminative Pose Inference”, *Image and Vision Computing (IVC)*, vol. 31, no. 3, pp. 223-230, 2013.
- [32] J. N. Carlson, S. Das, F. De la Torre, C. W. Callaway, P. E. Phrampus, J. Hodgins. “Motion capture measures variability in laryngoscopic movement during endotracheal intubation: A preliminary reporter”, *Journal of Simulation in Healthcare*, 2012
- [33] F. Zhou, F. De la Torre and J. Hodgins. “Hierarchical Aligned Cluster Analysis (HACA) for Temporal Segmentation of Human Motion”, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 35, no. 3, pp. 582-596, 2013
- [34] F. De la Torre. “A unified least-squares framework for component analysis”, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 34, no. 6, pp. 1041-1055, 2012.
- [35] L. Pan, W. Chu, J. M. Saragih and F. De la Torre. “Fast and Robust Circular Object Detection with Probabilistic Pairwise Voting (PPV)”, *IEEE Signal Processing Letters*, Volume 18 , Issue 11, pp. 639 - 642, November 2011.
- [36] J. R. Tena, F. De la Torre and I. Matthews. “Interactive Region-based Linear 3D Face Models”, *ACM SIGGRAPH*, June 2011.
- [37] Y. Zhou, F. De la Torre, J. Cohn. “Dynamic Cascades with Bidirectional Bootstrapping for Spontaneous Facial Action Unit Detection”, *IEEE Transactions on Affective Computing*, Volume 2 , Issue 2, pp. 79 - 91 , April-June 2011.
- [38] O. Deniz, G. Bueno, J. Salido and F. De la Torre. “Face Recognition using Histograms of Oriented Gradients”, *Pattern Recognition Letters*, Volume 22 , Issue 12, pp. 1598 1603 , September 2011.
- [39] D. Huang, K. Meyers, S. Henry, F. De la Torre and C. C. Horn. “Computerized detection and analysis of cancer chemotherapy-induced vomiting in a small animal model, musk shrew”, *Journal of Neuroscience Methods*, Volume 197 , Issue 2, pp. 249 258, April 2011.
- [40] R. C. Thurston, J. Hernandez, J. M. Del Rio and F. De la Torre. “Support vector machine to improve physiologic hot flash measures: Application to the ambulatory setting”, *Psychophysiology*, pp. 1-7, December 2010.
- [41] J. Gonzalez-Mora, F. De la Torre, N. Guil and E. Zapata . “Learning 3D Generic Face Models from Images”, *Image and Vision Computing*, Volume 28, Issue 7, pp. 1117 - 1129, July 2010.
- [42] M. H. Nguyen and F. De la Torre. “Metric Learning for Image Alignment”, *International Journal of Computer Vision*, Volume 88 , Issue 1, pp. 69 - 84, May 2010.
- [43] M. H. Nguyen and F. De la Torre. “Optimal Feature Selection for Support Vector Machines”, *Pattern Recognition*, Vol. 43, Issue 3, pp. 584 - 591, March 2010.

- [44] H. Hu, P. Zhang, F. De la Torre. “Face recognition using enhanced linear discriminant analysis”, *IET Computer Vision*, Vol. 14, Issue 3, pp. 195 - 208, June 2010.
- [45] J. Melenchon, F. De la Torre, E. Martinez and J. A. Montero “Emphatic Visual Speech Synthesis”, *IEEE Transactions on Audio, Speech and Language Processing*, Vol. 17, Num. 3, pp. 459 - 468. March 2009.
- [46] R. C. Thurston, K. A. Matthews, J. Hernandez and F. De la Torre. “Improving the performance of physiologic hot flash measures with support vector machines”, *Psychophysiology*, 46, 285 - 292, January 2009.
- [47] M. Nguyen, J.F. Lalonde, A. Efros and F. De la Torre. “Image-based shaving”, *Computer Graphics Forum Journal (Eurographics)*, September 2008.
- [48] E. Lopez-Vidriero, R. Costic, M. Manzano, F. De la Torre, J. Lara, F. H. Fu and M. Rodosky, “Evaluacin biomecnica del efecto del taladrado versus perforado antes de la colocacin de arpones para la ciruga artroscopica de manguito”, *Cuadernos de Artroscopia*, Vol 14, Supp 2, Num. 32, pp. 69, May 2007.
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- [174] N. Brunet, F. De la Torre and F. Perez. “Learning Good Features for Active Shape Models”, 2nd IEEE International Workshop on Subspace Methods, in conjunction with ICCV, September 2009.
- [175] E. H. Spriggs, F. De la Torre, and M. Hebert. “Temporal Segmentation and Activity Classification from First-person Sensing”, *IEEE Workshop on Egocentric Vision*, in conjunction with CVPR, June 2009.
- [176] F. De la Torre, J. Hodgins, J. Montano and S. Valcarcel. “Detailed Human Data Acquisition of Kitchen Activities: the CMU-Multimodal Activity Database (CMU-MMAC)”, CHI 2009 Workshop. Developing Shared Home Behavior Datasets to Advance HCI and Ubiquitous Computing Research, April 2009.
- [177] J. Gonzalez, R. Murthi, F. De la Torre. “Bilinear Active Appearance Models”, *Workshop on Non-rigid Registration and Tracking through Learning*, in conjunction with ICCV, October 2007.
- [178] R. Gross, L. Sweeney, F. De la Torre, S. Baker. “Model-Based Face De-Identification”, *IEEE Workshop on Privacy Research In Vision*, in conjunction with CVPR, June 2006.
- [179] F. De la Torre, C. Vallespi, P. Rybski, M. Veloso and T. Kanade. “Multiple Face Recognition from Omnidirectional Video”, *IEEE Workshop on Learning in Computer Vision and Pattern Recognition*, June, 2005.
- [180] F. De la Torre. “Automatic Learning of Appearance Face Models”, *Workshop on Recognition, Analysis and Tracking of Faces and Gestures in real-time systems*, in conjunction with ICCV, October 2001.

Unrefereed conferences

- [182] S. Das, J. Carlson, F. De la Torre, A. Fisch, F. Guyette, J. K. Hodgins and D. M. Yealy, “A novel video content analysis system for interactive video laryngoscopy”, National Association of Emergency Medicine Service Professional (NAEMSP) Annual Meeting, Bonita Springs, FL, 2013
- [183] J. Carlson, S. Das, F. De la Torre, C. Callway, P. Phrampus and J. Hodgins, “Motion Capture Measures variability in Laryngoscopic Movement During Endotracheal Intubation: A Preliminary Report”, poster presentation at the national meeting for the National Association of EMS Physicians. Tucson AZ, January 2012
- [184] D. Huang, K. Meyers, F. De la Torre, and C.C. Horn, “Development of a computer algorithm for automatic detection of cancer chemotherapy-induced vomiting in a small animal model, musk shrews”. UPCI retreat.

- [185] D. Huang, K. Meyers, F. De la Torre, and C.C. Horn, "Automatic detection of cancer chemotherapy-induced vomiting in musk shrews," The Society for the Study of Ingestive Behavior 2009
- [186] R. C. Thurston , J. Hernandez , J. M. Del Rio, F. De la Torre, K. A. Matthews. Improving the physiological measurement of hot flashes with support vector machine. Invited poster presentation. American Federation for Aging Research Annual Meeting. Santa Barbara, CA. September 2008.

Technical Reports

- (not above)[187] Z. Harchaoui, F. de la Torre, J. Cohn. Multi-Label Classification with Correlated Labels CMU Technical Report, October 2010
- [188] J. Hernandez Rivera, Z. Harchaoui, F. de la Torre. Instance-selecting regularization penalty for supervised image classification CMU Technical Report CMU-RI-TR-10-42, October 2010
- [189] F. De la Torre. "A Least-Squares Unified View of PCA, LDA, CCA and Spectral Graph Methods", *tech. report CMU-RI-TR-08-29*, Robotics Institute, Carnegie Mellon University, May, 2008.
- [190] F. De la Torre. "Coordinating Component Analysis", *tech. report CMU-RI-TR-06-08*, Robotics Institute, Carnegie Mellon University, February, 2006.

Ph.D. Advising Carnegie Mellon University

- Minh Hoai Nguyen. "Segment-based SVMs for Time Series Analysis". Carnegie Mellon University. December 2011.
- Ekaterina Spriggs (co-advised with M. Hebert). "Learning the Grammars of Human Behavior". Carnegie Mellon University. May 2014.
- Feng Zhou. " Spatial, Temporal and Spatio-Temporal Correspondence for Computer Vision", Carnegie Mellon University. September 2014.
- Ricardo Silva (co-advised with Joao Paulo Costeira and Alexandre Bernardino). "Unifying Low-rank Models for Computer Vision". Carnegie Mellon University. February 2015.
- Xuehan Xiong. "Supervised Newton Methods and its applications to computer vision", Carnegie Mellon University. October 2015.
- Vincent Chu (co-advised with Jeff Cohn). "Personalized SVM for AU-detection", Carnegie Mellon University, May 2017.
- Jayakorn Vongkulbhisal (co-advised with Joao Paulo Costeira and Alexandre Bernardino). "Low-rank models for computer vision". Carnegie Mellon University. Expected December 2017.

Ada Zhang. “Segment SVMs for Parkinson’s monitoring”. Carnegie Mellon University. Expected May 2017.

Calvin Murdoch. “Learning Optimal Representations for Visual Learning”. Carnegie Mellon University. Expected May 2018.

Dustin Axman (co-advised with Joao Paulo Cunha). “Mining ECG signals”. Carnegie Mellon University. Expected May 2019.

Master’s Advising

Carnegie Mellon University

Rajesh Murthi (MSIT program). “Face Recognition across Pose”, Carnegie Mellon University, May 2005.

Mahaneeya Raman (MSIT program). “Omnidirectional Mosaic”, Carnegie Mellon University, May 2005.

Anandan Karunanithi (MSIT program). “Wearable Multimodal Platform”, Carnegie Mellon University, May 2005.

Tomas Simon. “AU detection with segment-based SVMs”, Carnegie Mellon University, April 2010.

Javier Hernandez. “Structured Instance Selection for Robust Classification”, Carnegie Mellon University, April 2010.

Feng Zhou. “Temporal Clustering and Alignment of Human Motion”, Carnegie Mellon University, May 2011.

Zengyin Zhang. “Human Pose Estimation from Images”, Carnegie Mellon University, May 2011.

Vincent Chu. “Personalized SVM for AU-detection”, Carnegie Mellon University, May 2013.

Yang Cai. “A Prototype System for Multimedia Event Detection (MED)”, Carnegie Mellon University, April 2013.

Francisco Vicente. “Eyes-off-the-road detection”, Carnegie Mellon University, May 2015.

Zehua Huang. “ Bilinear Models for Facial Image Analysis ”, May 2015.

Shitong Yao. “ Sequential Max-Margin Classifiers ”, May 2015.

Gines Hidalgo. TBD, Carnegie Mellon University, May 2015.

Ramon Sanabria. TBD, Carnegie Mellon University, May 2015.

Other Universities

Carlos Agell. “Multimodal Diaries”, Polytechnic University, Barcelona, February 2007.

Oriol Vinyals. “Learning Kernel Expansions for Image Classification”, Polytechnic University, Barcelona, April 2007.

Sara Trujillo. "Intelligent Surveillance from Ensembles of Cameras", University of Sevilla, Sevilla, May 2007.

Manuel Quero. "Patch-based Active Appearance Models ", University of Sevilla, Sevilla, June 2007.

Coro Albeiz. "Filtered Component Analysis for Active Appearance Models". San Sebastian School of Engineering University of Navarre, Spain, May 2007.

Javier Hernandez. "Support Vector Machines for Hot Flash Detection", La Salle School of Engineering, Barcelona, June 2007.

Esteban Curras. "Automatic Segmentation of Proteomic Images", Engineering school of Gijon, Gijon, Spain. September 2007.

Tomas Simon. "Action Unit Recognition from Video", Polytechnic University of Valencia, September 2007.

Javier Montano. "Depression assessment from Video", Polytechnic University of Cartagena, January 2008.

Junhe Gan. "Tracking and Recognizing Object across Poses in Multi-view Video", Lund University, Sweden, May 2008.

Hao Wang. "Feature Selection for 3D Human Motion Analysis", Lund University, Sweden, May 2008.

Pep Beltran. "A Multimodal Database for Human Activity Recognition", La Salle School of Engineering, Barcelona, June 2008.

Francisco Javier Perez Grau. "Learning Optimal representations for face fitting", University of Sevilla, Sevilla, June 2008.

Joan Perez. "Optimal Support Vector Feature Selection for Facial Feature Detection", La Salle School of Engineering, Barcelona, September 2008.

Alex Collado. "Real-time Facial feature tracking", La Salle School of Engineering, Barcelona, September 2008.

Xavier Boix. "Discriminative Approaches for Facial Fitting", La Salle School of Engineering, Barcelona, November 2008.

Jose Maria del Rio. "Learning Temporal Models for Hot Flash Detection", La Salle School of Engineering, Barcelona, November 2008.

Ruben Garcia. "Action Unit detection", La Salle School of Engineering, Barcelona, June 2009.

Margara Tejera. "Depression assessment from Video", University of Sevilla, Sevilla, June 2009.

Daniel Casas. "Learning to track", Polytechnic University, Barcelona, June 2009.

Mariate Ortiz. "Learning 3D face models". Polytechnic University of Cartagena, September 2009.

Ricard Forcada. “Multimodal Data Collection”. La Salle School of Engineering, Barcelona, June 2010.

Jose Antonio Gil. “Grand Challenge Data Collection”. Technun, Navarra, Spain, June 2010.

Alberto Gil. “Quality of Life Technologies”. Technun, Navarra, Spain, June 2011.

Pablo Navarro. “Driver fatigue detection”. University of Valladolid, Spain, June 2013.

**Postdoctoral
Advising**

Xavier Perez, 01/15-Present
Stanislav Panev, 07/15-Present
Joan Navarro, 07/15-06/16
Ji Zhao, 08/12-08/13
Samarjit Das, 07/09-07/11 (co-advised with Jessica Hodgins)
Dong Huang, 07/09-present
Karim T. Abou-Moustafa, 09/11-05/12
Zad Harchaoui, 03/09-02/10 (co-advised with Jeff Cohn)
Minyoung Kim, 09/09-02/10
Laura Igual, 02/09-06/09

**Hosting
Visiting
Professors**

- Jinsong Han, 08/15-Present
- Deyu Meng, 08/12-08/13
- Petia Georgieva, 08/12-12/12
- Ying Chen, 03/09-02/10
- Xuelei Hu (co-advised with Jeff Schneider), Associate Professor, Nanjing University of Science and Technology. 04/09-02/10
- Tae-Kyun Kim. College fellow. Cambridge University. 06/09-09/09
- Maria Gloria Bueno (co-advised with Jeff Cohn), Assistant Professor, University of Castilla la Mancha, 01/09-09/09
- Oscar Deniz, Assistant Professor, University of Castilla la Mancha, 01/09-08/09
- Nicolas Guil, Professor in the CS department, University of Malaga, Spain, 06/07-08/07

**Hosting
Visiting
Scholars**

Xavi Martin, Carlos Vallespi, Jordi Casovila, Pep Beltran, Oriol Vinyals, Carlos Agell, Sara Trujillo, Coro Arbelaz, Guillermo Gonzalez, Manuel Quero, Esteban Curras, Nuria Brunet, Esteban Cuesta, Hao Wang, Junhe Gan, Jose Maria Cabero, Ricardo Cervera, Javier Montano, Maria Teresa Ortin, Jose Maria del Rio, Dan Casas, Margara Tejera, Moritz Tenorth, Ruben Garca, Jose Gonzalez, Joan Campoy, Gemma Roig, David Monzo, Xavier Boix, Ricardo Cervera, Ricard Forcada, Jose Antonio Gil, Ruben Nicolas, Yan Tian, Yuan Shi, Jesus Mora, Yunfeng Zhu, Wei Liu, Karim T. Abou-Moustafa, Markus Storer, Sergio Valcarcel, Nayoung Lee, Lili Pan, Jesus Bonache, Yang Liu, Qiulei Han, Feng Xie, Fernando Batlle, Vincent Chu, Alberto Gil, Risheng Liu, Danny Lan, Xingguo Li, Hao Ji, Enrique Gonzalez, Pengtao Xie, Yixiong Liang, Aurelio Ponz, Ang Li, Zhiding Yu, Manuel Lopez Antequera, Breogan Amoedo, Francisco Vicente Carrasco, Shitong Yao, Pablo Navarro Sanz, Yingying Zhu, Liantao Wang, Yi Wang, Zehua Huang, Leon Ding, Santi Ortega Avila, Marc Estruch Tena, Julio Ortiz, Xavier Perez, Miguel Angel Bautista, Albert Pumarola, Longfei Han, Dingwen Zhang, Francisco Fernandez.

**Thesis
Committee
Member**

Carnegie Mellon University

Ralph Gross. "Face De-Identification using Multi-Factor Active Appearance Models", Carnegie Mellon University, January 2008.

Alvaro Collet. "Object recognition and pose estimation in household environments". Carnegie Mellon University, April 2009.

David Bradley. "Learning in Modular Systems". Carnegie Mellon University, September 2009.

Marius Leordeanu. "Pairwise Constraints for Matching, Perceptual Grouping and Recognition", Carnegie Mellon University, July 2009.

David Duke. "Intelligent Diabetes Assistant", Carnegie Mellon University, January 2010.

Ahmed Bilal. "Feature-less Computer Vision for Classification and Alignment", Carnegie Mellon University, June 2010.

Sarah Aboutalib. "Context-Dependent Multi-Cue Object Recognition", Carnegie Mellon University, December 2010.

Tony Qi Wu. "Vision-based clear path detection through the use of in-vehicle camera", Carnegie Mellon University, November 2012.

Seung-il Huh. "Cellular Event Detection in Time-lapse Live Cell Microscopy Images", Carnegie Mellon University, December 2012.

Yuandong Tian. "Theory and Practice of Globally Optimal Deformation Estimation", Carnegie Mellon University", September 2013.

Susana Brandao. "Heat Based Descriptions for Multiple 3D view Object Recognition", Carnegie Mellon University", June 2015.

Tomas Simon. "Forecasting Human Motion in Social Situations", Carnegie Mellon University", June 2016.

John Lee. "Understand Visual Appearance of Road Scene using Monocular Camera", Carnegie Mellon University", June 2016.

Michael Taylor. "Joule Counting Correction for Electric Vehicles using Artificial Neural Networks", Carnegie Mellon University", December 2015.

Other Universities

Jose Gonzalez. "Face Modeling Across Pose", University of Malaga (Spain). December 2008.

Michael Van Den Bergh. "Visual Body Pose Analysis for Human-computer Interaction", ETH Zurich, Dept. of Information Technology and Electrical Engineering, January 2010.

Mark Cox. "Unsupervised Alignment of Thousands of Images", Queensland University of Technology, June 2010.

Markus Storer. "Shape and Appearance Based Analysis of Facial Images for Assessing ICAO Compliance", Technical University of Graz, December 2010.

Jeff Girard. “Facial Expression Dynamics in Major Depressive Disorder: Duration and Velocity of Smiles and Brow-Raises in MDD and SAD”, University of Pittsburgh, May 2012 (M.S. program).

Ijaz Akhter, “Modeling Spatiotemporal Regularity in Deformable Structures”, LUMS School of Science and Engineering, Pakistan, October 2012.

Shahriar Shariat Talkhoonche. “Robust Time-Series Retrieval Using Adaptive Segmental Alignment”, Rutgers University, New Jersey, June 2013.

Richard Roberts, “Optical Flow Templates for Mobile Robot Environment Understanding and Navigation”, Georgia Tech University, May 2014.

Gayan Sadeep Jayasumana Hirimbura Matara Kankanamge, “Kernel Methods on Riemannian Manifolds”, Australian National University, October 2014.

Nicolaou, Michael, “Machine Learning for Automatic Analysis of Affective Behaviour”, Imperial College, November 2014.

Mayank Bansal, “Disparate view matching”, University of Pennsylvania, December 2014.

**Ph. D.
Qualifiers**

Susana Brandao, April 15th 2012 (ECE).

Albal Priti, April 18th 2012 (ECE).

Stephen Siena, April 26th 2013 (ECE).

Zhiding Yu, April 16th 2013 (ECE).

Teaching

Courses Taught at Carnegie Mellon

- Guest lectures in Human Motion Modeling and Analysis, December 2012.
- Guest lectures in Machine Learning for Signal Processing, September (2009-2013).
- Guest lectures in Artificial Intelligence for Health and Sustainability, April 2012.
- Computer Vision seminars for summer interns, August 2010.
- Guest lecture in Data Visualization, October 2009.

Courses Taught at La Salle School of Engineering (Barcelona)

- Digital Image Processing (1997-1998, 1998-1999, 1999-2000)
- Computer Vision (2000-2001)
- Signal Processing (1998-1999)
- Calculus (1996-2000)
- Numerical Calculus (1995-1996, 1996-1997, 2000-2001)
- Algebra (2000-2001)

**Popular
Press
Coverage**

2000 Fast Forward, TV3, Barcelona, “PC’s que reconeixen l’expressio facial” (PC’s which recognize facial expressions), Program on TV, April 2001.

Patents

”System and Method for Detecting and Tracking Facial Features in Images”, Application US 14596148

”Vehicle Operator Monitoring System and Method”, Application US P029136-RD-SDJ

”Driver gaze detection system”, Application US 61/754134

”Eyes-off-the-road classification with glasses classifier”, Application US61/754515

”Interactive Region-Based Linear 3D Face Models”, Application US13/089,675

Software Artifacts

Robust Principal Component Analysis.

<http://www.salleurl.edu/~ftorre/papers/rpca/rpca.zip>

Feature Selection for SVM.

<http://www.robots.ox.ac.uk/~minhhoai/downloads.html>

Joint Localization and Classification.

<http://www.robots.ox.ac.uk/~minhhoai/downloads.html>

Max-Margin Early Event Detectors.

<http://www.robots.ox.ac.uk/~minhhoai/projects/mmed.html>

Temporal Commonality Discovery. 100 downloads since May 2013

http://humansensing.cs.cmu.edu/wschu/project_tcd.html

Aligned Cluster Analysis (ACA). 801 downloads since May 2011.

http://www.f-zhou.com/tc_code.html

Canonical Time Warping. 915 downloads since May 2011.

http://www.f-zhou.com/ta_code.html

Generalized Time Warping. 303 downloads since May 2012.

http://www.f-zhou.com/ta_code.html

Factorized Graph Matching. 1150 downloads since May 2012.

http://www.f-zhou.com/gm_code.html

IntraFace. 5000 downloads since June 2013.

<http://www.humansensing.cs.cmu.edu/intraface>

Show Case

Demonstrated IntraFace. *IEEE Automatic Face and Gesture Recognition 2015*.

Demonstrated IntraFace. *CVPR 2013*.

Demonstrated real-time face detection and tracking in omnidirectional video. *Neural Information Processing Systems*, Vancouver 2004.

Demonstrated real-time omnidirectional video. *International Conference on Multimodal Interfaces*, State College, PA 2004.

Permanent exhibition on facial expression analysis in the Carnegie Science Center (Pittsburgh). It is part of the roboworld exhibit.

Databases

I have co-lead the effort to collect detailed multimodal data of natural human activity. To record human behavior in settings that are as natural as possible, we have installed a fully operable kitchen and captured audio, video, accelerometer/gyroscopes, and motion capture data of 40 individuals cooking five different meals (brownies, salad, pizza, sandwich, and scrambled eggs) from start to finish. For more information see [http : //kitchen.cs.cmu.edu/](http://kitchen.cs.cmu.edu/).

Invited Colloquium, Workshop Presentations

“Vision-based systems for driver monitoring and de-identification”,
Workshop on Anonymization, Gothenburg, September 2015.

“Larry Davis”,
Larry Davis 60’s birthday, Boston, June 2015.

“Human Sensing”,
Amazon, February 2015.

“Computational Face”,
Workshop on Spontaneous Facial Behavior Analysis, in conjunction with ECCV 2014, Zurich, September 2014.

“Human Sensing”,
Workshop on ChaLearn Looking at People: pose recovery, action/interaction, gesture recognition, in conjunction with ECCV 2014, Zurich, September 2014.

“Spatio-Temporal Matching for Human Pose Detection”,
ECCV 2014 Area Chair Workshop, Zurich, June 2014.

“Unsupervised and weakly supervised learning for human activity analysis”,
Workshop on Recent Advances in Computer Vision, Daejeon (Korea), September 2012.

“Matrix Completion for Image Segmentation”,
ACCV 2012 Area Chair Workshop, Seoul, September 2012.

“Facial Image Analysis”,
Samsung, Korea, September 2012.

“Unsupervised and weakly supervised discovery of events for human sensing”,
Workshop on Gesture Recognition (CVPR), Providence, June 2012.

“Metric Learning for Image Alignment”,
Workshop on Kernels and Distances for Computer Vision, Barcelona, November 2011.

“Facial Expression Analysis”,
NASA/GSFC IS&T Colloquium, October 2010.

“Unsupervised and Weakly-Supervised Event Discovery from Video (and Audio)”,
Workshop on Detection and Identification of Rare Audiovisual Cues, September 2010.

“Local Minima Free Active Appearance Models”,
Workshop on Recent Trends in Computer Vision, University of Maryland, February 2010.

“Computer vision for intelligent scene analysis and IED detection: A review to the past and a look to the future”,
NATO Defense Against Terrorism, November 2006.

“Multi-Modal Biometrics at a Distance: A Review of the Past and a Look to the Future”,
MITRE, August 06.

“The Application of Pattern Recognition Techniques and Inference to Threat Prediction”,
Great Lakes Photonics Symposium, June 2004.

“Multilinear models for Computer Vision”,
Eastern North American Region of the International Biometric Society (ENAR),
March 2004.

**Invited
University
Talks**

“Unifying bilinear and nuclear norm approaches for matrix factorization”,
Tech. Univ. of Graz, Institute for Computer Graphics and Vision, December 2013.

“Component Analysis”,
Georgia Tech., Computer Science, November 2013.
Idiap Research Institute, Martigny, August 2013.
Toyota Technology Institute, Chicago, July 2013.
University of Rutgers, Dept. of Computer Science, July 2013.
John Hopkins University, Dept. of Electrical Engineering, May 2013.
Tech. Univ. of Graz, Institute for Computer Graphics and Vision, May 2013.
ETH Zurich, Dept. of Information Technology and EE, May 2013.
University of Maryland, Dept. of Computer Science, May 2013.
University of Manchester, Dept. of Electrical Engineering, May 2013.
Pompeu University, Barcelona, April 2013.
Imperial College, Dept. of CS, April 2013.
Queen Mary and Westfield College. Uni. of London, Dept. of CS, April 2013.
Oxford University, Dept. of Electrical Engineering, April 2013.
Birmingham University, Dept. of Electrical Engineering, April 2013.
Ohio State University, Dept. of CS, April 2013.
West Virginia University, Dept. of CS and EE, April 2013.

“Human Sensing”,

Instituto Superior Tecnico, Dept. of EE and CS, Portugal, July 2009.
Ohio State University, Dept. of CS, November 2009.
University of Pittsburgh, Dept. of CS, November 2009.
Stony Brook, Dept. of CS, NY, December 2009.
General Electric, NY, December 2009.
Rensselaer Polytechnic Institute, Dept. of CS, NY, December 2009.
Tech. Univ. of Graz, Institute for Computer Graphics and Vision, January 2010.
University of Ljubljana, Computer and Information Science, January 2010.
Technical University of Munich, Dept. of CS, January 2010.
EPFL, School of Computer and Communication Science, January 2010.
ETH Zurich, Dept. of Information Technology and EE, January 2010.
Bonn University, Institut für Numerische Simulation, January 2010.
TU Darmstadt, Dept. of CS, January 2010.
University of Florida, Dept. of Computer and Information Science and Engineering, February 2010.
University of Central Florida, Dept. of CS, February 2010.
University of Maryland, Dept. of Computer Science, March 2010.
University of Pennsylvania, Dept. of Computer Science, March 2010.
West Virginia University, Dept. of CS and EE, March 2010.
University of Rutgers, Dept. of Computer Science, March 2010.
The Courant Institute of Mathematical Sciences, NYC, March 2010.
Harvard University, School of Engineering and Applied Science, April 2010.
Boston University, Dept. of Computer Science, April 2010.
MIT, Computer Science and Artificial Intelligence Laboratory, April 2010.
UoC-SD, Computer Science and Engineering, April 2010.
UCLA, Computer Science, April 2010.
USC, Institute for Robotics and Intelligence Systems, April 2010.
USC, Multimodal Communication and Computation Laboratory Institute for Creative Technologies, April 2010.
Stanford, Computer Science, April 2010.
University of Berkeley, Computer Science, April 2010.
University of Santa Barbara, Computer Science, April 2010.
Google, Mountain view, CA, April 2010.
Microsoft, Mountain view, CA, April 2010.
Georgia Tech., Computer Science, April 2010.
University of Toronto, Computer Science, May 2010.
Cornell University, Computer Science, May 2010.
Hebrew University, Computer Science, June 2010.
Columbia University, Statistics, September 2010.
Stevens Institute, Computer Science, October 2010.
Toyota Technology Institute, Chicago, October 2010.
CSIRO ICT Center, Brisbane, March 2011.
NICTA, Canberra, March 2011.
Max Planck Institute, Tübingen, June 2011.
Universidad de Barcelona, Barcelona, November 2011.
Computer Vision Center, Barcelona, November 2011.

“Learning representations for Human Sensing”,
Google, NYC, February 2008.

General Electric, NY, February 2008.
IBM, NYC, Feb. 2008.
ETH Zurich, Dept. of Information Technology and EE, September 2008.
Imperial College, Dept. of CS, September 2008.
Queen Mary and Westfield College. Uni. of London, Dept. of CS, September 2008.
Carnegie Mellon University, Dept. of Psychology, October 2008.
Telefonica, Spain, December 2008.

“Learning the representation for modeling, classification and clustering problems with energy-based component analysis methods”,

University of Pennsylvania, Dept. of Computer Science, April 2007.
University of Maryland, Dept. of Computer Science, April 2007.
Brown University, Dept. of Computer Science, April 2007.
Carnegie Mellon University, Dept. of Mathematical Sciences, April 2007.
Pompeu Fabra, Dept. of Electrical Engineering, January 2007.

“Subspace methods for classification, clustering and modeling high dimensional data”.

Carnegie Mellon University, Dept. of Biological Sciences, Feb. 2006.

“Component Analysis for Multimodal Diaries”,

University of Pennsylvania, Dept. of Computer Science, May 2005.
Siemens, New Jersey, May. 2005.
Columbia University, Dept. of Computer Science, May 2005.
University of Maryland, Dept. of Computer Science, May 2005.
Toyota Technology Institute, Chicago, May 2005.
Brown University, Dept. of Computer Science, May 2005.
Ohio State University, Dept. of Computer Science, May 2005.

“Extended Linear models for Computer Vision”,

FAMU-FSU, College of Engineering, January 2003.

“Robust parameterized subspace learning”,

Queen Mary and Westfield College. Uni. of London, Dept. of CS, Sept. 2001.
Oxford University, Dept. of Electrical engineering, September 2001.
University of Dundee, Dept. of Computer Science, December 2001.
University College London, Gatsby Computational Neuro. Unit, Dec. 2001.
Boston University, Dept. of Computer Science, April 2002.
Carnegie Mellon University, Robotics Institute, April 2002.