

# Michael Villamizar

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**Address** Idiap Research Institute  
1920 Martigny - Switzerland  
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**Date of Birth** 28<sup>th</sup> September 1981  
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## Research Interests

Computer vision, machine learning, artificial intelligence and robotics.

## Software Skills

Python, TensorFlow, Keras, Matlab, C++, OpenCV, Blender, ROS.

## Professional Experience

- 2016-Present** Postdoctoral Researcher - Idiap Research Institute
- 2012-2016** Postdoctoral Researcher - Institut de Robòtica i Informàtica Industrial (CSIC-UPC)  
Spanish National Research Council (CSIC) - Universitat Politècnica de Catalunya (UPC)
- 2004-2012** PhD Researcher - Institut de Robòtica i Informàtica Industrial (CSIC-UPC)  
Spanish National Research Council (CSIC) - Universitat Politècnica de Catalunya (UPC)

## Education

- 2004-2012** PhD in Computer vision and robotics - Universitat Politècnica de Catalunya (UPC)  
Barcelona - Spain
- 1999-2004** Mechatronics Engineering - Universidad de San Buenaventura  
Bogotá - Colombia

## Research Projects

- 2020-present** GSS - Gaze tracking on screens  
The Ark - Switzerland
- 2019-present** ADVANCe - Augmented dialogue tool based on verbal and non-verbal behavior computing  
Innovation Promotion Agency - CTI - Switzerland
- 2018-2019** Adatis: Optimisation du Controle Qualite  
The Ark - Switzerland
- 2017-2019** Unicity: 3D scene understanding through machine learning to secure entrance zones  
Innovation Promotion Agency - CTI - Switzerland
- 2016-2018** VIEW-2: Visibility Improvement for Events Webcasting  
Innovation Promotion Agency - CTI - Switzerland

- 2013-2016** ViSen: Visual Sense, Tagging visual data with semantic descriptions  
(PCIN-2013-047) - European project
- 2014-2016** Robot-Int-Coop: Robot-Human Interaction, Cooperation and Learning in Urban Areas  
(DPI2013-42458-P) - National project - Spain
- 2011-2015** ARCAS: Aerial Robotics Cooperative Assembly System  
(FP7-ICT-2011-7-287617) - European project
- 2011-2014** RobTaskCoop: Cooperación robots humanos en áreas urbanas  
(DPI2010-17112) - National project - Spain
- 2007-2012** MIPRCV: CONSOLIDER-INGENIO 2010 Multimodal interaction in pattern recognition and computer vision  
(CSD 2007-00018) - National project - Spain
- 2006-2009** URUS: Ubiquitous networking robotics in urban settings  
(IST-FP6-STREP-045062) - European project
- 2005-2006** NRS: Research atelier network robot systems  
(NoE-507728, RA) - European project

## Research Visits

- 2010** Departement Elektrotechniek (ESAT) - Katholieke Universiteit Leuven  
Advisors: Prof. Luc Van Gool and Dr. Helmut Grabner  
Leuven - Belgium

## Students Supervision

### Master Students

- 2015-2016** Alejandro Hernandez Ruiz, Online and active object recognition methods for human-robot interaction, Universitat Politècnica de Catalunya (UPC), Barcelona, Spain  
Co-Advisor: Prof. Rene Alquezar
- 2014-2015** Antonio Rubio Romano - 3D pose estimation using convolutional neural networks  
Universitat Politècnica de Catalunya (UPC), Barcelona, Spain  
Co-Avisor: Dr. Francesc Moreno Noguera

### Awards

- 2016** Diploma of the Universitat Politècnica de Catalunya  
In recognition to the Best Poster Award (2015)  
Barcelona, Spain, 2016
- 2015** Best Poster Award  
Iberian Conference on Pattern Recognition and Image Analysis (IBPRIA)  
Santiago de Compostela, Spain, 2015
- 2015** Diploma of the Universitat Politècnica de Catalunya  
In recognition to the Best Computer Vision Paper Award (2014)  
Barcelona, Spain, 2015
- 2014** Best Computer Vision Paper Award  
Jornadas de Automática  
Valencia, Spain, 2014

## Summer/Autumn Schools

- 2015** II Autumn School on Deep Learning  
Organized by University of Valencia  
Topics: Deep learning  
Valencia, Spain, November 2015
- 2008** International Computer Vision Summer School (ICVSS)  
Organized by University of Cambridge and University of Catania  
Topics: Reconstruction and recognition  
Sicily, Italy, June 2008

## Languages

Spanish (native), English (good), Catalan (basic), French (basic)

## Publications

### Journal Articles

- 2020** WatchNet++: Efficient and accurate depth-based network for detecting people attacks and intrusion  
**M. Villamizar**, A. Martinez-Gonzalez, O. Canevet and J.M Odobez  
Machine Vision and Applications (MVAP)
- 2019** Multi-scale sequential network for semantic text segmentation and localization  
**M. Villamizar**, O. Canevet and J.M Odobez  
Pattern Recognition Letters (PRL)
- 2019** Efficient Convolutional Neural Networks for Depth-Based Multi-Person Pose Estimation  
A. Martinez-Gonzalez, **M. Villamizar**, O. Canevet and J.M Odobez  
IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
- 2018** Online Learning and Detection of Faces with Low Human Supervision  
**M. Villamizar**, A. Sanfeliu and F. Moreno-Noguer  
The Visual Computer Journal (TVCJ)
- 2017** Boosted Random Ferns for Object Detection  
**M. Villamizar**, J. Andrade-Cetto, A. Sanfeliu and F. Moreno-Noguer  
IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)
- 2017** Teaching Robot's Proactive Behavior using Human Assistance  
A. Garrell, **M. Villamizar**, F. Moreno-Noguer and A. Sanfeliu  
International Journal of Social Robotics (IJSR), 2017
- 2016** Random Clustering Ferns for Multimodal Object Recognition  
**M. Villamizar**, A. Garrell, A. Sanfeliu and F. Moreno-Noguer  
Neural Computing and Applications (NCAA), 2016
- 2016** Interactive Multiple Object Learning with Scanty Human Supervision  
**M. Villamizar**, A. Garrell, A. Sanfeliu and F. Moreno-Noguer  
Computer Vision and Image Understanding (CVIU), 2016
- 2012** Bootstrapping Boosted Random Ferns for Discriminative and Efficient Object Classification  
**M. Villamizar**, J. Andrade-Cetto, A. Sanfeliu and F. Moreno-Noguer  
Pattern Recognition, 2012

### Book Chapters

- 2019** Robust Perception for Aerial Inspection: Adaptive and On-Line Techniques  
**M. Villamizar** and A. Sanfeliu  
Aerial Robotic Manipulation  
Springer Berlin Heidelberg, pp. 261-273, 2019
- 2013** Robot Interactive Learning through Human Assistance  
G. Ferrer, A. Garrell, **M. Villamizar**, I.Huerta and A. Sanfeliu  
Multimodal Interaction in Image and Video Applications  
Springer Berlin Heidelberg, pp. 185-203, 2013
- 2007** Object Recognition  
J. Andrade-Cetto and **M. Villamizar**  
Wiley Encyclopedia of Electrical and Electronics Engineering [Book Chapter]  
John Wiley and Sons, p. 1-28, 2007

### PhD Thesis

- 2012** Efficient Approaches for Object Class Detection  
**M. Villamizar**  
Barcelona, Spain, September 2012

### Conference Articles

- 2020** Residual Pose: A Decoupled Approach for Depth-Based 3D Human Pose Estimation  
A. Martinez-Gonzalez, **M. Villamizar**, O. Canevet and J.M Odobez  
International Conference on Intelligent Robots and Systems (IROS)  
Las Vegas, USA, October 2020
- 2018** WatchNet: Efficient and Depth-based Network for People Detection in Video Surveillance Systems  
**M. Villamizar**, A. Martinez-Gonzalez, O. Canevet and J.M Odobez  
International Conference on Advanced Video and Signal-based Surveillance (AVSS)  
Auckland, New Zealand, November 2018
- 2018** UNICITY: A depth maps database for people detection in security airlocks  
J. Dumolin, O. Canevet, **M. Villamizar**, H. Nunes, E. Mugellin, F. Moscheni, and J.M Odobez  
International Conference on Advanced Video and Signal-based Surveillance Workshop (AVSSW)  
Auckland, New Zealand, November 2018
- 2018** Real-time Convolutional Networks for Depth-based Human Pose Estimation  
A. Martinez-Gonzalez, **M. Villamizar**, O. Canevet and J.M Odobez  
International Conference on Intelligent Robots and Systems (IROS)  
Madrid, Spain, October 2018
- 2018** Investigating Depth Domain Adaptation for Efficient Human Pose Estimation  
A. Martinez-Gonzalez, **M. Villamizar**, O. Canevet and J.M Odobez  
European Conference on Computer Vision Workshop (ECCVW)  
Munich, Germany, September 2018
- 2017** Aerial Social Force Model: A New Framework to Accompany People Using Autonomous Flying Robots  
A. Garrell, L. Garza-Elizondo, **M. Villamizar**, F. Herrero and A. Sanfeliu  
International Conference on Intelligent Robots and Systems (IROS)  
Vancouver, Canada, September 2017

- 2015** Real Time People Detection Combining Appearance and Depth Image Spaces using Boosted Random Ferns  
V. Vaquero, **M. Villamizar** and A. Sanfeliu  
ROBOT'2015: Iberian Robotics Conference  
Lisbon, Portugal, November 2015
- 2015** Modeling Robot's World with Minimal Effort  
**M. Villamizar**, A. Garrell, A. Sanfeliu and F. Moreno-Noguer  
International Conference on Robotics and Automation (ICRA)  
Seattle, USA, July 2015
- 2015** Efficient Monocular Pose Estimation for Complex 3D Models  
A. Rubio, **M. Villamizar**, L. Ferraz, A. Penate-Sanchez, A. Ramisa, E. Simo-Serra, A. Sanfeliu and F. Moreno-Noguer  
International Conference on Robotics and Automation (ICRA)  
Seattle, USA, July 2015
- 2015** Multimodal Object Classification using Random Clustering Trees  
**M. Villamizar**, A. Garrell, A. Sanfeliu and F. Moreno-Noguer  
Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA)  
Santiago de Compostela, Spain, June 2015
- 2014** Fast Online Learning and Detection of Natural Landmarks for Autonomous Aerial Robots  
**M. Villamizar**, A. Sanfeliu and F. Moreno-Noguer  
International Conference on Robotics and Automation (ICRA)  
Hong Kong, July 2014
- 2014** Estimacion monocular y eficiente de la pose usando modelos 3D complejos  
A. Rubio, **M. Villamizar**, L. Ferraz, A. Penate-Sanchez, A. Sanfeliu and F. Moreno-Noguer  
XXXV Jornadas de Automatica  
Valencia, Spain, September 2014
- 2013** Proactive Behavior of an Autonomous Mobile Robot for Human-Assisted Learning  
A. Garrell, **M. Villamizar**, F. Moreno-Noguer and A. Sanfeliu  
International Symposium on Robot and Human Interactive Communication (IEEE RO-MAN)  
Gyeongju, Korea, August 2013
- 2012** Online Human-Assisted Learning using Random Ferns  
**M. Villamizar**, A. Garrell, A. Sanfeliu and F. Moreno-Noguer  
International Conference on Pattern Recognition (ICPR)  
Tsukuba, Japan, November 2012
- 2011** Efficient 3D Object Detection using Multiple Pose-Specific Classifiers  
**M. Villamizar**, H. Grabner, J. Andrade-Cetto, L. Van Gool, A. Sanfeliu and F. Moreno-Noguer  
British Machine Vision Conference (BMVC)  
Dundee, UK, September 2011
- 2011** Detection Performance Evaluation of Boosted Random Ferns  
**M. Villamizar**, F. Moreno-Noguer, J. Andrade-Cetto and A. Sanfeliu  
Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA)  
Las Palmas de Gran Canaria, Spain, June 2011
- 2010** Efficient Rotation Invariant Object Detection using Boosted Random Ferns  
**M. Villamizar**, F. Moreno-Noguer, J. Andrade-Cetto and A. Sanfeliu  
Conference on Computer Vision and Pattern Recognition (CVPR)  
San Francisco, USA, June 2010
- 2010** Shared Random Ferns for Efficient Detection of Multiple Categories  
**M. Villamizar**, F. Moreno-Noguer, J. Andrade-Cetto and A. Sanfeliu  
International Conference on Pattern Recognition (ICPR)  
Istanbul, Turkey, August 2010

- 2010** Comparative Analysis for Detecting Objects Under Cast Shadows in Video Images  
J. Scandaliaris, **M. Villamizar** and A. Sanfeliu  
International Conference on Pattern Recognition (ICPR)  
Istanbul, Turkey, August 2010
- 2009** Combining Color-Based Invariant Gradient Detector with HOG Descriptors  
for Robust Image Detection in Scenes Under Cast Shadows  
**M. Villamizar**, J. Scandaliaris, J. Andrade-Cetto and A. Sanfeliu  
International Conference on Robotics and Automation (ICRA)  
Kobe, Japan, May 2009
- 2009** Local Boosted Features for Pedestrian Detection  
**M. Villamizar**, A. Sanfeliu and J. Andrade-Cetto  
Iberian Conference on Pattern Recognition and Image Analysis (IBPRIA)  
Povoa de Varzim, Portugal, June 2009
- 2007** Robust Color Contour Object Detection Invariant to Shadows  
J. Scandaliaris, **M. Villamizar**, J. Andrade-Cetto and A. Sanfeliu  
Robust Color Contour Object Detection Invariant to Shadows  
Vina del Mar - Valparaiso, Chile, November 2007
- 2007** Unidimensional Multiscale Features for Efficient Rotated Object Detection  
Under Mild Occlusions  
**M. Villamizar**, A. Sanfeliu and J. Andrade-Cetto  
Iberian Conference on Pattern Recognition and Image Analysis (IBPRIA)  
Girona, Spain, June 2007
- 2006** Computation of Rotation Local Invariant Features Using the Integral Image  
for Real Time Object Detection  
**M. Villamizar**, A. Sanfeliu and J. Andrade-Cetto  
International Conference on Pattern Recognition (ICPR)  
Hong Kong, China, August 2006
- 2006** Orientation Invariant Features for Multiclass Object Recognition  
**M. Villamizar**, A. Sanfeliu and J. Andrade-Cetto  
Iberoamerican Congress on Pattern Recognition (CIARP)  
Cancun, Mexico, November 2006
- 2006** Computo de Características Invariantes a la Rotación para el Reconocimiento  
de Distintas Clases de Objetos  
**M. Villamizar**, A. Sanfeliu and J. Andrade-Cetto  
Jornadas de Automatica  
Almeria, Spain, September 2006

## Press

- 2020** Radio Télévision Suisse (RTS) [Television]  
Mise au Point: Algorithmes sexistes, Martigny, Switzerland, 18/10/2020
- 2015** TVE [Television]  
TVE - L'informatiu, Barcelona, Spain, 28/02/2015
- 2014** El Periódico [Newspaper]  
El Periódico (Ed. Català) Sociedad, Barcelona, Spain, 17/02/2014
- 2012** El Mundo [Newspaper]  
El Mundo (Ed. Catalunya) Innovadores, Barcelona, Spain, 23/03/2012

## Additional Links

<b>Citations</b>	Google scholar [h-index: 12]
<b>Videos</b>	Youtube [about 20K views]
<b>Videos</b>	Youtube
<b>Code</b>	Bitbucket [18 algorithms]