German Ros

Contact Details

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Education

2011–Summer 2016* **PhD in Computer Vision**, *Computer Vision Center – Universitat Autonoma de Barcelona*, Spain.

2011–2012 **MSc in Computer Vision and Artificial Intelligence**, *Universitat Autonoma de Barcelona*, Spain.

2010–2011 **MSc in Computer Vision and Image Analysis**, *Kingston University of London*, UK, *1st class.*

2005–2010 **BSc in Computer Science (Hons.)**, *University of Murcia*, Spain, *1st class.*

Patents

2016 **Scene Recognition Apparatus for Autonomous Vehicles**, *Pending*, Toshiba Research Corporation, main intellectual author.

Industrial Projects

2015 **Do I Fit? (patent pending)**, *Volkswagen–SEAT–CVC*, Recognition systems for urban environments, (Project co-leader).

Research Projects

2016– **ACDC: Automated and Cooperative Driving in the City**, *CVC-MINECO, SPAIN*, Learning Algorithms for Urban Scene Understanding, Researcher.

2012–2015 **eCo-DRIVERS: Ecological Cooperative Driver and Road Intelligent Visual Exploration for Route Safety**, *CVC-MINECO, SPAIN*, Advanced Automatic Systems for Visual Perception in Vehicles, Researcher.

Research Experience

2016 **Research intern**, *Toshiba Research & Development Center*, Interactive and Media Laboratory, Automotive division, Kawasaki, Japan.
Novel Training methods for Deconvolutional Networks; under the supervision of Dr. Watanabe-san

2015 **Research intern**, *Toshiba Research Lab Cambridge*, Cambridge, UK.
Deep Semantic Segmentation for Driverless cars; under the supervision of Dr. Pablo Alcantarilla and Dr. Bjorn Stenger

2014–Ongoing **Research collaborator**, *Applied Mathematics Group*, University of Murcia, Spain.
Manifold Optimization techniques for Robust Decompositions;Regular collaboration with Dr. Julio Guerrero

2014 **Research visitor**, *Universite Catholique de Louvain (UCL)*, Louvain, Belgium.
Short visit hosted by Dr. Laurent Jacques

2013–2014 **Research visitor**, *NICTA, Canberra Research Lab*, Canberra, Australia.
Robust Decompositions for Outlier Detection in Urban Visual Odometry; under the supervision of Dr. Jose Alvarez

2013 **Research visitor**, *Institute of Measurement and Control Technology (MRT)*, Karlsruhe Institute of Technology, Karlsruhe, Germany.
Robust Lie-Averaging for Fast pose Initialization; under the supervision of Prof. Christoph Stiller

2010–2011 **Research visitor**, *Robotic Vision Team*, Kingston University, London, UK.
Visual SLAM for indoors Robots; under the supervision of Prof. Paolo Remagnino

2010–2011 **Research visitor**, *Human Body Motion Group*, Kingston University, London, UK.
Fully Articulated Pose-hand Recovery; under the supervision of Dr. Jesus Martinez-del-Rincon

2009–2010 **Research Assistant**, *Applied Engineering Group*, University of Murcia, Spain.
Augmented reality methods based on natural features

2008–2009 **Research Assistant**, *Applied Engineering Group*, University of Murcia, Spain.
Fish-tracker, fish visual tracking in controlled environments

Research Interests

Autonomous Vehicles	Learning methods for Autonomous cars, Semantic segmentation, self-localization
Machine Learning	Deep Learning, Virtual Worlds for automatic labelled data generation, Domain Adaptation, CNNs. LSTM and RNNs
Applied Mathematics	Robust decompositions (RPCA), Robust estimation, Continuous optimization, Riemannian optimization, Theory of embeddings, Non-linear dimensionality reduction
Computer Vision	Visual geometry, Semantic labelling, Obstacle detection
Robotics	Visual Odometry, Visual Simultaneous Localization and Mapping
Intelligent Vehicles	Real-time scene representations

Skills & Tools

Machine Learning	Convolutional Neural Networks, RNNs, Virtual worlds for automatic training, Transfer Learning, Network compression
Optimization	Continous optimization, Constrained optimization, Riemannian optimization
Domain Adaptation	Applied to semantic labelling of urban scenes
Visual Geometry	Robust motion estimation, multi-view geometry
Programming & Prototyping	C/C++, Python, MATLAB, CUDA, Java
Frameworks	Caffe, MatConvNet, Chainer
Libraries	OpenCV, OpenSceneGraph, Point Cloud Library, SciPy, Qt

Teaching Experience

2012–2013 **T.A., Machine Learning**, *ETSE, Universitat Autonoma de Barcelona*, Barcelona, Spain.

2013–2014 **T.A., Machine Learning**, *ETSE, Universitat Autonoma de Barcelona*, Barcelona, Spain.

2014–2015 **T.A., Data Structures**, *ETSE, Universitat Autonoma de Barcelona*, Barcelona, Spain.

2014–2015 **T.A., Artificial Intelligence**, *ETSE, Universitat Autonoma de Barcelona*, Barcelona, Spain.

2015–2016 **Author, Online Course of Hands-on Deep Learning with MatConvNet**, Online.

Student Supervision

2016 **MSc. dissertation**, *Jordi Frias*, Universitat Autonoma de Barcelona, Barcelona, Spain.
Urban Scene Understanding for Intelligent Vehicles

2016 **MSc. dissertation**, *Albert Mosella Montoro*, Universitat Autonoma de Barcelona, Barcelona, Spain.
On Deconvolutional Nets for Semantic Segmentation

2016 **MSc. dissertation**, *Akhil Gurram*, Universitat Autonoma de Barcelona, Barcelona, Spain.
Depth Estimation via Deconvolutional Nets

2015 **BSc. dissertation**, *Joanna Materzynska*, University of Vienna, Vienna, Austria.
On Deep Semantic Segmentation

2015 **BSc. dissertation**, *Sergi Canyameres*, Universitat Autonoma de Barcelona, Barcelona, Spain.
Deep learning to improve Pedestrian Detection

2015 **BSc. dissertation**, *Jordi Frias*, Universitat Autonoma de Barcelona, Barcelona, Spain.
Real-time Representations for Urban Scene Understanding

2014 **Research intern**, *Jordi Frias*, Universitat Autonoma de Barcelona, Barcelona, Spain.
Methods for Road Detection in 3D

2014 **BSc dissertation**, *Gabriel Villalonga*, Universitat Autonoma de Barcelona, Barcelona, Spain.
3D Pedestrian Detection

2014 **BSc dissertation**, *Andrea ALvarez*, Universitat Autonoma de Barcelona, Barcelona, Spain.
Semantic Segmentation with 3D Features

2013 **MSc dissertation**, *Manuel Granados*, Universitat Autonoma de Barcelona, Barcelona, Spain.
Semantic Scene Understanding for Urban Scenarios

Languages

Spanish **Native**
English **Proficient user**
Catalan **Basic user**
Japanese **Basic user**

Awards & Honours

2011 **Best industrial IT project of the year**, *Award given by the IT consortium, TIMUR*, Murcia, Spain.

2010 **Top student of Computer Science**, *Promotion 2005–2010*, Murcia, Spain.

2010 **Honourable mention Computer Science, 1st class**, *Promotion 2005–2010*, Murcia, Spain.

2009 **Award of excellence in academic performance**, *Top 10 student of science and mathematics*, Murcia, Spain.

Publications

German Ros and Gines Garcia-Mateos. *Augmented Reality based on Natural Features*. AP LAMBERT Academic Publishing GmbH & Co, 1st edition edition, 2012.

German Ros, Laura Sellart, Joanna Materzynska, David Vazquez, and Antonio Lopez. The SYNTHIA dataset: A large collection of synthetic images for semantic segmentation of urban scenes. In *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Las Vegas, USA (oral), 2016.

German Ros, Sebastian Ramos, Manuel Granados, Amir H. Bakhtiary, David Vazquez, and Antonio Lopez. Vision-based offline-online paradigm for autonomous driving. In *In Proc. IEEE Winter Conference on Applications of Computer Vision (WACV)*, Hawaii, USA, 2015.

German Ros, Julio Guerrero, Angel Sappa, Daniel Ponsa, and Antonio Lopez. Fast and robust fixed-rank matrix recovery. *arXiv preprint (submitted to T-PAMI), "http://arxiv.org/pdf/1503.03004v3.pdf"*, 2015.

German Ros and Jose Alvarez. Unsupervised image transformation for outdoor semantic labelling. In *In Proc. IEEE Intelligent Vehicles Symposium*, Seoul, Korea, 2015.

Alejandro Gonzalez, Gabriel Villalonga, German Ros, David Vazquez, and Antonio Lopez. 3D-guided multiscale sliding window for pedestrian detection. In *In Proc. Iberian Conference on Pattern Recognition and Image Analysis*, Santiago de Compostela, Spain, 2015.

German Ros, Julio Guerrero, and Jose Alvarez. Motion estimation via robust decomposition with constrained rank. *arXiv preprint "http://arxiv.org/pdf/1410.6126v1.pdf"*, 2014.

German Ros, Julio Guerrero, Angel Sappa, Daniel Ponsa, and Antonio Lopez. VSLAM pose initialization via Lie-groups and Lie-algebras optimization. In *In Proc. IEEE International Conference on Robotics and Automation (ICRA)*, Karlsruhe, Germany, 2013.

German Ros, Julio Guerrero, Angel Sappa, Daniel Ponsa, and Antonio Lopez. Fast and robust l1-averaging-based pose estimation for driving scenarios. In *In Proc. British Machine Vision Conference (BMVC)*, Bristol, UK, 2013.

German Ros, Angel Sappa, Daniel Ponsa, and Antonio Lopez. Visual slam for driverless cars: A brief survey. In *In Proc. IEEE Workshop on Navigation, Perception, Accurate Positioning and Mapping for Intelligent Vehicles*, Alcala de Henares, Spain, 2012.

German Ros, Jesus Martinez del Rincon, and Gines Garcia-Mateos. Articulated particle filter for hand tracking. In *In Proc. International Conference on Pattern Recognition (ICPR)*, Tsukuba Science City, Japan, 2012.

Luisa M. Vera, German Ros, Gines Garcia-Mateos, and F. Javier Sanchez-Vazquez. MS-222 toxicity in juvenile seabream correlates with diurnal activity, as measured by a novel video-tracking method. *Journal of Aquaculture, Elsevier*, 2010.

German Ros, Gines Garcia-Mateos, Luisa M. Vera, and F. Javier Sanchez-Vazquez. A new taxonomy and graphical representation for visual fish analysis with a case study. In *In Proc. Workshop on Visual Observation and Analysis of Animal and Insect Behavior (VAIB), ICPR*, Istanbul, Turkey, 2010.