

CV date	05/09/2022
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Part A. PERSONAL INFORMATION

First name	Ezequiel		
Family name	López Rubio		
Gender	Male	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number			
e-mail		URL Web	
Open Research and Contributor ID (ORCID)		0000-0001-8231-5687	

A.1. Current position

Position	Full Professor		
Initial date			
Institution	University of Málaga		
Department/Center	Computer Languages and Computer Science / Computer Science School		
Country	Spain	Teleph. number	
Key words	Artificial intelligence; deep learning; computer vision		

A.2. Previous positions (research activity interruptions, art. 45.2.b))

Period	Position/Institution/Country/Interruption cause
	Assistant Professor/University of Málaga/Spain
	Associate Professor (non-tenured)/University of Málaga/Spain
	Associate Professor (tenured)/University of Málaga/Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Computer Engineering	University of Málaga/Spain	
MSc in Computer Engineering	University of Málaga/Spain	

Part B. CV SUMMARY (max. 5000 characters, including spaces)

My main research activity belongs to the Artificial Intelligence field of knowledge. I focus on deep artificial neural networks, image processing and computer vision. In these topics I have published many times in the most important international journals, as a single author and with my group of collaborators.

Within the deep learning subfield, I have developed supervised and unsupervised neural systems that process visual information in an efficient way so that they outperform the state-of-the-art methods. I have proposed approaches based on deep convolutional neural networks for a variety of applications: 3D magnetic resonance image denoising and super resolution, vehicle tracking and identification in traffic surveillance videos, background subtraction and anomalous object detection in surveillance videos, skin lesion classification, homography estimation, content-based image retrieval and neural rendering.

Regarding the image processing and pattern recognition subfields, I also research on conic curve fitting. I have proposed several methods for ellipse, ellipsoid and parabola fitting that are robust to outliers in the input data.

I have established a long-term research collaboration with the Department of Computer Technology of the De Monfort University (Leicester, England), which has yielded several publications in international conferences and journals. Several PhD students have attained their international doctorate degrees under my supervision within this collaboration. Other research

collaborations have been secured with the University of Michigan at Ann Arbor and the University of Amsterdam.

My integration in the Research and Development system is intense, having participated in 20 research projects at the regional, national and international levels. Moreover, I have also participated in several research contracts with private companies. I have undertaken the responsibility of principal investigator in 7 research projects at the regional and national levels. Also, I am the principal investigator of the Computational Intelligence and Image Analysis (ICAI) research group of the University of Málaga, which is registered in the official catalog of research groups of Andalusia with the code TIC-163. I also belong to the Biomedic Research Institute of Málaga (IBIMA), where I am the adjunct principal investigator of the research group, which is integrated into Area 6 of the IBIMA (Innovative Therapies and New Technologies). The IBIMA has recognized the ICAI as a consolidated research group.

My main scientific indicators are given next. h index (according to Scopus): 16. Times cited (according to Scopus): 1038. h index (according to Google Scholar): 22. Times cited (according to Google Scholar): 1631. h index (according to Web of Science): 15. Times cited (according to Web of Science): 711. Articles in Journal Citation Report indexed international journals: 78 (50 of them in first quartile journals, Q1). Successful teaching evaluations (quinquenios docentes): 4 (2001-2005, 2006-2010, 2011-2015, 2016-2020). Successful research evaluations (sexenios de investigación): 3 (2001-2006, 2007-2012, 2013-2018). Supervised PhD theses: 8 (2 of them with honors mentions, Premio Extraordinario de Doctorado). Supervised MSc final projects: 32. Competitive research projects in which I have participated: 20 (8 of them as principal investigator). Noncompetitive research projects in which I have participated: 7.

Part C. RELEVANT MERITS (sorted by typology)

C.1. Most important publications in books and journals with "peer review" and in conferences (see instructions).

- 1 **Scientific article**. Jorge García-González, Miguel A. Molina-Cabello, Rafael M. Luque-Baena, Juan M. Ortiz-de-Lazcano-Lobato, Ezequiel López-Rubio. 2021. Road pollution estimation from vehicle tracking in surveillance videos by deep convolutional neural networks Applied Soft Computing 113, 107950. ISSN: 1568-4946.
- 2 **Scientific article**. Lopez-Rubio, Ezequiel; Miguel Ángel Molina Cabello; Francisco M. Castro; Rafael Marcos Luque Baena; Manuel J. Marín Jiménez; Nicolás Guil. 2021. Anomalous object detection by active search with PTZ cameras Expert Systems with Applications. 181, pp.115150-115150. ISSN 0957-4174.
- 3 **Scientific article**. Saúl Calderón Ramírez; Shengxiang Yang; Armaghan Moemeni; et al;. 2021. Improving Uncertainty Estimation With Semi-supervised Deep Learning for COVID-19 Detection Using Chest X-ray Images IEEE Access. 9, pp.85442-85454. ISSN 2169-3536.
- 4 **Scientific article**. Karl Thurnhofer Hemsí; EZEQUIEL LÓPEZ RUBIO; Enrique Domínguez Merino; David Elizondo. 2021. Skin lesion classification by ensembles of deep convolutional networks and regularly spaced shifting IEEE Access. ISSN 2169-3536.
- 5 **Scientific article**. Miguel Ángel Molina Cabello; David A. Elizondo; Rafael Marcos Luque Baena; Lopez-Rubio, Ezequiel. 2020. Aggregation of convolutional neural network estimations of homographies by color transformations of the inputs IEEE Access. 8-1, pp.79552-79560. ISSN 2169-3536.
- 6 **Scientific article**. Jorge García González; Juan Miguel Ortiz de Lazcano Lobato; Rafael Marcos Luque Baena; Lopez-Rubio, Ezequiel. 2020. Background subtraction by probabilistic modeling of patch features learned by deep autoencoders Integrated Computer Aided Engineering. 27-3, pp.253-265. ISSN 1069-2509.
- 7 **Scientific article**. Safa Hamreras; Bachir Boucheham; Miguel Ángel Molina Cabello; Rafaela Benítez Rochel; Lopez-Rubio, Ezequiel. 2020. Content-based image retrieval by ensembles of deep learning object classifiers Integrated Computer Aided Engineering. 27-3, pp.317-331. ISSN 1069-2509.

- 8 **Scientific article**. Jesús Benito Picazo; Enrique Domínguez Merino; Esteban José Palomo Ferrer; Lopez-Rubio, Ezequiel. 2020. Deep learning-based video surveillance system managed by low-cost hardware and panoramic cameras Integrated Computer Aided Engineering. 27-4, pp.373-387. ISSN 1069-2509.
- 9 **Scientific article**. Karl Thurnhofer Hemsí; Lopez-Rubio, Ezequiel; Elidia Beatriz Blázquez Parra; María del Carmen Ladrón de Guevara Muñoz; Óscar David de Cózar Macías. 2020. Ellipse fitting by spatial averaging of random ensembles Pattern Recognition. 106, pp.107406-107406. ISSN 0031-3203.
- 10 **Scientific article**. Miguel Ángel Molina Cabello; David A. Elizondo; Rafael Marcos Luque Baena; Lopez-Rubio, Ezequiel. 2020. Foreground detection by ensembles of random polygonal tilings Expert Systems with Applications. 161, pp.113518-113518. ISSN 0957-4174.
- 11 **Scientific article**. Karl Thurnhofer Hemsí; Lopez-Rubio, Ezequiel; Núria Roé Vellvé; Miguel Ángel Molina Cabello. 2020. Multiobjective optimization of deep neural networks with combinations of Lp-norm cost functions for 3D medical image super-resolution Integrated Computer Aided Engineering. 27-3, pp.233-251. ISSN 1069-2509.
- 12 **Scientific article**. Antonio Díaz Ramos; Lopez-Rubio, Ezequiel; Esteban José Palomo Ferrer. 2020. The Forbidden Region Self-Organizing Map neural network IEEE Transactions on Neural Networks and Learning Systems. 31-1, pp.201-211. ISSN 2162-237X.
- 13 **Scientific article**. Miguel Ángel Molina Cabello; Jorge García González; Rafael Marcos Luque Baena; Lopez-Rubio, Ezequiel. 2020. The effect of downsampling-upsampling strategy on foreground detection algorithms Artificial Intelligence Review. 53, pp.4935-4965. ISSN 0269-2821.
- 14 **Scientific article**. Karl Thurnhofer Hemsí; Lopez-Rubio, Ezequiel; Enrique Domínguez Merino; Rafael Marcos Luque Baena; Núria Roé Vellvé. 2019. Deep learning-based super-resolution of 3D Magnetic Resonance Images by Regularly Spaced Shifting Neurocomputing. 398, pp.314-327. ISSN 0925-2312.
- 15 **Scientific article**. Jorge García González; Juan Miguel Ortiz de Lazcano Lobato; Rafael Marcos Luque Baena; Miguel Ángel Molina Cabello; Lopez-Rubio, Ezequiel. 2019. Foreground detection by probabilistic modeling of the features discovered by stacked denoising autoencoders in noisy video sequences Pattern Recognition Letters. 125, pp.481-487. ISSN 0167-8655.
- 16 **Scientific article**. Jesús Benito Picazo; Enrique Domínguez Merino; Esteban José Palomo Ferrer; Lopez-Rubio, Ezequiel; Juan Miguel Ortiz de Lazcano Lobato. 2019. Motion detection with low cost hardware for pan-tilt-zoom (PTZ) cameras Integrated Computer-Aided Engineering. 26-1, pp.21-36. ISSN 1069-2509.
- 17 **Scientific article**. Lopez-Rubio, Ezequiel; Karl Thurnhofer Hemsí; Elidia Beatriz Blázquez Parra; Óscar David de Cózar Macías; María Carmen Ladrón de Guevara Muñoz. 2018. A fast robust geometric fitting method for parabolic curves Pattern Recognition. 84, pp.301-316. ISSN 0031-3203.
- 18 **Scientific article**. Lopez-Rubio, Ezequiel; Miguel Ángel Molina Cabello; Rafael Marcos Luque Baena; Enrique Domínguez Merino. 2018. Foreground Detection by Competitive Learning for Varying Input Distributions International Journal of Neural Systems. 28-5, pp.1750056. ISSN 0129-0657.
- 19 **Scientific article**. Ezequiel López Rubio; Esteban José Palomo Ferrer; Francisco Ortega Zamorano. 2018. Unsupervised Learning by Cluster Quality Optimization Information Sciences 436-437, pp.31-55. ISSN 0020-0255.
- 20 **Scientific article**. Miguel Angel Molina Cabello; Rafael Marcos Luque Baena; Lopez-Rubio, Ezequiel; Karl Thurnhofer Hemsí. 2018. Vehicle Type Detection by Ensembles of Convolutional Neural Networks Operating on Super-resolved Images Integrated Computer-Aided Engineering. 25-4, pp.321-333. ISSN 1069-2509.

C.3. Projects or research lines in which you have participated.

- 1 **Project.** UMA18-FEDERJA-084, Detection of anomalous behavior agents by Deep learning in low-cost video surveillance intelligent systems. JUNTA DE ANDALUCÍA. EZEQUIEL LOPEZ RUBIO. (Universidad de Málaga). 01/10/2019-15/11/2022. 58.602,43 €.
- 2 **Project.** DIAS3P: Advanced smart device to enhance the safety of pedestrian crossings. Universidad de Málaga. Gonzalo Ramos Jiménez. (Universidad de Málaga). 01/06/2020-30/09/2022. 38.115 €.
- 3 **Project.** Marea Plastic: MÁlaga REaction Against Plastic. Universidad de Málaga. Óscar David De Cózar Macías. (Universidad de Málaga). 01/06/2020-30/09/2022. 48.031,42 €.
- 4 **Project.** RTI2018-094645-B-I00, Automated detection with low-cost hardware of unusual activities in video sequences. Ministerio de Ciencia, Innovación y Universidades. Ezequiel López Rubio. (Universidad de Málaga). 01/01/2019-30/09/2022. 64.856 €.
- 5 **Project.** Anomaly detection in roads by moving cameras. Universidad de Málaga. Rafael Marcos Luque Baena. (Universidad de Málaga). 24/05/2021-24/05/2022. 4.000 €.
- 6 **Project.** B1-2019_02, Self-organizing neural systems for non-stationary environments. Universidad de Málaga. Esteban José Palomo Ferrer. (Universidad de Málaga). 24/05/2021-24/05/2022. 4.000 €.
- 7 **Project.** EQC2018-004571-P, Exascalable laboratory for Artificial Intelligence and Numeric Modeling (6im). Subprograma estatal de infraestructuras de investigación y equipamiento científico-técnico. Enrique Alba Torres. (Universidad de Málaga). 20/11/2018- 31/12/2019. 826.298,44 €.
- 8 **Project.** DIAS2P: Advanced smart device to enhance the safety of pedestrian crossings. Universidad de Málaga. Gonzalo Ramos Jiménez. (Universidad de Málaga). 2018-2019. 39.800 €.
- 9 **Project.** PI_57101, Eco-districts versus district rehabilitation. Enhancement of obsolete districts for sustainability (EUObs). Junta de Andalucía. Rafael Reinoso Bellido. (Universidad de Granada). Desde 01/05/2014. 411.543,33 €.
- 10 **Contract.** Development of a software to check the conformity of the installation of the cover of a building. Checktobuild. 8.06/5.47.5979. Ezequiel López Rubio. 01/09/2021-31/12/2023. 44.649,06 €.
- 11 **Contract.** Development of a software to enhance the generation of volumetric three-dimensional models by Deep learning applied to neural models of radiance fields. Arquimea Research Center. 8.06/5.47.5796. Ezequiel López Rubio. 12/02/2021-12/11/2022. 29.858,82 €.
- 12 **Contract.** Development of a software implementation of an algorithm to enhance the reillumination of perspectives and the generation of surface maps obtained by volumetric three-dimensional models from deep learning applied to radiance field neural models. Arquimea Research Center. 8.06/5.47.6163. Ezequiel López Rubio. 24/02/2022-31/12/2023. 36.494.12 €.

C.4. Participation in technology/knowledge transfer activities and exploitation of results.

Ezequiel López Rubio; Rafael Marcos Luque Baena; Esteban José Palomo Ferrer. Patent number P201401055. Artificial vision system for the detection of pedestrians or animals in highways. 29/09/2016. Universidad de Málaga (66%), Universidad de Extremadura (33%).