

CV Date	19/01/2024
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Part A. PERSONAL INFORMATION

First Name	Juan Antonio		
Family Name	Fernández Madrigal		
Sex	Not Specified	Date of Birth	
ID number Social Security, Passport			
URL Web	https://babel.isa.uma.es/jafma		
Email Address			
Open Researcher and Contributor ID (ORCID)	0000-0003-1376-7967		

A.1. Current position

Job Title	Catedrático de universidad		
Starting date	2016		
Institution	Universidad de Málaga		
Department / Centre	Ingeniería de Sistemas y Automática / E.T.S.I. Telecomunicación		
Country		Phone Number	952132892
Keywords	Movil robots; Assintential robots; Service robots; Cognitive behavior and learning; Personal robots; Human-robot interphase; Architectures of control of robots; Robotics learning; Telerobots; Robot programmation; Location; Surrounding modeled; Robots of education and entertainment		

A.3. Education

Degree/Master/PhD	University / Country	Year
Doctor Ingeniero en Informática	E.T.S.I. Informática (Universidad de Málaga)	2000
Licenciado en Informática	Facultad de Informática (Universidad de Málaga)	1994

Part B. CV SUMMARY

Prof. Juan-Antonio Fernández-Madrigal earned his MSc in Computer Science in 1994 in the Univ. of Málaga. He worked temporarily in a real state co. and then was granted by the Spanish Gov. as a PhD student since 1996 to 1999. In 1998 he engaged in a stay as a research scholar in the Univ. of Texas at Austin under the supervision of Prof. Ben J. Kuipers, working on Cognitive Robotics (abstraction for mobile robot mapping). Shortly after he was hired as Assist. Prof. in the Systems Engineering and Automation Dpt. of the Univ. of Málaga. He earned his PhD in 2000 with honors after his work on the use of abstraction in mobile robots, and was appointed to Assoc. Prof. in the same univ. In 2013 he did a research stay in the Univ. of Plymouth (UK) under the supervision of Prof. Angelo Cangelossi and Dr. Davide Marocco, where he worked on Developmental Robotics (integrating reinforcement learning with neural networks). In october 2016 he was appointed to his current position as Full Professor.

He has been teaching since 1998 in subjects such as Control Engineering, Real-Time Systems and Robotics, including graduate, master and doctoral programmes. Up to date he has supervised 75 degree theses, has participated in 3 educational innovation projects and has a number of scientific publications concerning education in engineering.

His research career can be defined by these lines: Cognitive and Developmental Robotics, where he has used abstraction for addressing intractability, reinforcement learning for a diversity of robotic tasks, and decision-making for robot planning (awarded with an "Intel Innovator" trophy for their parallel implementations); Probabilistic Robotics, where he has

contributed with novel paradigms for localization and mapping (including an international book), in the remote control of networked telerobots, and also transferred his experience to industrial applications; robotic Software Engineering, in the integration of heterogeneous sw for mobile robots.

He has consistently and uninterruptedly developed these works since 1996 in 2 EU, 12 national, 5 regional and 4 local research projects, has been PI of 3 regional ones and of 2 funded by his univ. So far he has been co-author of 43 scientific journal publications indexed in JCR, 22 of them Q1, 22 T1, has written 3 international books, 2 books in Spanish, 4 book chapters, 75 conf. papers (53 intl. confs.; 25 IEEE, 10 ICRA, 5 IROS) and 24 tech reports. His H-index, according to Google Scholar, is 33, with 3812 cites. He has been reviewer in flagship JCR journals and confs. in his areas of research and of research projects for the Austrian Science Fund, and a member of the organizing committee of the IEEE International Conference on Mechatronics in 2009.

He has supervised 4 PhD theses, 3 of them in international modality, 2 awarded by public and private entities (all authors are now post-docs in top-notch institutions, in academic positions or in important industry companies). He has been co-inventor in 6 patents, one of them awarded by the Spanish Inventor Club in 2004.

Besides this, he has been reviewer of the MIT Review Innovators Under 35 UE awards, created and maintained during a number of years a novel sw framework for programming mobile robots, appeared in media for the dissemination of his work (tv, radio, newspapers, social networks, ...), participated in scientific outreach activities, and carried out diverse management work in his univ. and other institutions.

Part C. RELEVANT ACCOMPLISHMENTS

C.1. Most important publications in national or international peer-reviewed journals, books and conferences

AC: corresponding author. (n° x / n° y): position / total authors. If applicable, indicate the number of citations

- 1 Scientific paper.** Manuel Castellano-Quero; Manuel Castillo-López; Juan-Antonio Fernández-Madrigal; Vicente Arévalo-Espejo; Holger Voos; Alfonso García-Cerezo. 2023. A multidimensional Bayesian architecture for real-time anomaly detection and recovery in mobile robot sensory systems. *Engineering Applications of Artificial Intelligence*. Elsevier. 125, pp.106673. <https://doi.org/10.1016/j.engappai.2023.106673>
- 2 Scientific paper.** Jesús M. Gómez-de-Gabriel; Juan-Antonio Fernández-Madrigal; María del Carmen Rey-Merchán; Antonio López-Arquillos. 2023. A Safety System based on Bluetooth Low Energy (BLE) to prevent the misuse of Personal Protection Equipment (PPE) in construction. *Safety Science*. Elsevier. 158. <https://doi.org/10.1016/j.ssci.2022.105995>
- 3 Scientific paper.** Denisa-Andreea Constantinescu; Angeles Navarro; Francisco Corbera; Juan-Antonio Fernández-Madrigal; Rafael Asenjo. 2021. Efficiency and Productivity for Decision Making on Low-Power Heterogeneous CPU+GPU SoCs. *The Journal of Supercomputing*. Springer. 77, pp.44-65. ISSN 1558-1748. <https://doi.org/10.1007/s11227-020-03257-3>
- 4 Scientific paper.** Juan-Antonio Fernández-Madrigal; Angeles Navarro; Rafael Asenjo; Ana Cruz-Martín. 2021. Efficient Geometrical Clock Synchronization for Pairwise Sensor Systems. *IEEE Sensors Journal*. IEEE. 21-1, pp.838-846. ISSN 1558-1748. <https://doi.org/10.1109/JSEN.2020.3014525>
- 5 Scientific paper.** Manuel Castellano-Quero; Juan-Antonio Fernández-Madrigal; Alfonso García-Cerezo. 2021. Improving Bayesian inference efficiency for sensory anomaly detection and recovery in mobile robots. *Expert Systems With Applications*. Elsevier. 163, pp.113755. ISSN 0957-4174. <https://doi.org/j.eswa.2020.113755>

- 6 **Scientific paper.** Juan-Antonio Fernández-Madrigal; Angeles Navarro; Rafael Asenjo; Ana Cruz-Martín. 2020. Characterization, Statistical Analysis and Method Selection in the Two-Clocks Synchronization Problem for Pairwise Interconnected Sensors. *Sensors*. MDPI. 20-17, pp.4808. ISSN 1424-8220. <https://doi.org/10.3390/s20174808>
- 7 **Scientific paper.** Manuel Castellano-Quero; Juan-Antonio Fernández-Madrigal; Alfonso-José García-Cerezo. 2020. Statistical Study of the Performance of Recursive Bayesian Filters with Abnormal Observations from Range Sensors. *Sensors*. MDPI. 20-15, pp.4159. ISSN 1424-8220. <https://doi.org/10.3390/s20154159>
- 8 **Scientific paper.** Cipriano Galindo; Juan-Antonio Fernández-Madrigal. 2020. Grounding Concepts and Methods of Real-Time Scheduling in Reality using Arduino. *IEEE Transactions on Education*. IEEE. Early Access, pp.1-8. ISSN 0018-9359. <https://doi.org/10.1109/TE.2020.2975352>
- 9 **Scientific paper.** Denisa-Andreea Constantinescu; Angeles Navarro; Juan-Antonio Fernández-Madrigal; Rafael Asenjo. 2020. Performance evaluation of decision making under uncertainty for low power heterogeneous platforms. *Journal of Parallel and Distributed Computing*. Elsevier. 137, pp.119-133. ISSN 0743-7315. <https://doi.org/10.1016/j.jpdc.2019.11.009>
- 10 **Scientific paper.** Ángel Martínez-Tenor; Ana Cruz-Martín; Juan-Antonio Fernández-Madrigal. 2019. Teaching Machine Learning In Robotics Interactively: The Case Of Reinforcement Learning With Lego® Mindstorms. *Interactive Learning Environments*. Taylor Francis. 37-3, pp.329-340. ISSN 1049-4820. <https://doi.org/10.1080/10494820.2018.1525411>
- 11 **Scientific paper.** Jesús M. Gómez-de-Gabriel; Juan A. Fernández-Madrigal; Antonio López-Arquillos; Juan Carlos Rubio-Romero. 2019. Monitoring harness use in construction with BLE beacons. *Measurement*. Elsevier. 131-1, pp.329-340. ISSN 0263-2241. <https://doi.org/10.1016/j.measurement.2018.07.093>
- 12 **Scientific paper.** Ángel Martínez-Tenor; Juan-Antonio Fernández-Madrigal; Ana-María Cruz-Martín; Javier González-Jiménez. 2018. Towards a Common Implementation of Reinforcement Learning for Multiple Robotic Tasks. *Expert Systems With Applications*. Elsevier. 100, pp.246-259. ISSN 0957-4174. <https://doi.org/10.1016/j.eswa.2017.11.011>
- 13 **Scientific paper.** Gago-Benítez, Ana; Fernández-Madrigal, Juan-Antonio; Cruz-Martín, Ana. 2014. Marginal Probabilistic Modelling of the Delays in the Sensory Data Transmission of Networked Telerobots. *Sensors*. 14-2, pp.2305-2349. ISSN 1424-8220. <https://doi.org/10.3390/s140202305>
- 14 **Scientific paper.** Blanco, Jose-Luis; González-Jiménez, Javier; Fernández-Madrigal, Juan-Antonio. 2013. A Robust, Multi-Hypothesis Approach to Matching Occupancy Grid Maps. *Robotica*. 31, pp.687-701. ISSN 0263-5747. <https://doi.org/10.1017/S0263574712000732>
- 15 **Scientific paper.** Fernández-Madrigal, J.A.; Llopis, L.; Cruz-Martín, A.; Galindo, C.; González-Jiménez, J.2013. H: a component-based specification language for heterogeneous applications. *Computer Standards & Interfaces*. 35-1, pp.30-49. ISSN 0920-5489. <https://doi.org/10.1016/j.csi.2012.03.003>
- 16 **Scientific paper.** Gago-Benitez, A.; Fernandez-Madrigal, J.-A.; Cruz-Martin, A.2013. Log-logistic modelling of sensory flow delays in networked telerobots. *Sensors Journal*, IEEE. 13-8, pp.2944-2953. ISSN 1558-1748. <https://doi.org/10.1109/JSEN.2013.2263381>

C.2. Conferences and meetings

- 1 Denisa Constantinescu; Angeles Navarro; Rafael Asenjo; Juan-Antonio Fernández-Madrigal; Ana Cruz-Martín. Enhancing On-Line Planning Under Uncertainty via Bloom Filter Based Memory. *Jornadas Sarteco 2021*. Sociedad de Arquitectura y Tecnología de Computadores (SARTECO). 2021. Spain.

- 2 Denisa Contantinescu; Angeles Gonzalez; Francisco Corbera; Juan-Antonio Fernández-Madrigal; Rafael Asenjo. Solving Large-Scale Markov Decision Processes on Low-Power Heterogeneous Platforms. 19th International Conference on Computational and Mathematical Methods in Science and Engineering. Universidad de Cádiz. 2019. Spain.
- 3 Marina Aguilar-Moreno; Ana Cruz-Martín; Juan-Antonio Fernández-Madrigal. Modelado cinemático y simulación realista del manipulador móvil Turtlebot-2 + Widow-X en ROS. XXXIX Jornadas de Automática. 2018. Spain.
- 4 Denisa-Andrea Constantinescu; Ángeles González-Navarro; Juan-Antonio Fernández-Madrigal; Rafael Asenjo-Plaza. Optimization of a decision-making algorithm for heterogeneous platforms. XXVIII Jornadas de Paralelismo (JP2017). Dpto de Arquitectura de Computadores - Universidad de Málaga. 2017. Spain.
- 5 A. Martinez-Tenor; J.A. Fernandez-Madrigal; A. Cruz-Martin. Lego Mindstorms NXT and Q-learning: a teaching approach for robotics and engineering. 7th International Conference of Education, Research and Innovation (ICERI, 2014). 2014. Spain.
- 6 R. Asenjo-Plaza; A. Gonzalez-Navarro; J.A. Fernandez-Madrigal; A. Cruz-Martin. On the parallelization of a three-parametric log-logistic estimation algorithm. Jornadas de Computación Empotrada. 2014. Spain.
- 7 Jose Luis Blanco Claraco; javier González Jiménez; Juan Antonio Fernández Madrigal. Sparser Relative Bundle Adjustment (SRBA): constant-time maintenance and local optimization of arbitrarily large maps. IEEE International Conference on Robotics and Automation (ICRA'13). 2013. Germany.

C.3. Research projects and contracts

- 1 **Project.** Arpeggio – Advanced robotic perception for SLAM. Ministerio de Ciencia e Innovación. Javier González Jiménez. (Universidad de Málaga). 01/09/2021-31/08/2024. 99.600 €.
- 2 **Project.** ReiLeaR - Reinforcement Learning for Multiple Robotic Tasks (proyecto puente del plan propio de la UMA asociado al proyecto no financiado “ReiLeaR” de la Junta de Andalucía, PY20_00055). Universidad de Málaga. Juan Antonio Fernández Madrigal. (Universidad de Málaga). 15/11/2021-15/11/2022. 8.000 €.
- 3 **Project.** Demonstrator for robotic hands with rolling fingers (AT21_00051). (PIs: Gómez-de-Gabriel, Fernández-Madrigal). Consejería de Economía, Conocimiento, Empresas y Universidad de la Junta de Andalucía; Unión Europea - Fondos FEDER. Jesús Manuel Gómez de Gabriel. (Universidad de Málaga). 01/04/2022-28/02/2022. 45.913,75 €.
- 4 **Project.** GARTHIM. Remote Reinforcement Learning for Mobile Robots Connected to Internet. Fondos FEDER Unión Europea; Junta de Andalucía. Juan Antonio Fernández Madrigal. (Universidad de Málaga). 15/11/2019-15/11/2021. 63.353,98 €.
- 5 **Project.** Creación y explotación de mapas semánticos por robots móviles (WISER - DPI2017-84827-R). Ministerio de Economía, Industria y Competitividad. Javier González Jiménez. (Universidad de Málaga). 01/01/2018-01/01/2021.
- 6 **Project.** Reinforcement learning with abstraction for the autonomous development of a mobile robot (Proyecto puente del plan propio de la UMA asociado al proyecto no financiado de la Junta de Andalucía de código TEP2279). Universidad de Málaga. Juan Antonio Fernández Madrigal. (Universidad de Málaga). 25/05/2015-25/05/2016. 4.000 €.

C.4. Activities of technology / knowledge transfer and results exploitation

- 1 **Patent of invention.** Juan Antonio Fernández Madrigal; Ana Gago Benítez; Ana María Cruz Martín; Ángel Martínez Tenor; Rafael Asenjo Plaza; María Angeles González Navarro. 2 565 878. Computer methods and automatic information systems for the regulation of the amount of data transmitted among networked devices Spain. 02/09/2016. Universidad de Málaga.
- 2 **Patent of invention.** Ángel Martínez Tenor; Juan Antonio Fernández Madrigal; Ana María Cruz Martín; Ana Gago Benítez; Rafael Asenjo Plaza; María Angeles González Navarro. 2 550 728. Methods implemented in a computer and computer systems for the automatic activation and deactivation of concurrent data transmissions between network connected devices Spain. 11/05/2016. Universidad de Málaga.