Dr. Ricardo Rodríguez Jorge

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GENERAL INFORMATION

Personal information

- Institute web page: https://portalcientifico.unav.edu/investigadores/1113189/detalle
- Research interest group: https://rodriguezricardo.net/ResearchInterestGroup/default.html
- GitHub: https://github.com/RicRod-dev?tab=overview&from=2025-05-01&to=2025-05-31

AREAS OF INTERESTS

- Artificial neural networks
- Mechatronics
- Pattern recognition
- Artificial Intelligence
- Signal Processing
- Fuzzy-logic
- Genetic algorithms
- Natural Language Processing
- Medical Informatics
- Control Systems
- Adaptive Control Systems
- Data science
- Big data
- Cybersecurity
- Auto-scaling in Network Function Virtualization
- Extended Kalman filter
- Grey-box modeling
- Computational fluid dynamics (CFD)

ACADEMIC TRAINING

Ph.D. Degree - Doctor in Science Oct. 2009 – Nov. 2012

CZECH TECHNICAL UNIVERSITY IN PRAGUE (CTU) *Prague, Czech Republic*

- PHD. IN MECHANICAL ENGINEERING
- Department of Instrumentation and Control Engineering
- Field of study: Control and Systems Engineering, AWARDED: awarded by the Dean of the Faculty for finishing on time with high score and for the high quality of my Doctoral thesis
- Thesis title: *Lung tumor motion prediction by neural networks*

Master's Degree in Sciences Aug. 2005 – Sep. 2007

THE NATIONAL C. FOR RESEARCH AND TECH. DEVELOPMENT(CENIDET) *Cuernavaca, Mexico*

- MASTER OF SCIENCE IN COMPUTER SCIENCE (MSc.)
- Department of Computer Sciences
- Field of study: Artificial Intelligence, AVERAGE: 96.33
- Thesis title: *Validation and Verification Automatic Module of Extracted Rules of a Neural-Symbolic Hybrid System*

Engineering Degree - (Equivalent to: Bachelor's + Master's) Aug. 2000 – Dec. 2004

TECHNOLOGICAL INSTITUTE OF LAZARO CARDENAS *Lazaro Cardenas, Mexico*

- COMPUTATIONAL SYSTEMS ENGINEERING
- Department of Computer and Systems
- Field of study: Distributed systems and networks, AVERAGE: 94.28
- Internship project:*Exploitation of Resources of a CMU Camera for its Started up on a ROMIC Robot*

PUBLICATIONS(More representative)

Co-edited book

- Jolanta Mizera-Pietraszko, **Ricardo Rodriguez-Jorge**, Diego Moises Almazo-Perez, Pit Pichappan, ADVANCES IN DIGITAL TECHNOLOGY -PROCEEDINGS OF THE 8TH INTERNATIONAL CONFERENCE ON APPLICATIONS OF DIGITAL INFORMATION AND WEB TECHNOLOGIES ICADIWT 2017, SERIES FRONTIERS IN ARTIFICIAL INTELLIGENCE AND APPLICATIONS, IOS Press, 978-1-61499-772-6 (print) — 978-1-61499-773-3 (online), Amsterdam, the Netherlands (2017), 284 pages, 978-1-614.

Preface

- Jolanta Mizera-Pietraszko, **Ricardo Rodriguez-Jorge**, Diego Moises Almazo-Perez,Pit Pichappan, PREFACE TO ADVANCES IN DIGITAL TECHNOLOGIES PROCEEDINGS OF THE 8TH INTERNATIONAL CONFERENCE ON APPLICATIONS OF DIGITAL INFORMATION AND WEB TECHNOLOGIES ICADIWT 2017, w:Frontiers in Artificial Intelligence and Applications(red. Jolanta Mizera-Pietraszko, Ricardo Rodriguez Jorge, Diego Moisés Almaz), IOS Press, ISBN 978-1-61499-773-3 (online), Amsterdam, the Netherlands (2017), V.

Journal Publication

- **Rodríguez-Jorge, R.**; Sánchez-Pérez, L.; Bila, J.; Škvor, J., Rotating machinery fault diagnosis using a quadratic neural unit, International Journal of Grid and Utility Computing, Vol. 13, No. 2, 2022, pp. 309-319, Inderscience Enterprises Ltd. Indexed in JCR, Impact Factor: 0.5, Q4 Elsevier.
- **R. Rodriguez-Jorge**, I De Leon-Damas, J Bila, J Skvor, Internet of things-assisted architecture for QRS complex detection in real time, Journal of Internet of Things, Vol 14 (2021), pp. 100395, Indexed in JCR, Impact Factor: 5.711, Q1.
- **R. Rodrguez-Jorge** and J. Bila, Cardiac Arrhythmia Prediction by Adaptive Analysis via Bluetooth, MENDEL, Vol. 26, No. 2, pp. 29-38. https://doi.org/10.13164/mendel.2020.2.029. Indexed in Scopus.
- S. Cervantes, A. Mexicano, José-Antonio Cervantes, **Ricardo Rodriguez**, and Jorge Fuentes-Pacheco, Binary Pattern Descriptors for Scene Classification, IEEE LATIN AMERICA TRANSACTIONS, VOL. 18, NO. 1, JANUARY 2020, https://ieeexplore.ieee.org/document/9049465, indexed in JCR, Impact Factor: 0.967.
- Bila, J., **Rodríguez, R.**, Novak, M. (2019). Modeling of Complex Systems by Means of Partial Algebras. MENDEL, 25(1), 103-110. https://doi.org/10.13164/mendel.2019.1.103. Indexed in Scopus.
- Mexicano, Adriana; **Rodriguez Jorge**, Ricardo, et al. "Acceleration of the K-Means algorithm by removing stable items", Int. J. of Space-Based and Situated Computing (IJSSC), Vol. 7, No. 2, 2017. https://doi.org/10.1504/IJSSC.2017.086819, Indexed in Emerging Sources Citation Index (Clarivate Analytics).
- Vergara Villegas, Osslan Osiris; Cruz Sánchez, Vianey Guadalupe; **Rodríguez Jorge, Ricardo**; Nandayapa, Alfaro, M. de J. (2016). Editorial for Volume 7 Number 3 Recent ADvances in Augmented Reality (RADAR). International Journal of Combinatorial Optimization Problems and Informatics, 7(3), 1–6.https://ijcopi.org/index.php/ojs/article/view/22/21, Indexed in CONACYT, Web of Science, Redalyc, Latin Index.
- **Ricardo Rodriguez**, Adriana Mexicano, Jiri Bila, S. Cervantes, and Rafael Ponce, "Feature Extraction of Electrocardiogram Signals by Applying Adaptive Threshold and Principal Component Analysis," Journal of Applied Research and Technology, Vol. 13, Issue 4, April 2015, ISSN: 1665-6423. https://doi.org/10.1016/j.jart.2015.06.008, (Indexed in JCR, CONACYT, impact factor: 0.447).

Book chapter

- J.U. Reyes Munoz, E.A. Martínez-García, **R. Rodriguez Jorge**, R. Torres-Cordoba, Chapter: WMR Kinematic Control Using Underactuated Mechanisms for Goal Direction and Evasion, Book: Kinematics, IntechOpen, Croacia, ISBN: 978-953-51-3687-3. https://www.intechopen.com/books/kinematics/ wmr-kinematic-control-using-underactuated-mechanisms-for-goal-direction-and-evasion, (Web of Science, Book Citation Index).
- Osslan Osiris Viergara Villegas, Vianey Guadalupe Cruz Sánchez, Humberto de Jesús Ochoa Domínguez, Jorge Luis García-Alcaraz, **Ricardo Rodriguez Jorge** (2016), "Automatic Defect Detection and Classification of Terminals in a Bussed Electrical Center Using Computer Vision", Handbook of Research on Managerial Strategies for Achieving Optimal Performance in Industrial Processes, IGI Publishing Hershey, PA, USA ©2016, May 2016, pp. 241-266, DOI: http://doi.org/10.4018/978-1-5225-0130-5.ch012, ISBN13: 9781522501305.

Refereed papers

- **Rodriguez-Jorge, R.**, A Grey-Box Model for Real-Time Control and Monitoring, Advances on P2P, Parallel, Grid, Cloud and Internet Computing. 3PGCIC 2024. Lecture Notes on Data Engineering and Communications Technologies ,Springer Nature Switzerland, Cham, (Web of Science, Proceedings Citation Index).

- Mexicano, A.; Carmona, J.C.; Cervantes, S.; Cervantes, J.A.; Lopez, S., **Rodriguez, R.**, A Modified Version of K-Means Algorithm, The 16th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing, Lecture Notes in Networks and Systems, 2021,Springer, Cham. (Web of Science, Proceedings Citation Index).
- **Rodríguez-Jorge, R.**; Sánchez-Pérez, L.; Bíla, J.; Škvor, J., Adaptive architecture for fault diagnosis of rotating machinery, Advanced Informaton Networking and Applicatons, Vol 3., 2021. Springer, Cham (Web of Sciences, Core Rank B).
- **Rodríguez-Jorge, R.**; De León-Damas, I.; Bila, J., Detection of the QRS Complexity in Real Time with Bluetooth Communication, Advances on P2P, Parallel, Grid, Cloud and Internet Computing. 3PGCIC 2020. Lecture Notes in Networks and Systems, vol 158. Springer, Cham.(Web of Science, Proceedings Citation Index).
- Cuong Nguyen Cong, **Ricardo Rodriguez-Jorge**, Nghien Nguyen Ba, Chuong Trinh Trong, Nghia Nguyen An, Design of Optimal PI Controllers using the Chemical Reaction Optimization Algorithm for Indirect Power Control of a DFIG model with MPPT (Web of Science, Core Rank B).April 2020.
- N.B. Nghien, **Rodriguez-Jorge, Ricardo** (2020) Building an Early Warning Model for Detecting Environmental Pollution of Wastewater in Industrial Zones. In: Barolli L., Hellinckx P., Natwichai J. (eds) Advances on P2P, Parallel, Grid, Cloud and Internet Computing. 3PGCIC 2019. Lecture Notes in Networks and Systems, vol 96. Springer, Cham. (Web of Science, Proceedings Citation Index).
- Mexicano-Santoyo, A.; **Rodriguez-Jorge, Ricardo**; Abrego, A., Jiménez; Zúñiga-Treviño; Martínez-García, Edgar. A.,Visual Analysis of Differential Evolution Algorithms, Proceedings of the 11th International Conference MISSI 2018.(Web of Science, Proceedings Citation Index).
- **Rodriguez Jorge, Ricardo**; Bila, Jiri; Mizera-Pietraszko, Jolanta; Martinez-Garcia, Edgar A.,Weight Adaptation Stability of Linear and Higher-Order Neural Units for Prediction Applications, Proceedings of the 11th International Conference MISSI 2018. (Web of Science, Proceedings Citation Index).
- Mizera-Pietraszko, Jolanta; Kolaczek, Grzegorz; **Rodriguez Jorge, Ricardo**; Martínez García, Edgar Alonso,Information Streaming Systems: A Review, The 2018 IEEE International Conference on INnovations in Intelligent SysTems and Applications (INISTA 2018), July 3-5, 2018, Thessaloniki, Greece. (Web of Science, Procceddings Citation Index).
- Ibarra Fierro, Gabriela I.; **Rodriguez-Jorge, Ricardo**; Mizera-Pietraszko, Jolanta; Martínez García, Edgar Alonso, Design and implementation of a data acquisition system for R peak detection in electrocardiogram, Artificial Intelligence for Health 2018 (AI4Health 2018), January 19-21, 2018, Funchal, Madeira, Portugal.
- Montes, Angel; Mizera-Pietraszko, Jolanta; **Rodriguez Jorge, Ricardo**; Martínez García, Edgar Alonso, Particle swarm optimization as a new measure of machine translation efficiency, 9th International Conference on Soft Computing and Pattern Recognition (SoCPaR 2017), December 11-13, 2017, Marrakech, Morocco.
- E.A. Martinez-Garcia, N. Avila, **R. Rodriguez-Jorge**, J.K. Sheba, R.E.Mohan, E. Magid, Non Linear Fitting Methods for Machine Learning, 3rd Intl. Workshop on Signal Processing and Machine Learning Nov. 8-10, 2017, Barcelona, Spain. Lecture Notes on Data Engineering and Communications Technologies Series, Volume 13. (Web of Science, Proceedings Citation Index).
- **R. Rodriguez-Jorge**, E.A. Martinez-Garcia, J. Mizera-Pietraszko, J. Bila, R. Torres-Cordoba, Prediction of highly non-stationary time series using neural networks, 3rd Intl. Workshop on Signal Processing and Machine Learning Nov. 8-10, 2017, Barcelona, Spain. Lecture Notes on Data Engineering and Communications Technologies Series, Volume 13. (Web of Science, Proceedings Citation Index).
- **R. Rodriguez-Jorge**, E.A. Martinez-Garcia, R. Torres-Cordoba, J. Bila, J. Mizera-Pietraszko, Adaptive Threshold, Wavelet and Hilbert Transform for QRS detection in Electrocardiogram Signals, 3rd Intl. Workshop on Signal Processing and Machine Learning Nov. 8-10, 2017, Barcelona, Spain. Lecture Notes on Data Engineering and Communications Technologies Series, Volume 13. (Web of Science, Proceedings Citation Index).
- N. B. Nghien, **R. Rodríguez-Jorge**, E. A. Martinez-Garcia, R. Torres-Córdoba, J. Mizera-Pietraszko and A. Montes Olguín, Predicting the Short-Term Exchange Rate between United State dollar and Czech Koruna Using Hilbert-Huang Transform and Fuzzy Logic, 3rd Intl. Workshop on Signal Processing and Machine Learning Nov. 8-10, 2017, Barcelona, Spain. Lecture Notes on Data Engineering and Communications Technologies Series, Volume 13. (Web of Science, Proceedings Citation Index).
- Almazo, Diego; **Rodriguez Jorge, Ricardo**; Mizera-Pietraszko, Jolanta, Computational Fluid Dynamics Simulation for Propeller, Proceedings of 8th International Conference on Applications of Digital Information and Web Technologies 2017, Ciudad Juarez, Chihuahua, Mexico. (Web of Science, Proceedings Citation Index).
- Mizera-Pietraszko, Jolanta; Kołaczek, Grzegorz; **Rodriguez Jorge, Ricardo**, Source-Target Mapping Model of Streaming Data Flow for Machine Translation, INnovations in Intelligent SysTems and Applications (INISTA), 2017 IEEE Interna onal Conference on, 3-5 July2017, Gdynia, Poland. (IEEE Xplore, Web of Science Core Collection Database).

- **Rodriguez Jorge, Ricardo**, Artificial Neural Networks: Challenges in Science and Engineering Applications, Proceedings of 8th International Conference on Applications of Digital Information and Web Technologies 2017, Ciudad Juarez, Chihuahua, Mexico. http://doi.org/10.3233/978-1-61499-773-3-25, rred(Web of Science, Proceedings Citation Index).
- Montes Olguín, Angel; **Rodriguez Jorge, Ricardo**, Climate fuzzy control proposal for a homemade greenhouse, Proceedings of 8th International Conference on Applications of Digital Information and Web Technologies 2017, Ciudad Juarez, Chihuahua, Mexico.(Web of Science, Proceedings Citation Index).
- Martinez, Ana; **Rodriguez Jorge, Ricardo**; Villa-Angulo, R.; Bila, Jiri; Mizera-Pietraszko, J., Review on higher-order neural units for monitoring cardiac arrhythmia patterns, Proceedings of 8th International Conference on Applications of Digital Information and Web Technologies 2017, Ciudad Juarez, Chihuahua, Mexico.(Web of Science, Proceedings Citation Index).
- **Rodriguez Jorge, Ricardo**; Bila, Jiri; Mizera-Pietraszko, Jolanta; Loya Orduño, Ricardo Ezequiel, "Adaptive Methodology for Designing a Predictive Model of Cardiac Arrhythmia Symptoms based on Cubic Neural Unit," Proceedings of 8th International Conference on Applications of Digital Information and Web Technologies 2017, Ciudad Juarez, Chihuahua, Mexico.(Web of Science, Proceedings Citation Index).

PARTICIPATION IN RESEARCH PROJECTS (More representative)

CORDIS, European Union | *Grant number: 101070080* Sep. 2023 – Aug. 2025

- Awarded by: : European Union's Horizon Europe research and innovation programme
- Project:DARROW - Making wastewater treatment more sustainable and efficient using a data-driven AI solution
- Role: Research Scientist / Collaborator

CDTI, Spain | *Grant number: CER-20231019* Oct. 2024 – June 2025

- Awarded by: Ministry of Science and Innovation
- Project: "Smart cybersecurity countermeasures for the network of the future."-CICERO
- Role: Research Scientist / Collaborator

IRONTEC, Regional | *Grant number: 04-000268* 2023 – 2025

- Awarded by: IRONTEC,INTERNET Y SISTEMAS SOBRE GNU/LINUX IRONTEC
- Title of the project: Advanced framework for secure end-to-end management of virtualised networks and provision of cybersecurity services as a Service
- Role: Research Scientist / Collaborator

PICRAH4.0, National | *Grant number: 04-000299* 2024 – 2025

- Awarded by: IRONTEC,INTERNET Y SISTEMAS SOBRE GNU/LINUX IRONTEC
- Title of the project: Intelligent and cybersecure platform for adaptive optimization in simulated operation of heterogeneous autonomous robots
- Role: Research Scientist / Collaborator

RESEARCH VISITS

Research visit | *Institution: National Technologic of Mexico/ TI of Ciudad Victoria* July 1st – July 31th 2022

- Faculty: Division of Research and Postgraduate Studies
- Department: Division of Research and Postgraduate Studies
- Field: Computer Sciences postgraduate
- Address of the Faculty: Blvd. Emilio Portes Gil No. 1301, Cd. Victoria, Tamaulipas, Mexico.

Research visit | *Institution: Czech Technical University in Prague, CTU* Dec. 2016 – Jan. 2017

- Faculty: Mechanical Engineering
- Department: Instrumentation and Control Engineering
- Field: Control and Systems Engineering
- Addressof the Faculty: Technická 4, 166 07 Prague 6–Dejvice, Czech Republic.

Visiting student for a scientific research | *University: TOHOKU UNIVERSITY* May. 2011 – Jul. 2011

- Centre: Research Division on Advanced Information Technology.
- Project: Intelligent Prediction Method of Lung Tumor Motion for Highly Accurate Radiation Therapy.
- Host: Dr. Noriyasu Homma-Associate Professor. Yoshizawa-Homma laboratory
- Address: (Ao-A15), 6-3, Aoba, Aramaki, Aoba-ku, SENDAI,980-8578, JAPAN

Summer of the scientific research | *Institution:National Institute of Nuclear Investigations* JUN. 2004 – AG 2004

- Institution: National Institute of Nuclear Investigations (ININ)
- Project: "Exploitation of Resources of a CMU Camera for its Started up on a ROMIC Robot".
- Department: Applied sciences
- Address: Mexico state, Mexico

SOFTWARE AND OPERATING SYSTEMS SKILLS

Programming languages: C/C++, Python, Látex, Matlab, R-programming, Java, SQL, HTML/CSS, Prolog (Logic Programming)
Statistical software: SPSS
Math software: Maple
Operating systems: GNU/Linux, MacOS
Distributed storage (Big Data): Azure Data Lake
Processing (Big Data): Apache Spark, Hadoop
Data ingestion (Big Data): Apache Kafka, Apache NiFi
Cybersecurity: ElasticSearch, Wireshark
Machine learning libraries: PyTorch, TensorFlow, Keras, Scikit-learn
Platforms: Docker, OpenStack, OpenMano, Grafana, Prometheus

SKILLS

- Predictive modeling, Adaptive control
- Cybersecurity, Extended Kalman filters, Artificial Intelligence
- Research and publication in Cybersecurity, Virtualization, Adaptive control, Signal processing, Computational fluid dynamics, differential-algebraic models, Grey-box modeling, time series prediction, auto-scaling
- Machine learning algorithms development
- Data preprocessing techniques
- Team management and leadership
- Workflow Streamlining
- Automated data collection and cleaning
- integration of models into production
- Data warehouse establishment

STATEMENT OF CONTRIBUTION TO DIVERSITY

∗ My experience working as a Collaborator Professor at Tecnun-University of Navarra, in Spain, at Telecommunication Master Degree, the Master's Degree in Engineering Data Analysis (MADI), and the Electrical Bachelor´s degree have allowed me to serve as a teacher, mentor, and tutor of national and international students. Previously, I have been working as an Assistant Professor at Jan Evangelista Purkyně University in Ústí nad Labem, where I taught and tutored national and international Students from the ERASMUS program. I was very motivated to teach in English the classes from the following subjects: Algorithms and Programming I, Algorithms and Programming II, Professional English, Python and R for Data Science, Data Mining Techniques based on R Software, Data Analysis and Visualization, Introduction to MATLAB, and Professional presentation. In addition, my previous experiences as a Teaching Assistant for International Classes attended by students from The ERASMUS program has allowed me to teach the lab classes of the following subjects: Measurements in Engineering, and Computer Support for Studies. These work experiences have provided me with a very close interaction among multicultural populations coming from different countries all over the world, such as Slovenia, Turkey, Czech Republic, Spain, Venezuela, Poland, USA, UK, France, North Korea, Germany, India, Russia, Belgium, among others.