Antonio Guillen-Perez

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Dedicated AI Research Scientist with a Ph.D., bringing over 5 years of specialized experience in **Deep Reinforcement Learning (DRL)**, **autonomous vehicles**, and **sustainability**. Expert in applying DRL to **multi-agent coordination**, with a track record of significant contributions to leading AI conferences (NeurIPS, CVPR, AAAI) and major IEEE journals. Committed to pushing the boundaries of AI research and its application in real-world challenges.

Experience

- **Hewlett-Packard Enterprise (HPE) - AI Labs** — Milpitas-San Jose, CA
  Research Scientist — *Sep 2022 - Now*
  - Leading **Multi-Agent Deep Reinforcement Learning** (MADRL) research projects for sustainable computing, focusing on data center energy optimization, load shifting, and carbon footprint reduction.
  - Developed **AI-based cooling solutions** and **CFD surrogate models** for energy efficiency, integrating DRL and **Genetics Algorithms** for real-time optimization.
  - Advanced **multi-agent systems** for data center operations, significantly enhancing green computing initiatives.
  - Research on **Bayesian Optimization** and **Model Robustness**, contributing to AI's reliability and efficiency.

- **Polytechnic University of Cartagena** — Cartagena, Spain
  Associated Professor — *Sep 2018 - Jun 2022*
  - Taught theoretical and practical classes in **Communication Network Theory** and **Distributed Systems and Services**, emphasizing network optimization and distributed services operation.
  - Led research on network optimization algorithms and applied distributed system techniques in academic applications.

- **Dolphin Wave — Startup** — Murcia, Spain
  ML Engineer and Data Scientist — *Feb 2018 - Sep 2018*
  - Develop ML **predictive models** for mobility studies, employing WiFi & BLE RSSI for environmental sensing.
  - Implemented a **Deep Learning Multivariate Time Series Forecasting** model for demand prediction, enhancing business intelligence (BI) tools.

- **Polytechnic University of Cartagena** — Cartagena, Spain
  Research Fellow in the Department of Information and Communications Technologies — *Sep 2014 - Sep 2018*
  - Developed intelligent traffic light control systems through **DRL**, improving urban road traffic management.
  - Researched and applied **generative models** for security and optimization in urban settings, enhancing intelligent system capabilities.

Education

- **Polytechnic University of Cartagena** — Cartagena, Spain
  Ph.D. in Computer Science, Autonomous Vehicles, and Wireless Communications; CUM LAUDE. — *Sep 2018 - Jun 2022*
  - **Thesis**: *Contribution to Enhancing the Cognitive Capability of Intelligent Transportation Systems (ITS) Using Artificial Intelligence.* **Link**: doi:10.31428/10317/11206.
  - Key focus on AI and DRL for improving urban traffic management and Connected Autonomous Vehicles (CAVs). Achieved significant reductions in waiting times and emissions through novel **MADRL** applications.
  - Engaged in interdisciplinary research, integrating 5G/6G for CAVs, and explored Learning-from-Demonstrations (**LfD**) to accelerate system training.
  - Contributed to top-tier journals and conferences, demonstrating expertise in AI's role in advancing ITS.

- **University of California, Davis** — Davis, CA
  Predoctoral Stay - Associated Researcher — *Jun 2021 - Jan 2022*
  - Focused on AI in healthcare, specifically early detection of throat cancer, achieving over 90% accuracy. Pioneered a new research direction for disease detection using advanced neural network techniques. Nature Paper

- **Polytechnic University of Cartagena** — Cartagena, Spain
  Master and Bachelor's Degree in Electrical, Electronic, and Communications Engineering — *Sep 2012 - Sep 2018*
  - Specialized in Communications Systems and Networks. Conducted comprehensive studies on UAV network performance and developed a wireless sensor network for environmental monitoring.

Selected Research Contributions — View more on Google Scholar

Journal Articles

- Guillen-Perez, A., & C.,M.-D., *Multi-Agent Deep Reinforcement Learning to Manage Connected Autonomous Vehicles at Tomorrow's Intersections*, 2022. **IEEE Transactions on Vehicular Technology**, doi:10.1109/TVT.2022.3169907.
- Guillen-Perez, A., & C.,M.-D., *Learning from Oracle Demonstrations (LfOD) – A new approach to develop AIM control algorithms based on MADRL*, 2022, **IEEE Access**, doi:10.1109/ACCESS.2022.3175493.
- Guillen-Perez, A., *et al.*, *Flying Ad Hoc Networks: A New Domain for UAV Network Communications.* Sensors 2018, 18, 3571. doi:10.3390/s18103571.

Conference Proceedings

- Guillen-Perez, A., *et al.*, *Real-time Carbon Footprint Minimization in Sustainable Data Centers with Deep Reinforcement Learning*, **NeurIPS** 2023 Climate Change AI Workshop. **Award: Best ML Innovation**. Link.
- Guillen-Perez, A., *et al.*, *Sustainable Data Center Modeling: A Multi-Agent Reinforcement Learning Benchmark*, **NeurIPS** 2023 Climate Change AI Workshop. Link.
- Guillen-Perez, A., *et al.*, *N-Critics: Self-Refinement of Large Language Models (LLMs) with Ensemble of Critics*, **NeurIPS** 2023 R0-FoMo Workshop. Link to arXiv.

Skills

- **Programming & Development Environments:**Expert in **Python**, proficient with **Jupyter Notebook**, **Java**, and **Matlab**. Familiar with version control systems (**Git**), and IDEs (**VS Code**, **Spyder**, **PyCharm**). Experience in collaborative tools like **GitHub** and **GitLab**.
- **Artificial Intelligence & Machine Learning:**Deep knowledge in **Deep Learning** (Pytorch, TensorFlow, Keras), **Deep Reinforcement Learning** (RLLib, RAY, OpenAI Gym), and **AI techniques** (Multi-Agent Systems, Imitation Learning, Meta-Learning). Proficient with machine learning libraries (**Scikit-Learn**, **XGBoost**).
- **Data Science & Visualization:**Strong skills in data wrangling (**Numpy**, **Pandas**), and visualization (**Matplotlib**, **Seaborn**, **Plotly**). Experience in statistical analysis (**StatsModels**, **Scipy**) and data processing tools (**Dask**, **Spark**).
- **Computational Modeling & Sustainability:**Experienced in **CFD tools** (6SigmaDCX) for thermal and energy modeling. Proficient in developing **AI-driven sustainability solutions**, focusing on reducing energy consumption and minimizing environmental impacts.
- **Software Engineering Tools:**Practical experience with **containerization** (Docker) and cloud platforms (**AWS**, **Google Cloud**). Competent in deploying AI applications and managing cloud resources.
- **Research Documentation & Communication:**Proficient in **LaTeX** and the **Adobe Suite** (specifically **Adobe Illustrator** and **Adobe Photoshop**) for creating compelling scientific documentation and presentations. Skilled in designing high-quality diagrams and figures to clarify proposals and results in research papers and reports, enhancing understanding and engagement.

Advanced Coursework and Specializations — View more on LinkedIn

- **Deep Reinforcement Learning:** Focused studies in cutting-edge techniques and applications, including:
  - *Deep Reinforcement Learning Nanodegree* (Udacity) - Comprehensive coverage of advanced DRL algorithms and their practical applications.
  - *Practical Reinforcement Learning* (Coursera) - Hands-on experience with RL techniques and frameworks.
  - *Practical DRL for Coders v.1* (fast.ai) - Focused on implementation and coding aspects of DRL.
- **Natural Language Processing:** Key courses on NLP, focusing on modern techniques and models, including:
  - *Natural Language Processing with Attention Models* (Coursera) - Part of Natural Language Processing Specialization from DeepLearning.AI. Comprehensive exploration of attention mechanisms and their application in NLP.
- **Generative AI:** Foundational and advanced topics in generative models, including:
  - *How Diffusion Models Work* (DeepLearning.AI) - Exploring the cutting-edge world of diffusion-based generative AI.
  - *Introduction to Generative AI* (Coursera) - Instructor: Google Cloud Training. A primer on generative AI technologies and their practical applications.

References

- **Prof. J. Sebastian Gomez-Diaz** — UC Davis, US
  Professor and MS Program Director, Electrical and Computer Eng. — *Email: jsgomez@ucdavis.edu*

- **Prof. Maria Dolores Cano Banos** — Polytechnic University of Cartagena (UPCT), Spain
  Professor and Lead Researcher, R&D Group in AI and Networking — *Email: mdolores.cano@upct.es*