

# Max Vilarasau Serra

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## About

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I am specialized in Machine Learning & Artificial Intelligence; with a focus on Deep Reinforcement Learning and a profound interest in Quantitative Finance and Blockchain Technologies. With extensive experience in Python, my aim is to develop algorithmic trading systems with rigorous quantitative methodologies to extract actionable financial insights. I am currently interested in causal inference, stochastic processes, and market making.

## Experience

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### Bluecap Management Solutions

September 2025 – Current

*Associate*

Madrid, Spain

- Developing a risk-assessment algorithm for a leading Spanish bank to estimate business loan default probability and optimize lending decisions
- Incorporating Explicable Machine Learning techniques to design the pre-delinquency algorithm

### Riedulab

February 2023 – June 2023

*Analyst*

Barcelona, Spain (Remote)

- Analyzed the soft skills of 1,496 adolescent students from Spanish and Portuguese schools; drew inferences employing Factor Analysis & Structural Equation Modeling

## Projects *(all available on my GitHub 📄)*

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- **Domain Randomization for Deep Reinforcement Learning** → 📄/DR4DRL
  - Researched and implemented Domain Randomization techniques to improve the generalization of Deep Reinforcement Learning agents in financial portfolio management
  - Developed and trained DDPG-based trading agents under randomized market conditions (volatility, price dynamics, noise, etc)
  - Achieved higher Sharpe ratios and reduced overfitting vs. the baseline models
  - Validated model robustness on Dow Jones data, demonstrating statistically significant performance gains across multiple return-risk metrics
- **Clustering Unacquainted Students at ICADE Graduate Campus** → 📄/Unsupervised-ML-Clustering-Students
  - Developed unsupervised learning models to analyze behavioral patterns among graduate students using Hierarchical Clustering and Principal Components Analysis
  - Designed a self-constructed *Affinity Test* to group individuals based on multivariate similarity metrics
  - Enabled data-driven segmentation and dimensionality reduction for enhanced interpretation
  - Interpreted cluster structures through visualization and explained variance analysis to extract actionable insights
- **Recursive Neural Networks for Apple Stock Price Prediction** → 📄/Deep-Learning-RNN-Apple-Stock
  - Developed a deep learning model for time-series forecasting of Apple stock prices using LSTM networks
  - Designed and implemented data preprocessing pipelines for normalization, sequence generation, and model validation
  - Achieved accurate next-day closing price predictions using optimized hyperparameters
  - Visualized learning dynamics and error metrics to evaluate model convergence and predictive performance

## Education

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### Master of Science in Business Analytics – ICADE

October 2024 – July 2025

Major in Machine Learning & Artificial Intelligence

Madrid, Spain

- Honors (3): [1] AI & Reinforcement Learning – [2] Quantitative Finance – [3] Thesis
- GPA: 8.8/10.0

## Bachelor in Global Studies & Management – Ramon Llull University

Major in Management & Digital Business

September 2020 – June 2024

Barcelona, Spain

- Honor (1): [1] Applied Statistics
- GPA: 7.1/10.0

## Degree in Classical Piano – Granados-Marshall Academy

Studied under Pianist and Prof. Xavier Ricarte

September 2016 – June 2020

Barcelona, Spain

## Achievements & Awards

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- Awarded Best Thesis during M.Sc. studies → [tinyurl.com/DR4DRL](https://tinyurl.com/DR4DRL)
- Co-authored an article in a Q2 journal → [doi.org/10.1016/j.explore.2023.07.008](https://doi.org/10.1016/j.explore.2023.07.008)
- Jiu-Jitsu Blue Belt awarded by Robin Gracie; son of Hélio Gracie (founder of Brazilian Jiu-Jitsu)

## Skills, Languages & More

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- **Technical Skills:** Python (some libraries that I am familiar with: NumPy; Pandas; SciPy; SciKit-learn; Keras; PyTorch; TensorFlow; Stable Baselines3...); Git; L<sup>A</sup>T<sub>E</sub>X
- **Industry Skills:** Artificial Intelligence; Machine Learning; Reinforcement Learning; Deep Learning; Research; Econometric Analysis; Financial Modeling
- **Languages** (5): English (native); Spanish (native); Catalan (native); French (advanced); Russian (beginner)
- **Hobbies:** Classical Music; Strategy Games; Combat Sports
- **Sports:** Judo; Jiu-Jitsu; Grappling; Wrestling