Mateus Toledo

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EDUCATION

Universidad de Jaén
Jaén, Spain

PhD Candidate in Computer Science
Dec. 2025 – Present

- Research Focus: Uncertainty, Explainable AI (XAI), and Multi-Objective Recommender Systems.
- Presented research proposal "Maintaining Pareto Optimality in Non-Stationary Multi-Objective Recommender Systems" at the *elige-IA Doctoral Symposium* (Accepted).

Pontifícia Universidade Católica de Minas Gerais
Belo Horizonte, Brazil

Master of Science, Computer Science
Jan. 2021 – Sep. 2023

- Thesis: Multicriteria Decision-Making Under Uncertainty in Port Ore Flow.
- Awarded Vale Innovation Hub Research Grant; research published in PAPIREX Journal Of Research.

Pontifícia Universidade Católica de Minas Gerais
Belo Horizonte, Brazil

Bachelor of Engineering, Electrical Engineering
Jan. 2016 – Dec. 2020

- Honors: 1st Prize, VI Edition Business Acceleration Program (Fumsoft, 2019).

RESEARCH EXPERIENCE

AI Researcher – Recommender Systems & Explainable AI
Jan. 2025 – Dec. 2025

Universidad de Jaén
Jaén, Spain

- Engineered fairness algorithms for group recommender systems to mitigate bias across diverse user populations.
- Implemented interpretability techniques to enhance transparency in black-box AI models.
- Authored and published "GREX," a platform and open source library for supporting explanations in group recommender systems, presented at IDEAL 2025 (Springer).
- Collaborated with international research teams using PyTorch, TensorFlow, and CRSLab to advance trustworthy AI.

Master's Thesis Researcher
Dec. 2021 – Sep. 2023

Vale Innovation Hub
Belo Horizonte, Brazil

- Spearheaded the development of a multicriteria optimization model for port planning, replacing legacy monocriteria approaches.
- Achieved a **3x improvement** in model accuracy during the Covid-19 pandemic, enabling robust export profit predictions under extreme uncertainty.
- Formulated complex mathematical models utilizing Linear Programming (Gurobi, PuLP) and fuzzy logic to optimize ore flow.

Associate AI Engineer – Computer Vision
Jan. 2022 – April 2022

Omdena
Remote

- Deployed Mask R-CNN and YOLOv5 deep learning models to automate the digitization of architectural floor plans.
- Enhanced Optical Character Recognition (OCR) accuracy for multi-language technical drawings, improving data extraction rates.

PROFESSIONAL EXPERIENCE

Full Stack Software Engineer (Contract)
May 2023 – Sep. 2024

Freelance
Remote

- Architected a JavaScript-based chatbot for an international exchange agency, reducing customer service response time by **40%**.
- Developed a custom Jupyter Notebook extension (React/Python) to streamline data science workflows.
- Prototyped a full-stack booking management system for emergency accommodation services in Dublin.

Software Engineer & Technical Trainer
Jan. 2020 – June 2023

SYDLE (Enterprise SaaS/PaaS)
Belo Horizonte, Brazil

- Delivered technical Proofs of Concept (PoCs) for strategic clients (Porto Seguro, FINEP, MadeiraMadeira), securing high-value digital transformation contracts.
- Optimized database performance and automated BPM workflows, significantly reducing processing time for critical e-commerce operations.
- Orchestrated technical training programs for **1,700+ external users**, achieving a 98% satisfaction rate.
- Mentored 6 junior engineers and conceptualized *SYDLE Learning*, the company's Virtual Learning Environment.

PROJECTS & OPEN SOURCE CONTRIBUTIONS

PyGREX | *Python, ML Libraries, Software Development*   Open Source
- Developed and released PyGREX, a Python library for SOTA Group Recommender Systems explanations.
- Executable via script (pip install pygrex) or live demo application.

Technical Translations | *Git, R, Markdown, Community Management*   Open Source
- Democratized access to AI education by leading the Portuguese translation of Christoph Molnar's "Interpretable Machine Learning" book.
- Coordinated the translation of the classic "The Art of Computer Programming" to Portuguese, managing contributions via GitHub Pull Requests.

Decision Making Mining Application | *Python, Data analyses, Optimization*   Academic Project
- Repository for solving multicriteria decision problems using fuzzy logic and optimization techniques on mining and port context.

SELECTED PUBLICATIONS

- Toledo, M., Yera, R., Barranco, M.J., Dutta, B. (2026). GREX: A Platform for Supporting Explanations in Group Recommender Systems. *Lecture Notes in Computer Science*, vol 16239. Springer. DOI: 10.1007/978-3-032-10489-2_9

- Pereira Júnior, J. G., et al. (2025). On Multicriteria Decision-Making Under Conditions of Uncertainty. In *Tomada de decisão multicritério sob condições de incerteza* (Chapter 1). PUC Minas. ISBN 978-65-88547-80-9

- Figueiredo, L. R., et al. (2025). Scenario Building for Multicriteria Analysis Under Conditions of Uncertainty. In *Tomada de decisão multicritério sob condições de incerteza* (Chapter 4). PUC Minas. ISBN 978-65-88547-80-9

- Leão, M. T. da S., Ekel, P., & Liborio, M. P. (2023). A Multicriteria Decision-Making in Conditions of Uncertainty for the Ports' Ore Exportation. *PARIPEX - Indian Journal of Research*, 12(7), 1–5. DOI: 10.36106/paripex/9507597

TECHNICAL SKILLS

Programming & Data Science: Python (PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas), JavaScript, TypeScript
Optimization & Analysis: Gurobi, PuLP, SciPy, CVXPY, Fuzzy Logic, Linear Programming
Web Development:Next.js, Node.js, REST APIs
Cloud & DevOps: AWS (EC2, Lambda), Docker, Terraform, CI/CD, Git, GitHub
Certifications: Machine Learning (DeepLearning.ai), Explainable AI (Duke), Recommender Systems (University of Minnesota), LLMOps (Duke), AWS Machine Learning (Udacity)
Languages: Portuguese (Native), English (Fluent - C1), Spanish (Advanced - B2)