MATEUS TOLEDO

Software Engineer - MSc, B.E.

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LinkedIn ResearchGate ORCID

PROFILE

Software Engineer & AI Researcher passionate about building transparent and fair AI for complex decision-making. My work bridges advanced research (XAI, Recommender Systems) with practical operational needs —+5 years of experience in industrial and public digital transformation.

Key Highlights:

- Research on Explainable AI and Fairness in Group Recommender Systems at the University of Jaén (UJA), aiming to create more trustworthy AI.
- Delivered 3x higher accuracy with a multi-objective port planning model during peak Covid uncertainty.
- Applied Computer Vision techniques (Object Detection/Segmentation) within a global collaborative AI project (Omdena).

EDUCATION

- **Master's degree, Computer Science** | PUC Minas, Brazil | 08/02/2021 - 18/09/2023
- **Bachelor's degree, Electrical Engineering** | PUC Minas, Brazil | 08/02/2016 - 22/12/2020

LANGUAGES

- **English**: Fluent (C1) | **Spanish**: Advanced (B2) | **Portuguese**: Native

KEY EXPERIENCES AND RESPONSIBILITIES

UJA | AI Researcher | Jan ‘25 - Oct ‘25

Conducting research at the intersection of Recommender Systems (RecSys) and Explainable AI (XAI), focusing on enhancing model transparency and trustworthiness.

- Currently investigating novel methods to improve fairness and explainability, specifically within group recommender systems.
- Exploring and applying techniques to make complex recommendation algorithms more interpretable for users, researchers, and developers.

The main stack is based on Python (Pandas, Numpy, Scipy) and its Machine Learning libraries (Pytorch, Mlxtend, Scikit-learn) and LLMs (CRSLab, LongChain).

Contractor | Full Stack Engineer | May ‘23 - Sep ‘24

Provided contract software engineering services, developing full-stack web applications and solutions for various clients while based in Ireland.

- Developed a JavaScript-based chatbot to enhance customer service and support processes for an international student exchange agency.

● Worked on front-end (React) and back-end (Python) development for a custom Jupyter Notebook extension project.
● Prototyped a full-stack (JavaScript/Python) system to manage emergency accommodation bookings and operations, addressing specific business rules for a Dublin-based service provider.

Vale Innovation Hub | Master Thesis Researcher | Dec ‘21 - Sep ‘23

● Conducted Master's thesis research applied to a real-world challenge at Vale's Innovation Hub, developing and implementing an advanced multicriteria optimization model to revamp their port planning and export shipment management system, replacing the previous monocriteria approach.
● Achieved a 3x improvement in model accuracy during critical periods (Covid pandemic), enabling significantly more robust predictions of export profit margins.
● Successfully defended Master's Thesis based on this research.
The main stack consisted of Python for data analysis and graphics, as well as optimization algorithms that utilized linear programming, fuzzy logic, and min-max models.

SYDLE | Software Engineer & Technical Trainer - Enterprise Platform (SaaS/PaaS) | Jan ‘20 - Jun ‘23

SYDLE SaaS platform combines solutions for BPM, Process Automation, Content Management, CRM, Service Desk, and Chatbot.
Developed technical Proofs of Concept (PoCs) using the SYDLE ONE platform (SaaS/PaaS) for strategic clients (e.g., Porto Seguro, FINEP, MadeiraMadeira), demonstrating value for digital transformation and securing buy-in.
Main achievements:

- **Client Solutions & Integrations:**
  - Optimized database usage via data modeling solutions for Porto Seguro (major insurance company).
  - Built initial Financial Guarantee & Risk Analysis modules with core banking integration for FINEP (government financial institution).
  - Consulting for Digital Transformation in Brazilian Capital's such as Curitiba (Paraná) and Belo Horizonte (Minas Gerais).
  - Implemented REST APIs and automated Business Process Management (BPM) workflows for MadeiraMadeira (e-commerce) on critical voucher emission.
- **Training, Mentorship & Enablement:**
  - Led the strategy and delivery of technical training programs for the SYDLE ONE platform.
  - Trained over 1700 external users on platform features, achieving a 98% satisfaction rate.
  - Onboarded and provided initial technical training for 50+ new company hires.
  - Mentored 6 Beginner Engineers, offering technical guidance and support.
  - Conceptualized SYDLE Learning, the company's initial Virtual Learning Environment (VLE) - SYDLE Learning.

The tech stack includes Java, JavaScript, Node.js, GraalVM, BPM, AWS, Elasticsearch, and MongoDB.

Omdena | Associate AI Engineer - Object Detection & Image Segmentation | Jan ‘22 - Apr ‘22

Contributed to an Omdena collaborative AI project focused on automatically digitizing architectural floor plans using computer vision techniques.

● Applied Mask R-CNN (YOLOv5 - Deep Learning) for object detection and instance segmentation to identify structural elements and objects within floor plan images.
● Worked on improving Optical Character Recognition (OCR) accuracy for text elements on floor plans, including capabilities for handling non-English languages.
● Collaborated within a global, project-based team environment under the guidance of senior engineers, applying computer vision skills to a real-world challenge.

PUBLICATIONS

- **Toledo, M.,** Yera, R., Barranco, M.J., Dutta, B. (2026). GREX: A Platform for Supporting Explanations in Group Recommender Systems. In: Martínez, L., et al. Intelligent Data Engineering and Automated Learning – IDEAL 2025. IDEAL 2025. Lecture Notes in Computer Science, vol 16239. Springer, Cham. https://doi.org/10.1007/978-3-032-10489-2_9
- Pereira Júnior, J. G., Ekel, P. I., Palhares, R. M., Parreiras, R. O., & **Leão, M. T. da S.** (2025). Sobre a tomada de decisão multicritério em condições de incerteza [On multicriteria decision-making under conditions of uncertainty]. In P. I. Ekel & M. P. Libório (Eds.), Tomada de decisão multicritério sob condições de incerteza e suas aplicações [Multicriteria decision-making under conditions of uncertainty and its applications] (Chapter 1). Belo Horizonte: PUC Minas. ISBN 978-65-88547-80-9
- Figueiredo, L. R., Frej, E. A., Soares, G. L., Ekel, P. I., & **Leão, M. T. da S.** (2025). Construção de cenários para análise multicritério em condições de incerteza com base em informações quantitativas e qualitativas usando a decisão de grupo [Scenario building for multicriteria analysis under conditions of uncertainty based on quantitative and qualitative information using group decision-making]. In P. I. Ekel & M. P. Libório (Eds.), Tomada de decisão multicritério sob condições de incerteza e suas aplicações [Multicriteria decision-making under conditions of uncertainty and its applications] (Chapter 4). Belo Horizonte: 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
- **Leão, M. T. da S.** (2023). Tomada de decisão multicritério em condições de incerteza no escoamento portuário de minérios [Multicriteria decision-making under conditions of uncertainty in port ore flow]. (Master's thesis, Pontifícia Universidade Católica de Minas Gerais, Programa de Pós-Graduação em Informática). DOI: 10.13140/RG.2.2.11201.88168
- Toledo, I. H. L., & **Leão, M. T. da S.** (2022). A lógica pode auxiliar na obtenção de segurança jurídica nas decisões judiciais? [Can logic assist in achieving legal certainty in judicial decisions?]. Lógica, direito e inteligência artificial [Logic, Law, and Artificial Intelligence]). In B. Thaís, L. Pinheiro, & Y. Marcelo (Eds.), Estudos em direito público e privado: volume VI [Studies in public and private law: volume VI] (pp. 35–54). Belo Horizonte: PUC Minas. ISBN 978-65-88331-55-2.
- **Leão, M. T. da S.** (2020). Contratos no Ambiente de Contratação livre -ACL- e uma Estratégia para Análise de Risco Quantitativo [Contracts in the Free Energy Market and Risk Analysis Strategy]. (Bachelor's final paper, Pontifícia Universidade Católica de Minas Gerais, IPUC - Engenharia Eletrica). DOI: 10.13140/RG.2.2.24204.22406

SKILLS

- Programming Languages: Python, JavaScript, TypeScript.
- Optimization Tools: Gurobi, PuLP, SciPy, CVXPY
- Python Packages (Data and ML): NumPy, Matplotlib, Pandas, Scikit-learn, Pytorch, Tensorflow,
- Web development: React.js, Next.js, Material UI, Styled Components
- Backend: Tornado, Nest.js, Node.js, Express.js, GraphQL, HTTP/REST, SOAP APIs.
- Database: NoSQL (MongoDB and DynamoDB), Elasticsearch, SQL Server.
- Cloud service: Heroku, Amazon Web Services (AWS), Vercel.
- Software Packages: MS Office, LaTeX
- Test: Pytest, Jest.
- Versioning: Git, GitHub.
- ERP System: SAP, TOTVS.
- DevOps: TerraForm, LLMOps, CI/ CD, Docker.
- Methods: SOLID principles, TDD, DDD, Clean Architecture

CERTIFICATIONS

- Machine Learning - DeepLearning.ai | Specialization Coursera | Credential 3Y550NUNPRN8
- Explainable AI (XAI) - Duke University | Specialization Coursera | Credential LFB9M99V68LM

- Recommender Systems - University of Minnesota | Specialization Coursera | Credential 2O1JXY68ZYPR
- Large Language Model Operations (LLMOps) - Duke University | Specialization Coursera | Credential RM1YYQLUCSMY
- AWS Machine Learning | Udacity | Credential DTKKKKEW
- AWS Cloud Technical Essentials | Coursera | Credential FL5YY8Z4XMNH
- Building Modern Node.js Applications on AWS | Coursera | Credential Z5YFN7YWGYFF
- Nodejs, Typescript, TDD, DDD, Clean Architecture and SOLID | Udemy | Credential UC-Of4fa7cd-2c00-4f17-af34-e446e1afe8ea
- JavaScript Functional e Reactive | Cod3r |Credential j98sdj1jmz
- Make a GraphQL Server with Express.js | Coursera | Credential DUNWJZYNRFDQ
- Amazon DynamoDB: Building NoSQL Database-Driven Applications - AWS | Coursera | Credential BN9LHSCSXG8B
- Fundamentals of Nest.js | Coursera | Credential ZYXLL7WQZVYV
- Terraform Basics: Automate Provisioning of AWS EC2 Instances | Coursera | Credential A4AJZJR8GE2T

HONORS & AWARDS

- ***1st prize in VI Edition of Acceleration Program*** *| PUC Minas - Fumsoft | 2019*
  The Business Acceleration Program encourages entrepreneurship and supports all those interested in validating an idea, developing a business plan, and creating a minimum viable product (MVP).
  At the end of the program, the startups competed against each other. As the winner with Looksafe, I received three months of mentoring at Acelera MGTI, a Fumsoft Accelerator Program, with strategies for understanding the market, product, and customers.