

# MARCELO PRATES, PHD

## Data Scientist & ML/AI Engineer

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### EDUCATION

#### PhD in Computer Science

Federal University of Rio Grande do Sul (UFRGS)

Aug 2015 – Jul 2019    Porto Alegre, Brazil

- AI Ethics: On Quantifying and Understanding the Role of Ethics in AI Research (GCAI 2018), Assessing Gender Bias in Machine Translation (NCA 2020)
- Graph Deep Learning & Combinatorial Optimization: Learning to Solve NP-Complete Problems (AAAI 2019), Graph neural networks meet neural-symbolic computing (IJCAI 2021), Graph neural networks meet neural-symbolic computing: A survey and perspective (IJCAI 2020)
- Erdős number: 3 (via Moshe Vardi)

### EXPERIENCE

#### Lead Data Scientist

Dataside

Oct 2023 – Now    São José dos Campos, Brazil (Remote)

- Mentored junior data scientists in ML, generative AI, and MLOps; led client engagement and solution design for successful project acquisition.
- Built LLM-powered platforms for law and analytics using RAG, multi-format ingestion, and automated workflows (translation, summarization, legal analytics, NL database queries), reducing manual workload and costs.
- Developed advanced sales forecasting models with conformal prediction and quantile regression to minimize underestimation risk and control overestimation.
- Created hybrid classification systems (TF-IDF + LLM embeddings) for product categorization with calibrated probability rejection, improving accuracy and reducing revision time.
- Delivered RAG solutions for structured data extraction from unstructured documents (publishers, law firms) using multimodal ingestion and table detection, achieving high accuracy.
- Built computer vision systems for health and food sectors: (1) liquid volume estimation from photos; (2) food tray detection/classification for automated consumption tracking.
- Additional: custom chatbots, knowledge extraction, clustering, and outlier detection systems.
- Tech stack:
  - Languages: Python, Julia, Javascript, C#, SQL, Bash
  - AI/ML: PyTorch, Lightning, MLflow, Scikit-Learn, Optuna, PyCaret
  - LLM/NLP: Azure OpenAI, LangChain, RAG, HuggingFace, CrewAI, PydanticAI, LangGraph
  - Data: Databricks, Pandas, Polars, NumPy, Dask, PySpark, Pinecone, Weaviate, Chroma, PostgreSQL, Redis
  - MLOps: Azure, Docker, GitHub Actions
  - APIs: FastAPI, Flask
  - CV: OpenCV, Open3D, Scikit-Image, Shapely

#### Large Language Models Consultant

Vortigo

Nov 2023 – Jun 2024    Porto Alegre, Brazil (Remote)

- As LLM consultant, I collaborated with a Brazilian tech company in the design and implementation of assistant ChatBots informed by proprietary source code and spreadsheet knowledge bases by leveraging OpenAI's paid API and pretrained Large Language Models such as GPT3.5 and GPT4.
- Tech stack:
  - Languages & Core: Python
  - AI & ML: PyTorch, PyTorch Lightning, Pandas, Scikit-Learn, NumPy, Jupyter Notebooks, AWS Sagemaker
  - LLM & NLP: OpenAI API, HuggingFace, LangChain, BertTopic

#### Sabbatical Period

To focus on my generative art projects

Apr 2023 – Oct 2023    Porto Alegre, Brazil

- I took a short sabbatical period to focus on my generative art projects and maintain / improve existing Python packages I had built to help me in my artistic process, including prettypmaps

#### Machine Learning / Computer Vision Consultant

ConstructiN

Mar 2022 – Apr 2023    Porto Alegre, Brazil (Remote)

- As a senior ML & Computer Vision consultant, I spearheaded the design and implementation of advanced computer vision solutions for automated construction site monitoring using 360-degree photography, leveraging state-of-the-art deep learning architectures.
- Led a team of 3 data scientists in developing and deploying 4 production-ready computer vision applications, including a comprehensive analytics dashboard that enabled real-time construction progress monitoring through custom semantic segmentation models. The solution significantly improved project tracking efficiency and decision-making capabilities for clients.
- Tech stack:
  - Languages & Core: Python
  - AI & ML: TensorFlow, Keras, PyTorch, PyTorch Lightning, Pandas, Scikit-Learn, SciPy, NumPy, Matplotlib
  - Computer Vision: Open3D, OpenCV, Scikit-Image




### SKILLS

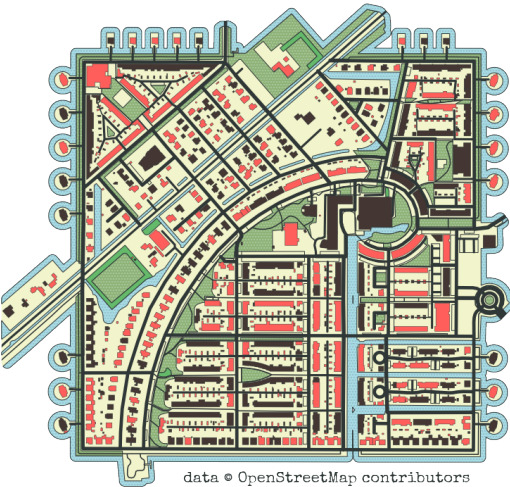
- Uncertainty Quantification
- Causal Inference
- Bayesian Machine Learning
- Graph Neural Networks
- Computer Vision
- ML for Healthcare
- ML for FinTech
- Geospatial Analytics
- LLMs & RAG Systems
- LangChain Ecosystem
- Vector Databases
- Tool Usage & Agentic AI
- LangGraph & State Machines
- Context Engineering
- Hybrid Search & Metadata Filtering
- DSpy & Prompt Optimization
- MLOps & Production ML
- MLflow & Experiment Tracking
- FastAPI & API Design
- CI/CD Pipelines
- Docker & Containerization
- Data Projects Management
- System Design
- Technical Leadership
- Azure Cloud Platform
- Databricks & Big Data
- SQL & Database Design
- Julia
- System Programming (C/C++)

### PROFICIENCY

- Portuguese (native speaker)
- English
- Spanish

### MOST PROUD OF

-  **Gender Bias in Machine Translation**  
Our 2018 research measured the prevalence of male defaults in Machine Translation tools
-  **VO2 Max for Samsung Galaxy Watch**  
Led the development and global deployment of VO2 max estimation feature, now available to millions of users worldwide
-  **Prettypmaps**  
Python library for drawing pretty maps from OpenStreetMap data (1st place on Hacker News, >11.000 stars, ranked among the 2000 most starred repositories on GitHub)



- 4. **MLOps & Infrastructure:** [AWS](#), [Docker](#)
- 5. **APIs & Services:** [Flask](#), [Django](#)

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## Generative Art Teacher

### [Responsive Cities](#)

📅 Nov 2022

📍 Porto Alegre, Brazil

- Taught a course on generative art history & principles and on useful tools and libraries for creative coding

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## Senior Data Scientist

### [Condati](#)

📅 Nov 2021 – Dec 2023

📍 Menlo Park, California (Remote)

- As Senior Data Scientist, I led the redesign and optimization of ML solutions for digital marketing campaign bid strategies, achieving significant ROI improvements and meeting client KPIs through:
  - Implementation of advanced forecasting models and automated bidding systems
  - Development of robust monitoring and validation frameworks
  - Design of novel optimization algorithms for real-time bid adjustments
  - End-to-end MLOps pipeline implementation for model deployment and monitoring
- Successfully diagnosed and resolved critical performance issues, bringing model effectiveness back to target levels within one year.
- Tech stack:
  1. **Languages & Core:** [Python](#), [Julia](#)
  2. **AI & ML:** [PyTorch](#), [TensorFlow.js](#), [Torch.js](#), [ML.js](#), [Flux.js](#), [Pandas](#), [SciPy](#), [NumPy](#)
  3. **Data Engineering:** [MySQL](#)
  4. **MLOps & Infrastructure:** [AWS Sagemaker](#)

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## AI Researcher & Project Leader - ML for Health

### [Samsung Research Brazil](#)

📅 Mar 2020 – Nov 2021

📍 Campinas, Brazil (Remote)

- Led the development of ML-powered health monitoring solutions for Samsung wearables, resulting in global implementation in the Galaxy Watch line.
- Designed robust data collection protocols and ML architectures for physiological signal analysis and health metric estimation.
- Developed memory-optimized, real-time health monitoring algorithms for resource-constrained wearable devices, ensuring high accuracy and efficiency.
- Deployed production models on Samsung Tizen OS, using custom Python-to-C transpilers and ONNX for efficient inference.
- Presented project outcomes directly to Samsung HQ, leading to worldwide adoption and impact.
- Led and mentored cross-functional teams of researchers and engineers, driving innovation in wearable health technology while meeting strict performance and resource constraints.
- Tech stack:
  1. **Languages & Core:** [Python](#), [Julia](#), [C/C++](#)
  2. **AI & ML:** [TensorFlow](#), [Keras](#), [PyTorch](#), [PyTorch Lightning](#), [ML.js](#), [Flux.js](#), [Pandas](#), [Scikit-Learn](#), [SciPy](#), [NumPy](#), [Matplotlib](#)
  3. **MLOps & Infrastructure:** [AWS Sagemaker](#)
  4. **Deployment:** [C](#), [ONNX](#), [Custom Python-to-C transpilers](#), [Samsung Tizen OS](#)

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## Data Scientist

### [Poatek IT Consulting](#)

📅 Jun 2019 – Mar 2020

📍 Porto Alegre, Brazil

- As a Data Scientist, I led multiple high-impact projects across different domains, delivering innovative solutions through:
    - Development of exact and heuristic algorithms for complex vehicle routing optimization
    - Implementation of computer vision and NLP pipelines for automated document processing and data extraction
    - Design of advanced NLP solutions for Named Entity Recognition and sentiment analysis
    - Creation of sophisticated credit risk modeling systems
    - Development of geospatial data analysis and visualization frameworks
  - Successfully integrated various ML/DL technologies including CNNs, ensemble methods, and pre-trained language models to enhance solution performance.
  - Tech stack:
    1. **Languages & Core:** [Python](#), [Julia](#), [C/C++](#)
    2. **AI & ML:** [TensorFlow](#), [Keras](#), [PyTorch](#), [PyTorch Lightning](#), [Pandas](#), [GeoPandas](#), [Scikit-Learn](#), [SciPy](#), [NumPy](#), [Matplotlib](#)
    3. **Computer Vision:** [OpenCV](#), [Scikit-Image](#)
    4. **MLOps & Infrastructure:** [Docker](#)
    5. **APIs & Services:** [Flask](#), [Django](#)
    6. **Optimization:** [JuMP](#), [Google OR-Tools](#)
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