

JOSEPH MARTINEZ

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PROFESSIONAL SUMMARY

Data Scientist with 4 years of expertise in Machine Learning and Natural Language Processing. Skilled in training and deploying LLMs and building simulation models. Focused on transforming data into impactful solutions, showcased through my work on high-profile research initiatives and contributions to interdisciplinary teams.

PROFESSIONAL EXPERIENCE

Aaru, Inc

New York, NY, USA

AI Software Developer

July 2024 - Present

- Improved the performance of multi-agent LLM systems by designing and implementing state-of-the-art algorithms in complex Agent-Based Simulation environments.
- Designed simulation environments integrating survey and historical data to model political and business scenarios, enabling the generation of actionable insights and predictive analytics.
- Conducted innovative research in machine learning and Natural Language Processing while collaborating with interdisciplinary teams to develop innovative AI-driven solutions for real-world challenges.

Virginia Modeling Analysis and Simulation Center

Suffolk, VA, USA

Graduate Research Assistant

September 2022 - December 2024

- Trained the Large Language Model (LLM) GPT-3.5's to create ABM Simulation models, by improving its ability to generate NetLogo interface and procedural code elements through few-shot prompting.
- Developed a conversational Chatbot expert in a custom domain enhancing answer fidelity by 90% by fine-tuning the LLM Llama2 7B on a dataset of 330 news articles.
- Trained and fine-tuned Machine Learning classification models (RFC, ANN, and BERT) to identify types of frustration in textual data, achieving an average accuracy of 70%.
- Designed and maintained detailed documentation of models, algorithms, and reports on GitHub repositories.
- Presented poster at a research conference in Pittsburgh, and attended others in Arlington, VA, and Oxford, OH.

Old Dominion University

Norfolk, VA, USA

Social Media Data Analyst (Consultant)

July 2021 - January 2022

- Geolocated, filtered, and estimated the tone of 7.3 million Tweets through fine-tuning fifteen NLP models (spaCy, BERT, RoBERTa) and Statistical Analysis. Models were highly reliable, with a mean accuracy of 72%.
- Extracted, cleaned, and pre-processed 15.5 million Tweets in multiple languages with Twitter's API and Python.
- Created dashboards with Tableau and Google Data Studio to represent migration data.
- Collaborated with teams from Norway, Colombia, Greece, and USA on a \$1.4M USD Minerva research initiative.

Universidad del Norte

Barranquilla, Colombia

Social Media Data Analyst (Research Assistant)

November 2020 - June 2021

- Trained a Natural Language Understanding (NLU) model with IBM Watson to semi-automate the identification of actors, factors, and relationships from news articles, achieving a final accuracy of 70%.
- Gathered, filtered, and cleaned geo-tagged 4,680 Tweets on migration using Twitter's API and Python.
- Conducted a lexicon-based Sentiment Analysis of Tweets to spot xenophobic trends.

EDUCATION

Old Dominion University

August 2022 - December 2024

Master's, Modeling and Simulation Engineering

GPA: 3.7

Universidad del Norte

January 2017 - March 2022

Bachelor's, Industrial Engineering

GPA: 3.6

SKILLS

Skills: Python, R, SQL, Pandas, Pytorch, ANN, PCA, NumPy, scikit-learn, Transformers, Hugging Face, OpenAI, FastAPI, Tableau, Power BI, Shiny, Git, GitHub, Docker

Languages: German, Spanish, English

PUBLICATIONS

- **Joseph Martínez**, Brian Llinas, Jhon G. Botello, Jose J. Padilla, and Erika Frydenlund. “Enhancing GPT-3.5’s Proficiency in NetLogo through Few-Shot Prompting and Retrieval-Augmented Generation” 2024 Winter Simulation Conference (WSC) IEEE (2024) [Finalist for Best Applied Paper].
- Erika Frydenlund, **Joseph Martínez**, Jose J. Padilla, Katherine Palacio, and David Shuttleworth. “Modeler in a Box: How Can Large Language Models Aid in the Simulation Modeling Process?” SIMULATION (2024).
- Lynch, Christopher J., Erik J. Jensen, Madison H. Munro, Virginia Zamponi, **Joseph Martínez**, Kevin O'Brien, Brandon Feldhaus, Katherine Smith, Ann Marie Reinhold, and Ross Gore. “GPT-4 Generated Narratives of Life Events using a Structured Narrative Prompt: A Validation Study.” (2024)
- **Joseph Martínez**, Melissa Miller-Felton, Jose J. Padilla, Erika Frydenlund. “Behind Derogatory Terming for Venezuelan Migrants in Colombia: Xenophobia and Sexism Identification with Twitter Data and NLP” (2023)
- Lauren Guerra, **Joseph Martínez**, and Francisco Pautt. “Design of a User Interface based on Information Engineering and Web Programming for the FUVADIS customer service process.” Universidad del Norte (2021).

AWARDS

- **International Student Exchange Program**
U.S. Department of Defense (DoD) · October 2024
· Selected to conduct interdisciplinary AI research at the University of Agder, Norway
- **SBP-BRIMS 2023 conference scholarship**
SBP-BRiMS Conference chair · September 2022
- **Outstanding results in the Saber Pro 2021 test**
Universidad del Norte · November 2022
· Best institutional score in Colombia's national standardized exam for higher education.
- **Graduate Research Assistantship**
Virginia Modeling, Analysis and Simulation Center (VMASC) · June 2022
- **Undergraduate Honorable Mention**
Universidad del Norte · March 2022
· Recognized as one of the top three students in Industrial Engineering based on academic excellence and GPA.
- **Andrés Bello Distinction**
Colombian Ministry of Education · November 2016
· Ranked in the top 1% of the country on the ICFES High School State Exam, earning national distinction.