# PROFESSIONAL SUMMARY

Research Assistant with 4 years of experience in Machine Learning, and Natural Language Processing. Proficient in training LLMs, Machine Learning algorithms, and building Simulation models. Strong communication skills through professional engagements. Proven ability in programming and large-scale data analytics to derive valuable insights. Collaborative team member with a track record of successful collaboration on international research projects.

# SKILLS

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| NLP: scikit-learn, Transformers, spaCy, Hugging Face, OpenAI GPTs | Deep Learning: Pytorch, Keras, ANN |
| Machine Learning: Classification, Regression, Clustering, PCA, NumPy | Data Analysis: Python, Pandas, R, SQL |
| Data Visualization: Tableau, Power BI, R Shiny | DevOps: Git, GitHub, Docker |

# PROFESSIONAL EXPERIENCE

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| **Aaru, Inc** | New York City, NY |
| *AI Software Developer* | July 2024 – Present |
| • Improved the performance of multi-agent Large Language Model systems by designing and implementing advanced algorithms for task coordination, communication efficiency, and decision-making 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, & Simulation Center (VMASC)** | Suffolk, VA |
| *Graduate Research Assistant* | Sep 2022 – Present |
| • 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. | |
| **University of Agder (UiA)** | Kristiansand, Norway |
| *Exchange Researcher* | Oct 2024 – Nov 2024 |
| • Conducted a joint research project with historians and AI researchers to analyze historical and cultural components of Norwegian identity in the public sphere.  • Utilized NER and LLMs to extract and analyze historical references from Norwegian newspapers, identifying patterns in cultural representation and omissions. | |
| **Old Dominion University** | Norfolk, VA |
| *Social Media Data Analyst (Consultant)* | Jul 2021 – Jan 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.  • 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)* | Nov 2020 – Jun 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

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| **Old Dominion University** | Norfolk, VA |
| M.Sc. Modeling and Simulation Engineering - GPA: 3.7 | Aug 2022 – Dec 2024 |
| **Correlation One** | New York City, NY |
| Data Science for All (Bootcamp) | Mar 2022 – Jul 2022 |
| **Universidad del Norte** | Barranquilla, Colombia |
| B.Sc. Industrial Engineering - GPA: 3.6 | Jan 2017 – Mar 2022 |

# 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 AND ACHIEVEMENTS

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| **International Student Exchange Program** |  |
| U.S. Department of Defense (DoD)  · Selected to conduct interdisciplinary AI research the University of Agder, Norway in person | Oct 2024 |
| **SBP-BRIMS 2023 conference scholarship** |  |
| SBP-BRiMS Conference chair | Sep 2022 |
| **Outstanding results in the Saber Pro 2021 test** |  |
| Universidad del Norte  · Best overall institutional score | Nov 2022 |
| **Graduate Research Assistantship** |  |
| Virginia Modeling, Analysis and Simulation Center (VMASC) | Jun 2022 |
| **Undergraduate Honorable Mention** |  |
| Universidad del Norte | Mar 2022 |
| **Andrés Bello Distinction** |  |
| Colombian Ministry of Education  · Distinction to outstanding students in the ICFES Saber 11 State Exam for high school | Nov 2016 |