Andrés Felipe Arias Russi

Computer Scientist, Systems Engineer and Mathematician

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Education

- **Universidad de los Andes** — Bogotá, Colombia
  B.Sc. in Systems Engineering and Computer Science — *Aug 2019 – Dec 2024*
  Relevant courses: Machine Learning - Generative Models, Quantum Computing, Data Structures and Algorithms, Algorithm Design and Analysis, Business Intelligence, Computing Infrastructure, Mobile Application Development, Web Development, Database Systems

- **Universidad de los Andes** — Bogotá, Colombia
  Bachelor of Mathematics — *Aug 2023 – Dec 2024*
  Relevant courses: Statistics, Probability, Optimal Transport, Differential Geometry, Topology, Mathematical Logic, Information Theory, Numerical Analysis, Theory of Computation, Pattern Recognition, Abstract Algebra, Measure and Integration Theory

Skills Summary

- **Soft Skills**: Collaborative problem solver, effective communicator, intellectually curious, open-minded, eager to learn, adaptable to new challenges, resourceful, teamwork, and positive attitude.
- **Programming Languages**: Python (proficient), JavaScript, TypeScript, Java, Dart, C++ (basic).
- **Data Science**: Natural Language Processing, Artificial Intelligence, Machine Learning, Deep Learning, Statistical Modeling, Data Analysis and Collection, Optimal Transport
- **Software Development**: Software Design and Architecture, Human-Robot Interaction, Reactive Programming.
- **Programming Tools and Libraries**: PyTorch, TensorFlow, Node.js, NumPy, Selenium, BeautifulSoup, ROS, FastAPI, React, Svelte, SQL, Flutter, PowerBI.
- **Certifications**: Deep Learning Specialization (Coursera, 2021), Machine Learning (Stanford University, 2020)
- **Languages**: Spanish (Native), English (Fluent).

Research Experience

- **Cornell University - Cornell Tech** — New York City, USA
  Research Assistant - Prof. Angelique Taylor — *Jun 2024 – Present*
  - **Human-Robot Interaction Enhancement**: Designed teleoperation interfaces using **Svelte** and **FastAPI** to enable autonomous robot behavior in healthcare settings.
  - **Collaborative Research**: Worked with multidisciplinary teams, including shadowing medical staff at NewYork-Presbyterian/Weill Cornell Medicine to align technological solutions with real-world needs.
  - **LLM Integration**: Integrated LLMs (**Gemini API**, **Llama 3.1**) to improve robot interaction and natural language understanding.
  - **Communication Architecture**: Developed IP communication framework with **WebRTC**, achieving small delay for video, audio, and robot commands.
  - **Vision Tracking**: Used **YOLO** for vision tracking, managing real-time data exchange between interfaces, robots, LLMs, and cameras.
- **Universidad de los Andes** — Bogotá, Colombia
  Research Assistant - Prof. Rubén Manrique — *Aug 2022 – Dec 2023*
  - **Biomedical Text NLP**: Created custom metric for text plainness and models like Gradient Boosting and Random Forest, achieving **+90%** accuracy predicting if a text is plain or professional.
  - **Model Optimization**: Applied different hyperparameter tuning techniques (e.g., **GridSearch**) to enhance model performance.
  - **Data Handling**: Managed large biomedical datasets; performed statistical analysis using tools like **Pandas** and **NumPy**, and NLP with **spaCy**.

Experience

- **Universidad de los Andes** — Bogotá, Colombia
  Teaching Assistant - Algorithm Design and Analysis — *Jan 2022 – Dec 2022*
  - **Teaching Assistance**: Assisted in grading assignments, clarifying students' doubts, and providing supplementary lessons to reinforce understanding of algorithms and data structures, ensuring students grasped problem-solving techniques and algorithmic concepts.
- **Universidad de los Andes** — Bogotá, Colombia
  Secondary Professor - Differential Calculus — *Jan 2024 – Jun 2024*
  - **Course Instruction**: Instructed a class of approximately 30 students in Differential Calculus, developing course materials and assessments to enhance understanding and application of key mathematical concepts.
- **Universidad de los Andes** — Bogotá, Colombia
  Robocol - Robotics Group Member — *Feb 2021 – Aug 2022*
  - **Computer Vision and Team Collaboration**: Worked on image processing algorithms and deep learning models (YOLO, CNNs) for computer vision tasks in the Vision Subsystem; collaborated on robotics competitions and projects, enhancing teamwork and technical skills.

Projects

- **Integrated Communication Framework for Healthcare Robotics**: Contributed to the development of an interface designed to connect with a crash cart, aiming to assist healthcare workers in emergencies. Conducted user tests to evaluate the interface's effectiveness and worked on integrating semi-autonomous control for the robot in a 'Wizard of Oz' setup.
- **Plain Language Text Generation**: Developed a linguistic analysis using statistical and NLP tools in Python to identify relevant variables determining the simplicity of biomedical texts. Constructed a classification model and tested multiple prompts using LLMs to generate a plain language version from professional texts. Hypothesis testing was used for statistical analysis. BERTScore was utilized to measure semantic fidelity between generated texts and a ground-truth benchmark.
- **Generative Models for Quasar Spectra Data**: Trained Variational Autoencoders (VAEs) to generate quasar spectra data, collaborating on data preprocessing, model training, and evaluation; gained experience in unsupervised learning and generative modeling techniques.
- **DevSavant Contest:**: Collaborated with a team of five to develop a project analyzer using LLMs with the GPT 3.5 API. Learned LangChain and strategies for prompting like few-shot and zero-shot learning.