NICOLÁS AYOBI

ML Engineer and AI Researcher

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SUMMARY

Result-oriented AI engineer with four years of experience in computer vision, natural language processing, deep learning architectures, and machine learning projects. I hold a Master's in Engineering from the University of Los Andes, where my studies were supported by Google DeepMind and focused on AI applications in public health. With a strong background as an AI researcher and consultant, I bring both academic and industry expertise in developing and deploying machine learning solutions. I am now seeking opportunities to apply my deep learning skills to drive innovation and scale industrial products.

WORK EXPERIENCE

Bogotá, Colombia
Jun/2023 – Sep/2024

Freelance Machine Learning Consultant and Developer   **Plibots S.A.S.**
- Analyzed client data and requirements and evaluated possible machine-learning solutions.
- Developed a software service with a CNN trained to prevent work accidents in field operations.
- Built and trained real-time human detection models to be deployed on CPUs and video cameras.

Bogotá, Colombia
Jan/2021 – Nov/2024

Research Professional in AI   **Center for Research and Formation in Artificial Intelligence**
- Led diverse research projects focusing on computer vision and deep learning applications, including vision-language integration, video analysis, image-guided robotics, and AI-based road safety.
- Formulated four new AI datasets along with solutions based on Transformers, LLMs and CNNs.
- Published 8 articles with novel state-of-the-art models in 5 top-tier AI journals and conferences, achieving an acceptance rate of 83% and an oral presentation rate of 80%.

TEACHING EXPERIENCE

Bogotá, Colombia
Jan/2022 – Dec/2023

Graduate Teaching Assistant   **Universidad de Los Andes**
- Taught laboratory classes and practical workshops using learning contents that I created.
- Formulated theoretical and practical evaluations and provided feedback.
- Guided and mentored students in more than 15 research projects about applications of AI.

Courses Taught: *Research Summer School on Deep Learning (3 months) ● Advanced Machine Learning (2 semesters) ● Computer Vision (1 semester) ● Coursera's Master's Degree in Artificial Intelligence by Uniandes (10 months)*

Bogotá,Colombia
Jan/2020 – Dec/2021

Undergraduate Teaching Assistant   **Universidad de Los Andes**
- Helped the teachers with course planning and learning content development.
- Assisted and guided students on class topics, projects, and assignments.
- Created practical workshops and graded assignments developed in the courses.

Courses Taught: *Introduction to Programming (1 semester) ● Data Structures in Java (2 semesters) ● Data Structures in Python (1 semester) ● Image Analysis and Processing (1 semester)*

EDUCATION

Bogotá, Colombia
Jan/2022 - Dec/2023

Master's degree in Biomedical Engineering (DeepMind Scholar)   **Universidad de los Andes**
- Research master's degree focused on computer vision applications to public health.
- GPA: 4.87/5.0
- Relevant Courses: *Computer Vision & Advanced Machine Learning.*

Bogotá, Colombia
Aug/2017 - Dec/2021

Bachelor's degree in Biomedical Engineering (Cum Laude)   **Universidad de los Andes**
- Double minor in Computational Mathematics and in Bioinformatics.
- GPA: 4.54/5.0
- Relevant Courses: *Data Structures, Image Analysis & Processing, Algorithmic Design and Analysis, Scientific Programming, Structural Mathematics, Object Oriented Programming.*

Sydney, Australia
Aug/2019 - Dec/2019

Undergraduate Exchange Program in Engineering   **University of New South Wales**
- Relevant Courses: *Signal Processing & Mechanics of the Human Body*

RELEVANT SKILLS

Programming Languages:

Proficient:	Python, Java, Bash, MATLAB
Intermediate:	HTML, CSS, SQL
Basic:	R, C++

Tools & Frameworks:

Proficient:	Excel, GitHub, LaTeX
Intermediate:	AWS, Flask
Basic:	Django, Docker

Machine Learning Frameworks:

Proficient:	Pytorch, OpenCV, Hugging Face, NLTK
Intermediate:	Scikit-Learn
Basic:	Tensorflow, H2O

AI Models & Algorithms

Deep Learning:	CNNs, Transformers, LLMs, RNNs, GNNs
Machine Learning:	AutoML, SVMs, Random Forest, k-NN, K-Means

Languages

English - C2 (professional level)
Spanish - native

CAREER ACHIEVEMENTS

Outstanding Reviewer
By: MICCAI 2024

Distinction for top 12 reviewers (top 0.56%) of the MICCAI 2024 Conference on medical AI .

Best Student Paper Award
By: Road++ Workshop, 2023

Main author of the Best Student Paper at ROAD++ Workshop on Event Detection for Situation Awareness in Autonomous Driving, hosted at ICCV 2023.

AI Challenge Winner
By: SAR-RARP50 Challenge, 2022

Leader of the winning team of two out of three sub-challenges and runner-up of the third sub-challenge of the SAR-RARP50 Challenge hosted at MICCAI 2022.

AI Challenge Finalist
By: MICCAI 2023 & 2024

Advisor of the runner-up team of three sub-challenges and winner of one sub-challenge of the PiTVis and PhaKir challenges hosted at MICCAI 2023 and 2024.

HONOURS & AWARDS

Cum Laude Graduation
By: Universidad de los Andes

Bachelor's graduation honor for GPAs in the top 3% of historical GPAs in the Engineering Faculty.

DeepMind Scholarship
By: Google DeepMind

Postgraduate scholarship and mentorship provided by Google Deepmind to top 3 applicants.

Uniandinos Scholarship
By: Uniandinos Association

Semestral scholarship for undergraduate students with outstanding GPAs (4 semesters).

Top 10 GPAs
By: Biomedical Engineering

Semestral distinction to biomedical engineering students with the top 10 GPAs (3 semesters).

SELECTED PUBLICATIONS

Video Analysis for Robotic Surgery

Pixel-Wise Recognition for Holistic Surgical Scene Understanding   **Project Repository Link**
Nicolás Ayobi, Santiago Rodríguez, Alejandra Pérez, Isabela Hernández, et al., Pablo Arbeláez
- Collaboration with Fundación Santa Fe de Bogotá.
- Published in ArXiv, In revision for Medical Image Analysis 2024.

Computer Vision & NLP

PiGLET: Pixel-Level Grounding of Language Expressions With Transformers   **Project Page Link**
Cristina González, Nicolás Ayobi, Isabela Hernández, Jordi Pont-Tuset, Pablo Arbeláez.
- Collaboration with Google Research Zurich.
- Published in IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2023.

AI for Pedestrian Safety

STRIDE: Street View-based Environmental Feature Detection and Pedestrian Collision Prediction   **Project Repository Link**
Cristina González* & Nicolás Ayobi*, et al., Olga L. Sarmiento, D. Alex Quistberg, Pablo Arbeláez.
- Collaboration with Drexel University.
- Oral Presentation at the ROAD++ Workshop of the IEEE/CVF International Conference in Computer Vision (ICCVW) 2023.

Surgical Image Segmentation

MATIS: Masked-Attention Transformers for Surgical Instrument Segmentation.   **Project Repository Link**
Nicolás Ayobi, Alejandra Pérez-Rondón, Santiago Rodríguez, Pablo Arbeláez.
- Oral Presentation at IEEE International Symposium on Biomedical Imaging (ISBI) 2023.

Computer Vision & NLP

Panoptic Narrative Grounding   **Project Repository Link**
Cristina González, Nicolás Ayobi, Isabela Hernández, Jordi Pont-Tuset, Pablo Arbeláez.
- Collaboration with Google Research Zurich.
- Oral Presentation at IEEE/CVF International Conference in Computer Vision (ICCV) 2021.

INVITED TALKS

Workshop Talk

Applying AI via deep learning to injury research & prevention   **World Safety Conference, 2024**

Master Class (Virtual)

Holistic Understanding of Image-Guided Surgical Robot Intelligence.   **Fundación Santa Fe de Bogotá, 2023**

Plenary Talk

Augmented Reality and AI, the Future of Robotic Surgery.   **Colombian Symposium on Robotic Surgery, 2023**

Industry Talk (Virtual)

Towards Multi-level Surgical Video Analysis with Transformers.   **Olympus Corporation, Japan, 2023**

ATTENDED EVENTS & PRESENTATIONS

Oral — International Conference of Computer Vision (2021 & 2023)
Oral — International Conference on Medical Image Computing and Computer Assisted Interventions (2022 & 2024)
Grant — EMBS-SPS Summer School on Medical Imaging (2023)
Oral — International Symposium on Biomedical Imaging (2023)
Lecture — World Safety Conference (2024)

COURSES & CERTIFICATES

Coursera — Introduction to Software Engineering
Coursera — Python for AI and Data Science
Coursera — Developing AI Applications in Flask
Coursera — Django Application Development With SQL and Databases
Coursera — (in progress) IBM Back-end Developer