Oscar **Guarnizo**

MASTER STUDENT · MACHINE LEARNING ENGINEER · JUNIOR RESEARCHER

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Education

University of Birmingham   *Birmingham, United Kingdom*

MSc. IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING   *Sept 2023 - Sept 2024*

- Hold the **Deepmind International Scholarship** covering £50,955 for tuition fees, living expenses, and additional expenses.

Yachay Tech University   *Urcuqui, Ecuador*

ENG. IN INFORMATION TECHNOLOGY (B.ENG.)   *April 2015 - March 2020*

- Received the *Cum Laude* recognition, CGPA 9.3/10, second-best grade of the promotion.

Experience

Machine Learning Engineer (Computer Vision)   *Santiago, Chile*

MOBIA LATIN AMERICA   *October 2022 - Jan 2023 · 4 mos*

- Developed a multistream license plate recognition system by assembling an **Nvidia deepstream** pipeline, training 3+ models with the **Nvidia TAO toolkit**, and periodically sending data streams to a **Kafka Apache** cluster for further use-cases.
- Lead a small ML team for building an end-to-end LPR system by using a Kanban method to deal with incremental software deliveries.

Junior Researcher | Co-founder   *Urcuqui, Ecuador*

DEEPARC RESEARCH   *June 2021 - Dec 2022 · 1 yr 7 mos*

- Increased and encouraged AI/ML research opportunities for young undergraduates by co-founding a non-profit organization, including the collaboration of 11 members and sending 15+ articles to international conferences and journals up to date.
- Mentored 3+ research projects by supporting undergraduate students with programming and conceptual practices for AI/ML models, culminating in 2 thesis in chemistry and biology applications and 2 research articles on computer vision for breast cancer detection and smart agriculture.

Machine Learning Engineer (Computer Vision)   *Santiago, Chile*

DIGEVO - OMIA AI GROUP   *Sept 2021 – Sept 2022 · 1 yr*

- Developed a pedestrian detection system based on the NVIDIA transfer learning toolkit and Deepstream SDK, deployed in about 5+ shopping centers from Chile and Ecuador.
- Improved the performance of a precision farming system based on **MaskRCNN** by adding 3 additional sub-tasks (tracking, counting, and spatial correlation) using TensorFlow, **OpenCV**, PyTorch, and **Pandas**.
- Increase the files formats capacity of an **Airflow ETL service** by adding 3+ transforms components to process metadata flows into a database.

Research Intern   *Thuwal, Saudi Arabia*

KING ABDULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY (KAUST)   *March 2021 - Aug. 2021 · 6 mos*

- Implemented *Image2StyleGAN* from scratch using **PyTorch** for adding further experimentation consisting in a cross-domain embedding between Anime and Human Faces **StyleGAN** generators, resulting in an article poster presented at EEML Summer School 2021 organized by **DeepMind.**
- Implemented 5 subsequent image processing tasks (morphing, style transfer, expression transfer, inpainting, and super-resolution) to interpret my StyleGAN embedding results.

Junior Researcher | Coordinator | Undergraduate Researcher   *Urcuqui, Ecuador*

YACHAY SCIENTIFIC COMPUTING GROUP (SCG)   *Feb 2019 - Apr 2022 · 3 yr 3 mos*

- Researched an extended project for initializing an ACO algorithm with random walks and an evaluation through **PCA**, resulting in an article.
- Supervised 1 research projects supporting undergraduate students by suggesting programming and conceptual practices on computer vision.
- Researched a vanilla path planning issue based on Ant Colony Optimization (ACO) as part of my undergraduate thesis, published at LACCI 2019.

Projects

Covariance Tensor
PROJECT PAGE
Developed a method to extract image features using tensor decomposition to model data in one step-forward by programming CNN for classification using Keras (TensorFlow), published at IEEE Access.

Image2StyleGAN
PROJECT PAGE
Reproduced StyleGAN embedding algorithms, adding further experimentation such as inpainting, super-resolution, colorization, morphing, style, and expression transfer.

ALPR System
PROJECT PAGE
Developed the entire process (data preparation, training, deployment) for an Automatic License Plate Recognition (ALPR) system using Nvidia TAO Toolkit, Nvidia Deepstream SDK, and Kafka Apache.

Skills

SKILLS	COURSEWORK	MOOC TRAINING
Spanish (Native)	English (IELTS C1 - 7/9)	Artificial Intelligence & Neural Networks	Deep Learning Specialization
Confident	Fundamentals of Programming*	Video AI Applications on Jetson Nano
Python	Pandas	Latex	C	PyTorch		Databases Management	Machine Learning
Tensorflow	Matplotlib		Operating Systems	Data Structures + Algorithms
Nvidia Deepstream	Nvidia TAO Toolkit	Functional Programming**	Learning How to Learn
Familiar	Computer Graphics & Image Processing	Neuromatch Deep Learning Academy 2021
Matplotlib	OpenCV	Docker	Kafka		Probabilities and Statistics**	*Teaching Assistant*
Amazon AWS	Airflow	Unix		**Research Assistant*

Publications

PUBLISHED

- Fonseca R, **Guarnizo O**, Suntaxi D, Cadiz A, Creixell W. *Convolutional Neural Network Feature Extraction Using Covariance Tensor Decomposition*. IEEE Access. 27 Apr 2021; pp. 9:66646-60. (Open Access, Peer-reviewed)

- J. Pereira, D. Suntaxi, **O. Guarnizo**, F Villalba, and D. Almeida. *Comparison between Two Novel Approaches in Automatic Breast Cancer Detection and Diagnosis and its Contribution in Military Defense*. Springer, Singapore, 2021; pp. 12. (Peer-reviewed)

- **O. Guarnizo** and I. Pineda. *Three Dimensional Adaptive Path Planning Simulation Based On Ant Colony Optimization Algorithm.* The Sixth IEEE Latin American Conference on Computational Intelligence LA-CCI, IEEE. 11 Nov 2019; pp. 1-6. (Peer-reviewed)

- J. R. González, F. P. Zhapa, **O. V. Guarnizo** and F. Ortega-Zamorano. *Successive Adaptive Linear Neural Modeling for Equidistant Real Roots Finding*. Third Ecuador Technical Chapters Meeting (ETCM), IEEE. 15 Oct 2018; pp. 1-6. (Peer-reviewed)

NOTE : conferences and presentations about my research work can be found in 🎓 RESEARCH, 🎓 GOOGLE SCHOLAR, and my ⧉ PORTFOLIO.

Leadership & Awards

2023 **Deepmind International Scholarship**, Scholarship Recipient at Birmingham, United Kingdom.
Hold a scholarship covering £50,955 for tuition fees, living expenses, and additional expenses during the entire one-year master degree at University of Birmingham, conferred to outstanding international students by **Deepmind**.

2022 **Best Research Poster Award - EEML Summer School 2022**, Award Recipient at Vilnius, Lithuania · Virtual.
Awarded as a top 5/100 best research poster during the EEML Summer School 2022 poster sessions organized by **DeepMind**

2021 **Scientific Computing Summer School 2021 Organizer**, Organizing Committee Member at Urcuqui, Ecuador · Virtual.
Coordinated the SCG summer school 2021 plan to increase the exposure of the research group by addressing machine learning topics and reaching around 300 national/international applications, including Ecuador, India, Greece, Colombia, among others.

2021 **Deep Learning and Computer Vision Instructor**, Associate Instructor at Urcuqui, Ecuador · Virtual.
Lectured 23+ undergraduate students 4 hours per week during two months on an *"Introduction to Deep Learning and Computer Vision"* course by imparting deep learning fundamentals, particularly studying convolutional neural networks and transfer learning.

2020 **Higher Education Scholarship**, Scholarship Recipient at Ibarra, Ecuador.
Hold a scholarship covering $22.000 for all undergraduate expenses from 2015-2020, conferred to outstanding students by Instituto de Fomento del Talento Humano (IFTH) & SENESCYT.

2019 **Top Finalist - International Tournament (TuApp 2019)**, Finalist at Tabasco, Mexico.
Selected as a top 60/200 finalist in an international innovation contest for high-achieving Latinx talent in tech by presenting an app based on computer vision and augmented reality for license plate recognition.

2019 **Volunteer ENES Training Program**, Associate Instructor & Volunteer at Ibarra, Ecuador.
Lectured 15+ low-income high school students 4 hours per week during 4 months for the higher education admission exam by imparting fundamental math concepts and problems, reaching 90% students obtaining high scores of over 900/1000.

Certificates

2022 **Deep Learning Specialization**, Virtual Student at Coursera · Virtual.
Working on the specialization, including 5 courses: 1.Neural Networks and Deep Learning, 2.Improving Deep Neural Networks, 3. Structuring Machine Learning Projects, 4.Convolutional Neural Networks, and 5.Sequence Models (ended 4/5 courses until now).

2022 **Building Video AI Applications at the Edge on Jetson Nano**, Virtual Student at Nvidia Deep Learning Institute · Virtual.

2022 **Machine Learning**, Virtual Student at Coursera · Virtual.

2022 **Master the Coding Interview: Data Structures + Algorithms**, Virtual Student at Udemy · Virtual.

2022 **Learning How to Learn: Powerful mental tools to help you master tough subjects**, Virtual Student at Coursera · Virtual.

2021 **Neuromatch Summer School 2021**, Interactive Student & Project Lead at Los Angeles, United States · Virtual.
Selected as an international participant for a three-week intensive training program based on theoretical DL modeling and computational techniques, culminating in a transfer learning project for MRI Tumor Classification using PyTorch and Kaggle Dataset.

2021 **Eastern European Machine Learning Summer School 2021**, Apprenticeship at Budapest, Hungary · Virtual.
Selected as one of 500+ international participants for a one-week highly competitive summer school on Deep Learning and Reinforcement Learning organized by **DeepMind** based on leadership potential and research skills, submitting an article reproduction *Image2StyleGAN*.

2021 **Vilnius Machine Learning Workshop 2021**, Apprenticeship at Vilnius, Lithuania · Virtual.
Participated in a two-day workshop on Deep Learning, Reinforcement Learning, and Causal Inference for supporting the ML community.

2021 **International Summer School on Deep Learning 2021**, Apprenticeship at Gdańsk, Poland · Virtual.
Selected as one of 300 participants international-wide for a one-week summer school on modern Deep Learning for high-achieving talent in research based on leadership and academic success.

2021 **Workshop on Mathematical Introduction to Reinforcement Learning**, Apprenticeship at Lahore, Pakistan · Virtual.
Selected as one of 100 participants international-wide for a three-day practical workshop on RL mathematical fundamentals, reviewing model-based, value-based, and policy-based methods, connecting with two RL experts.

2020 **GMTK Game Jam 2020**, Apprenticeship at Virtual Space.
Developed a retro video game in 48 hours named "Ride to the Heaven"