JOSE Nahuel

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MECHATRONICS ENGINEER

SUMMARY

I am a dedicated and innovative Mechatronics Engineer with a strong academic background and over 5 years of industry experience. I graduated with honors and earned an international Master double diploma from Argentinian and French universities, enhancing my skills in machine learning and AI.

Currently, I am pursuing a Ph.D. at the Department of Information Engineering (DII) of UNIVPM, where I am an integral member of the Vision Robotics and Artificial Intelligence (VRAI) research group. My Ph.D. research, conducted in collaboration with the Industrial Robotics Facility at the Italian Institute of Technology (IIT), focuses on developing advanced Robotics and Computer Vision techniques for autonomous inspection and monitoring.

My academic and industry experience provides a robust understanding of AI and Robotics, enabling me to propose innovative solutions and contribute effectively to teams. I stay engaged with the latest advancements, ensuring my solutions are high-performing and ready for industry transfer.

CURRENT POSITION

NOVEMBER 2024 - TO DATE   **VRAI - UNIVPM, ANCONA, ITALY**   *PH.D. STUDENT IN COMPUTER VISION AND ROBOTICS*

As a Ph.D. student at UNIVPM, I am at the forefront of developing cutting-edge Computer Vision techniques that improve mobile robotics performances. My research, conducted in collaboration with the Italian Institute of Technology (IIT), focuses on creating innovative solutions for autonomous inspection and monitoring.

The Ph.D. project I am carrying out plans to develop a robust process monitoring system leveraging unsupervised learning techniques applied to state-of-the-art models, integrating self and cross-attention mechanisms. A data-driven approach will ensure robustness to outdoor conditions. It will integrate multimodal inputs to improve domain adaptation and enhance performance. Additionally, semantic segmentation techniques could be leveraged to improve monitoring accuracy.

I seek to address critical industry challenges by:
- **Boosting Precision and Accuracy**: Enhancing data quality to ensure reliable and accurate inspections. My work involves leveraging advanced algorithms and state-of-the-art sensors to capture high-fidelity data.
- **Enhancing Safety**: Automating hazardous tasks to protect human inspectors. By integrating robust computer vision systems, I aim to develop autonomous robots capable of performing complex inspections in dangerous environments, significantly reducing human risk.
- **Improve Cost Efficiency**: Streamlining inspection processes to significantly reduce operational costs. My research focuses on optimizing robotic workflows and implementing efficient data processing techniques, potentially resulting in faster and more cost-effective inspections.
- **Minimizing Environmental Impact**: Optimizing maintenance to conserve resources and reduce environmental disturbance. I design solutions that prioritize sustainability, ensuring that robotic interventions are both effective and environmentally friendly.

My work aims to enhance algorithm performance and ensure efficient operation on edge devices, delivering high-performing solutions ready for industry integration. Additionally, I will evaluate the trade-offs between cutting-edge AI and robotic platforms, focusing on AI's resilience to noise during data acquisition. This will highlight current limitations and identify key areas for future innovation, driving stronger synergy between AI and robotics.

References: Ph.D. Mancini, Adriano Ph.D. Supervisor, *Mail*: a.mancini@univpm.it

EDUCATIONAL BACKGROUND

2014 - 2017   **MASTER ENGINEER IN ELECTRONICS, INFORMATICS, AND MECHATRONICS SYSTEMS**   **GPA**: 12,42/20
Brest Engineers' National School (ENIB), Brest, France

THESIS: *Reinforcement learning optimization strategy for action selection mechanism on a ROS behaviour-based controller for mobile robots.* Most used tools: ROS, OOP, C++, Git, Stage Robot Simulators. Code

2010 - 2017   **MASTER ENGINEER IN MECHATRONICS**   **GPA**: 8,84/10
Faculty of Engineering, Universidad Nacional de Cuyo, Mendoza, Argentina

2004 - 2009   **INFORMATICS TECHNICIAN DEGREE**   **GPA**: 8,62/10
Mining School Dr. Horacio Carrillo, Jujuy, Argentina

PROFESSIONAL EXPERIENCE

SEPTEMBER 2023 - TO DATE   **IIT, *Genoa, Italy***   *PH.D. STUDENT FELLOW*

Within the first year of the contract, besides a fast-paced onboarding to the team, I generated valuable contributions in the following projects under the direction of Dr. Cannella:

- Robot-Assisted Inspection of Pressure Equipment (RIAP): As a Computer Vision Specialist, I designed and developed a self-propelled robotic platform for inspecting pressure equipment using 3D laser scanners, digital cameras, and hyperspectral cameras.
- Active Damping Continuous Parallel Robot on Artificial Intelligence (ROSAIA): Led the design of a pose estimation process for robotic flexible arms in spatial in-orbit operations.
- Robot- and AI-based Inspection and Predictive Maintenance of Port Resources and Infrastructures: Applied transfer learning techniques to customize models for port environment inspections.
- Autonomous Monitoring Unit for Archaeological Structures: Developed a computer vision pipeline to detect anomalies in archaeological structures.
- Robotic Infrastructures with 5G Technology for Museum Heritage Management: Assessed 3D reconstruction technologies and developed a computer vision streaming process for object recognition and robotic arm guidance.

Tools and technologies used in this role: Python, Docker, OpenCV, Pandas, latest SotA CV Models (YOLO, YOLO-NAS, Detectron2, VGG16), Transformer Architectures, NERFStudio, RoboFlow, Label-Studio, Git, HPC Franklin, Singularity, Cameras (Digital, Depth & Stereo), Open GoPro, ROS, ROS2

References: Ph.D. Cannella, Ferdinando Principal Investigator, Facility Director, *Mail*: ferdinando.cannella@iit.it

SEPTEMBER 2022 TO AUGUST 2023   **DIALPAD, *California, USA***   *DATA ANALYTICS ENGINEER*
AI-powered cloud communications service aimed primarily at businesses. https://www.dialpad.com

Led the product analytics squad, providing data-driven insights to the product organization. Built strong relationships with the CPO and product managers, optimizing data processes with SQL and Python for a 50% efficiency boost. Developed a unified metrics framework, automated reporting, and implemented a churn prediction model on GCP Vertex. Skilled in SQL, Python, machine learning, cloud technologies, and data visualization tools.

MARCH 2021 TO AUGUST 2022   **MARVIK, *Montevideo, Uruguay***   *CONSULTANT MACHINE LEARNING ENGINEER*
ML consulting firm for the entire Machine Learning process, from design and data labelling to training and deploying to production. https://www.marvik.ai

As an ML consultant, I've augmented teams for various clients tackling diverse data challenges. My expertise spans from time series forecasting and NLP to image processing, recommendation systems, and LLMs. Notably, I developed a scalable recommendation system using LLMs and Vector Encoding for efficient matching within vast datasets, and an IoT-based safety alert system using image detection and cloud orchestration services. My tech stack includes Python, ML frameworks (Keras, TensorFlow, PyTorch), cloud platforms (AWS, Azure, GCP), and data tools (Spark, Databricks, SQL, NoSQL).

APRIL 2020 TO MARCH 2021   **ACCENTURE, *Buenos Aires, Argentina***   *JUNIOR MACHINE LEARNING ENGINEER*
Developed and deployed predictive models on Azure ML, optimizing data ingestion and ensuring model performance. Led web scraping initiatives to enrich data lake and enable advanced analytics. Provided actionable insights to sales through customer segmentation and A/B testing. Monitored industry sentiment during COVID-19 using NLP techniques and data visualization. Proficient in Python, ML frameworks, cloud platforms, and data engineering tools.

MAY 2018 TO MARCH 2020   GENROD, *Buenos Aires, Argentina*   RESEARCH & DEVELOPMENT ENGINEER

Genrod is a manufacturer of electrical supplies that launched a startup to develop IoT monitoring solutions for electric distribution companies https://www.genrod.com.ar.

Led a team developing IoT prototypes for monitoring electrical power distribution. Focused on firmware development, protocol optimization, and security for embedded devices. Successfully developed a 4G data acquisition module for power metering, now a commercial product. Expertise in C, Python, Bash, Linux, Raspberry Pi, RTOS, and various communication protocols (RF, Bluetooth, GSM, IPv4/6). Experienced in network administration, low-power wireless standards, and data analysis tools.

CONFERENCES PARTICIPATIONS

A. Scaro, N. Jose, G. Marchello, M. D'Imperio, C. Mennuti, F. Cannella, "Robotics in pressure equipment inspection: A review towards full autonomy," **Accepted** 2025 International Conference on Safety & Innovation, Roma, Italy, 2025

† N. Jose, G. Marchello and, F. Cannella, "Motion Blur Impact on Measurement in Autonomous Inspection," 2024 20th IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA), Genova, Italy, 2024, pp. 1-7, doi: 10.1109/MESA61532.2024.10704904.

† N. Jose and, M. G. Marchetta "Behavior-based controller for mobile robot (Controlador basado en comportamientos para robot movil)" 2019 10th Argentine Robotic National Congress (JAR), Neuquén, Argentina, 2019

2016   Attendance at International Intellectual Property Conference, Mendoza, Argentina

2016   Attendance at Conference RPL: Routing Over Low Power and Lossy Networks, Argentina

† Indicates applicant is (co-) corresponding author

SERVICE TO THE PROFESSION

2025   Reviewer for 2025 International Conference on Unmanned Aircraft Systems, **ICUAS**

2025   Reviewer for 2025 IEEE 28th Int. Conference on Computer Supported Cooperative Work in Design **CSCWD**

2024   Reviewer for 2025 IEEE Int. Conference on Robotics and Automation **ICRA**

2024   Reviewer for 2024 IEEE/ASME 20th Int. Conference on Mechatronic, Embedded Systems and Applications **MESA**

GRANTS & AWARDS

2018   Award Best GPA Honor Medal Mechatronic Engineering, *Universidad Nacional de Cuyo, Argentina*

2010 - 2016   Studies Grant, *Retama Foundation, Argentina*

2015   Grant for Academic Excellence "*Eng. Vittorio Orsi*", *Noroeste Foundation, Argentina*

2014   Grant Students' Mobility Support Program, *ARFITEC, Argentina*

2006 - 2010   Grants for Academic Excellence, *Noroeste Foundation, Argentina*

LANGUAGES

English (TOEIC 910/990 Dic. 2015, B1+ MCERL Dic. 2017)

Spanish (Native)

French (DELF B1 Level Nov. 2014)

Italian (Fluent)

EXTRACURRICULAR ACTIVITIES

2016   Volunteer Teaching Elementary Schools Children, *"Pocho Vive" Collective, Argentina*
2010 - 2014   Volunteer at Childhood Nutrition Recovery Center, *CONIN Foundation, Argentina*
1999 - 2009   Music Studies, *Argentina (Instrument: Guitar)*