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Gaston Mazzei

Date of birth: 16 Sep 1995 | **Nationality:** Argentinian, Italian | **Gender** Male |

(+54) 91123060601 | gastonmazzei95@gmail.com | gastonmazzei.github.io |

6900, Lugano, Switzerland

WORK EXPERIENCE

3 JAN 2021 – CURRENT – Buenos Aires, Argentina
NETWORK AUTOMATION ENGINEER – IQUALL NETWORKS INC.

As a Network Automation Engineer at Iquall Networks my role is to design implement and test algorithms using Python in order to provide automated solutions to international telecommunication companies inside propietary software that consists of an open-source ecosystem.

28 JAN 2020 – 27 NOV 2020 – Buenos Aires, Argentina
RESEARCH INTERNSHIP (MASTER) – ICAS

ICAS is the International Center for Advanced Studies. Under the research internship AI-Friendly was built (Masters' thesis)

1 NOV 2018 – 1 NOV 2019 – El Calafate, Argentina
DATA ANALYTICS / BUSINESS INTELLIGENCE (PART-TIME CONSULTANT) – KOSTEN AIKE HOTEL

Part Time Business Intelligence (or Data Analytics) consultant (freelance) for a four-star hotel in the Argentinian southern Patagonia: metrics such as occupation and per capita consumption were computed on a monthly basis along with an estimation of the hotel's carbon footprint in an attempt to improve its eco-friendlyness.

RESEARCH INTERNSHIP (BACHELOR) – CNEA - LEC (NATIONAL ATOMIC COMISSION AND QUANTUM ELECTRONICS LABORATORY)

Undergraduate research internship at CNEA-CAC (National Atomic Energy Comission) and LEC-UBA (Quantum Electronics Laboratory); a microfluidic device was designed and manufactured in order to trap yeast cells and study their cell membrane

EDUCATION AND TRAINING

25 MAR 2015 – 22 MAR 2021 – Ciudad Autonoma de Buenos Aires, Argentina
MASTER DEGREE IN PHYSICS – UBA (Buenos Aires University)

6-year degree; internationally equivalent to a MSc Physics degree and formally known in Spanish as "Licenciatura en Ciencias Fisicas". The University of Buenos Aires is a 200-year-old university that ranks 61 in the QS world ranking 2021 (transcripts: original & translated; thesis on YouTube)

8/10 | https://www.youtube.com/watch?v=KNp6kqE5dSA

14 MAR 2015 – 31 AUG 2020
BACHELOR IN EXPERIMENTAL PHYSICS – University of Buenos Aires

Physics Research Assistant degree awarded by the University of Buenos Aires in 2020. Internationally equivalent to a **Bachelor in Experimental Physics**; it is an intermediate degree for the MSc Physics degee and it can be earned enrolling in extra optional experimental courses (transcript; grade: 8/10)

8/10

JUN 2016 – JUL 2021 – Argentina
COMPUTER SCIENCE & MATHEMATICS - SINGLE COURSES – DC-UBA, DM-UBA, IC-UBA & ICAS-UNSAM

DC-UBA (Department of Computer Science, Buenos Aires University)
- Image Processing (2021)
- Management of Software Projects (2021)
- Algorithms and Data Structures 1 (2021)

DM-UBA (Department of Mathematics, Buenos Aires University)
- Mathematical Models of Complex Social Systems (2017)
- Quantitative Financial Analysis (2016)

ICAS-UNSAM (International Center for Advanced Studies, Saint Martin University)
- Machine Learning (2020)

IC-UBA (Institute of Calculus, Buenos Aires University)
- Exploratory Data Analysis (2018)

sources: [1][2]

PUBLICATIONS

Image Inpainting Applied to Art: Completing Escher's Print Gallery

2021
Image Inpainting applied to M.C. Escher's Print Gallery at Proceedings of the LatinX in AI (LXAI) Research workshop at ICML 2021 (accepted - july 2021 - sample)

Delta Hedging with Transaction Costs: Dynamic Multi-Scale Strategy using Neural Nets

2021
a portfolio strategy is parametrized by hedging at different periods and computing the weights with a convolutional 1D neural network (accepted and will be published in May 2021 in MACI VIII; the journal of the Argentinian Society of Applied Mathematics; paper)

Option Pricing Model with Transaction Costs

2017
Numerical simulations of the Black Scholes PDE with non-differentiable transaction costs and the analytical solution for exponential costs (published in MACI VI; the journal of the Argentinian Society of Applied Mathematics; paper p.569-573)

LANGUAGE SKILLS

Mother tongue(s): SPANISH

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C1	C1	C1	C1
FRENCH	A2	A2	A2	B1	A1
ITALIAN	A1	A2	A2	A2	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

CONFERENCES AND SEMINARS

1 JUN 2021
ML Collective Open Collab Research Jam 2

Presented AI-Friendly in a research jam organized by ML Collective (an independent nonprofit organization that supports open collaboration in machine learning research)

5 MAY 2021 – 6 MAY 2021
LXAI Social @ ICLR

Presented the Escher Inpaint Project as part of 'ML Techniques for Art Reconstruction' in the pitch for research projects applying for mentorship at ICLR Social Virtual Room n4416 inside LXAI's event LatinX in AI Social at ICLR 2021 (presentation link; and further proof)

5 MAY 2021 – 5 MAY 2021
MACI VIII - ASAMACI

Presented the recent publication 'Delta Hedging with Transaction Costs: Dynamic Multi-Scale Strategy using Neural Nets' at the MACI VIII virtual sessions; the Argentinian Society of Computational and Industrial Applied Mathematics (link to presentation)

29 MAR 2021 – 29 MAR 2021
ML Collective Open Collab Research Jam 1

Presented the Escher Inpaint Project in a research jam organized by ML Collective (an independent nonprofit organization that supports open collaboration in machine learning research)

8 NOV 2020 – 13 NOV 2020
Giambiagi Winter School, 22nd edition: "Artificial Intelligence and Deep Learning in Physics"

Presented a virtual poster about "www.AI-Friendly.com: an online free dense neural network" at the "22nd Giambiagi Winter School: Artificial Intelligence and Deep Learning in Physics"

1 MAY 2017
MACI VI - ASAMACI

Presented the paper 'Option Pricing Model with Transaction Costs' at MACI VI's Quantitative Finance Session (poster)

1 MAY 2017
DF-UBA

Presented the results of the calibration and characterization of a standing-wave optical resonator Nd:YAG laser at the Department of Physics inside the Buenos Aires University (poster)

DIGITAL SKILLS

python | linux | docker | docker-compose | nginx | jenkins | matlab | javascript | c++ | sql | NoSQL (Redis, MongoDB)

HOBBIES AND INTERESTS

Numerical Simulations - Applications of Dense Neural Nets

For the M.Sc Physics thesis, physical academic problems were numerically simulated and a dense neural net (FNN) was studied for the task of binary predictions. Each simulation is open-source and they are the following:

- **Tic Tac Toe**: the optimum strategy was learnt by a two-layer fully-connected neural network
- **Quantum Tunneling**: the transmission coefficient is fitted by a shallow fully-connected neural network that learns from binary observations identified with the collapse of the quantum wave-function
- **Exoplanets**: Kepler's third law is learnt by a shallow fully-connected neural network and thus the orbital period can be estimated from the radius and the solar mass
- **Group Theory**: detection of Lie algebras with a total number of different irreductible representations in a product descomposition that exceed a threshold
- **The Ising Model with a magnetic field**: classification of parameters that exceed a given threshold for the Energy and the Magnetizaion
- **Quadratic two-dimensional homogeneous ODEs**: detection of unstable equilibria
- **Detection of the Higgs Boson in LHC data**: the Higgs Boson is detected at a concentration 1% in LHC collisions in format LHCO by a shallow fully-connected neural network
- **Circuits' max power**: detection of pasive-components' values that lead to currents above a certain threshold for diode-perturbed common circuits

more info at my personal site

Software Development Projects

- **Peat** is a thin wrapper for creating Docker containers with cpu constraints
- **Google Form Randomizer** is a GoogleScript architecture for creating Google Forms with random options, e.g. multiple users can answer 100+ questions by answering only 5 each.
- **Telegram Geo-Recommender Bot** is a Python script so that Telegram Chatbots can respond to locations with the closest item inside a given Database in .csv.
- **Tracking Orchestra** performs tracking of objects and converts the 2D trajectories to music by mapping the vertical position to volume and the horizontal position to pitch. (link to video)

more info at my personal site

Fullstack Development Projects

- **AI-Friendly.com** is a dynamic website built with Nginx and Jenkins that makes publicly-available a neural network as per the state-sponsored transfer-learning mandate of ICAS to which I contributed during the Applied AI Internship
- **Bitcoin Autoencoder.com** is a dynamic website built with TensorflowJS and Flask that implements an automatic trading strategy based on a multi-thresholded strategy implemented in an autoencoder's latent space
- **Tictactoe-Neural.net** is an open-source and dynamic website built with CSS-Bulma, JavaScript and TensorflowJS that allows users to play against a neural net.
- **Covidarg-Fake-News** is a dynamic website built with Flask and hosted on Heroku that expands on the statistical implications of the Argentinian's corrupted coronavirus database from a bayesian perspective (spanish).
- **My personal website** is a static and open-source website hosted by GitHub and built with Ruby's Jekyll using Bulma

more info at my personal site

Other Projects & Fun

- The **Escher Inpaint Project** consists of the image inpainting of M.C. Escher's Print Gallery with deep learning techniques along with knowledge of the underlying conformal mapping. *(ongoing!)*
- **AI-VS-Humans: A Musical Experiment**: 200 humans were surveyed to measure the average human accuracy at recognizing classical music authors in between 8 options from short sound samples. Different AI-based-classifiers were measured against that benchmark and the conclusion was that a Random Forests Ensemble model performed with an average 3x accuracy that of humans. *(Sept 2020)*
- ***Musical projects***: electronic music, guitar-based music and romantic music with animated videos *(2016-2019)*

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