Gaston Mazzei

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WORK EXPERIENCE

Network Automation Engineer
Iquall Networks Inc. [4 Jan 2021 – Current]

City: Buenos Aires
Country: Argentina

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.

Research Internship (Master Thesis Project)
ICAS [1 Feb 2020 – 1 Dec 2020]

City: Buenos Aires
Country: Argentina

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

Data Analytics / Business Intelligence (part-time consultant)
Kosten Aike Hotel [1 Nov 2018 – 1 Nov 2019]

City: El Calafate
Country: Argentina

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.

EDUCATION AND TRAINING

Master Degree in Physics
UBA (Buenos Aires University) [29 Mar 2015 – 26 Mar 2021]

Address: 1428 Ciudad Autonoma de Buenos Aires (Argentina)
Final grade : 8.5/10
Thesis: https://www.youtube.com/watch?v=KmPtevZZpGM&feature=youtu.be

Computer Science Single Courses
DC-UBA (Department of Computer Science, Buenos Aires University) [25 Feb 2018 – Current]

Address: (Argentina)

Image Processing (ongoing, Q1 2021)

Algorithms and Data Structures 1 (ongoing, Q1 2021)

Computability and Logic (ongoing, Q1 2021)

Exploratory Data Analysis (Q1 2018, Final Grade: 10/10)

Machine Learning (single course)
ICAS-UNSAM (Institute Center for Advanced Studies, Saint Martin University) [28 Jun 2020 – 29 Oct 2020]

Address: (Argentina)

Quantitative Financial Analysis (single course)
DM-UBA (Department of Mathematics, Buenos Aires University) [29 Jul 2016 – 12 Nov 2016]

Address: (Argentina)

LANGUAGE SKILLS

Mother tongue(s):

Spanish

Other language(s):

English

LISTENING C2 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

DIGITAL SKILLS

python / linux / docker / docker-compose / nginx / jenkins / matlab / javascript

CONFERENCES AND SEMINARS

Presenting the Escher Inpainting Project
[ML Collective Open Collab Research Jam (#1), 31 Mar 2021 – 31 Mar 2021]

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)

Presenting www.AI-Friendly.com: an online free dense neural network
[Giambiagi Winter School, 20th edition: "Artificial Intelligence and Deep Learning in Physics", 10 Nov 2020 – 15 Nov 2020]

Presented a virtual poster about 'AI-Friendly' at the 22nd Giambiagi Winter School: Artificial Intelligence and Deep Learning in Physics

PUBLICATIONS

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

[2021]

ASAMACI is the Argentinian Society of Applied Mathematics (accepted and will be published in May 2021 - link to file)

Option Pricing Model with Transaction Costs

[2017]

ASAMACI is the Argentinian Society of Applied Mathematics; the paper consisted of numerical simulations of the Black Scholes PDE with non-differentiable transaction costs (link to file, page 569)

HOBBIES AND INTERESTS

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
- **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).
- **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 (ongoing).
- **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

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

Other Projects & Fun

- **Chess Trasnfer Learning**: use Deep Chess in order to play against taxi drivers that gather in a chess club in my current neighborhood. *(upcoming!)*
- 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)*

more info at my personal site