Loredana Sandu

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Undergraduate student of Mathematics, an avid learner with a highly curious nature and entrepreneurial spirit. Fond of intellectual challenges from early ages, I have developed a passion about programming and the applications of mathematics, especially in the fields of artificial intelligence and data science. Proficient in spoken and written English.

EDUCATION

Bachelor's Degree in Mathematics
September 2019 – July 2023

Autonomous University of Barcelona
Barcelona, Spain

- At the moment, I have passed 212 ECTS and I am enrolled for 30 ECTS, including an Internship and the Bachelor's Thesis.
- Current GPA: 7.33 / 10.00
- Currently conducting research for my thesis under the supervision of Dr. Pilar Dellunde. Focusing on the use of fuzzy-logic operators to develop interpretable neural network models.
- Studied at the University of Vienna as part of the Erasmus+ Exchange Programme.
- As a remark, I achieved a honorable mention in the course *Computational Tools for Mathematics* (grade: 9.70 / 10.00).

Erasmus+ Exchange Programme, Mathematics
September 2022 – February 2023

University of Vienna
Vienna, Austria

- GPA: 8.43 / 10.00 (equivalence in the Spanish grading system)

Baccalaureate (with Honors)
September 2017 – May 2019

Gallecs High School
Barcelona, Spain

- GPA: 10.00 / 10.00
- Research project: "Study on the evolution of the labour market in Spain during the decade following the 2008 economic recession" (grade: 10.00 / 10.00).
- Achieved a grade of 13.76 / 14.00 in the University entrance exams (PAU).

EXPERIENCE

Research Intern
March 2023 – Present

Centre for Research in Agricultural Genomics (CRAG)
Barcelona, Spain

- Intern in the *Rosaceae genetics and genomics* group, part of the Research program on Plant and Animal Genomics.
- Working on the development of deep learning models with applications in plant genomics. Developing hybrid models of Convolutional Neural Networks (CNNs) and Feed Forward Neural Networks (FFNNs) to extract patterns of SNPs and predict quantitative traits.
- Exploring other deep learning architectures such as Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM), Autoencoders (AEs), Generative Adversarial Networks (GANs), and Transformer models.

Private Programming Tutor   July 2020 – July 2022

Self-employed   Remote

- Taught Python, C and SQL remotely to teenage and adult students.
- The classes were focused on libraries like Pandas, Matplotlib, scikit-learn and Pytorch, and tools like Jupyter Notebook, Git, and Json. I also included the use of frameworks like Django, and databases like MySQL.
- Most students were located in the United Kingdom, Germany and Spain. Occasionaly, I also worked with students from the United States and Ecuador.
- Emphasized practical use cases in the areas of data science, machine learning, and APIs.

SELECTED PROJECTS AND REPORTS

Extending the SIR model through Branching Processes   February 2023

Mathematical Modeling, Stochastic Processes, Python, Academic writing   📄 Report | ⓞ Code

- Modeled the spread of an infection through a population with two types of individuals: those with a high number of social contacts and those with a low number of social contacts.
- Performed numerical and stochastic simulations using Python, based on previous mathematical analysis.
- Wrote a report on the development and mathematical analysis of the model, and the results of the simulations.
- Project conducted as part of the course *Modeling in evolutionary ecology and epidemiology* at the University of Vienna, co-authored with Aäron Roex.
- Advised by Himani Sachdeva and Jitka Polechová.

Simulation of the flocking behavior of birds   June 2021

Mathematical Modeling, Python, GnuPlot, Git, Academic Writing   📄 Report (in Catalan) | ⓞ Code

- Modeled the flocking behavior of birds, and the effect of the presence of elements such as food sources and predators on the flock.
- Developed a program using Python and GnuPlot to run the simulation.
- Wrote a report on the development and implementation of the model, and the results of the simulations.
- Project conducted as part of the course *Workshop in Mathematical Modelling* at the Autonomous University of Barcelona, co-authored with Anna Danot, Núria Fernández and Jan Mousavi.
- Advised by Julià Cufí and Xavier Mora.

Digit Recognition   May 2021

Python, Deep Learning, PyTorch   ⓞ Source code

- Logistic regression model that classifies handwritten digits.
- Accuracy: 90.27%.

Face Recognition   March 2021

Python, Computer Vision, Numpy, OpenCV, Pillow, Tesseract   ⓞ Source code

- Program that recognizes faces of an image. Tested with newspapers.
- Capstone Project for the *Python 3 Programming Specialization* by the University of Michigan.

Classification of Convex Cones   May 2020

C, Abstract Algebra   ⓞ Source code

- Program that classifies the convex cone generated by input vectors in the 3-dimensional real vector space.
- Project developed as part of the course *Computational Tools for Mathematics* at the Autonomous University of Barcelona.
- Advised by Joaquim Roé.

Courses and Certificates

SQL for Data Science   July 2021
University of California, Davis

Python 3 Programming Specialization   July 2021
University of Michigan

Certificate of Proficiency in English (CPE)   July 2020
University of Cambridge

C Programming Course   May 2016
Mollet's Informatics Center

Skills

Industry knowledge	Programming │ Mathematical Modeling │ Data Science │ Machine Learning │ Deep Learning │ Data Analysis
Programming Languages	*Experienced:* Python │ C │ SQL │ R │ AMPL │ HTML │ CSS │ LaTeX *Familiar:* C++ │ MATLAB │ JavaScript │ Solidity
Libraries and Frameworks	PyTorch │ scikit-learn │ Pandas │ Numpy │ Matplotlib │ Seaborn │ Django │ OpenCV │ Pillow │ Tesseract
Tools and Platforms	Jupyter Notebook │ Anaconda │ Git │ SageMath │ Heroku │ Digital Ocean │ Wordpress
Soft Skills and Others	Resourceful │ Innovative │ Curious │ Committed │ Persistent │ Fast Learner │ Problem Solving │ Lively

Languages

English	Proficient (Level C2)
Spanish	Native
Catalan	Native
Romanian	Intermediate

Participation in Hackathons

Datathon by Aily Labs   June 11 – June 12, 2022 │ Barcelona, Spain

- Gained knowledge on the applications of artificial intelligence in the health sector.
- Worked on a project for the detection of glaucoma in retinal images, using computer vision techniques and CNNs.

HackUPC 2022   April 29 – May 1, 2022 │ Barcelona, Spain

- Gained knowledge and experience in the fields of computer vision and game autoplayers.
- Participated in events related to cybersecurity and algorithms.

Awards and Achievements

Recognition of excellence at the University entrance exams (PAU)   July 2019

Interuniversity Council of Catalonia (CIC), Generalitat de Catalunya

- These distinctions are awarded to students in Catalonia who, in the June ordinary sitting, have obtained a grade equal to or higher than 9.00/10.00 points as a qualification for the general phase of the University entrance exams (PAU).

2nd place at a regional chess tournament   May 2015

Granollers Chess Club

- I had an interest in chess at early ages and played in several regional tournaments.

Other

Interests   Philosophy | General Science | Literature | Writing | Calisthenics | Swimming | Botany | Classical music and guitar

Driving licenses   A2 | B