Cătălin-Alexandru Rîpanu

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Relevant Education

POLYTECHNIC University of Bucharest **September 2024 – July 2026**
Faculty of Automatic Control and Computers *Bucharest, Romania*

- Pursuing a **Master of Science Degree** in **Artificial Intelligence**, with all coursework conducted in English
- Relevant **coursework:** Deep Neural Networks, Computer Vision, Knowledge Representation & Reasoning, Type Systems & Functional Programming, Multi-Agent Systems, Natural Language Processing, and Symbolic & Statistical Learning

POLYTECHNIC University of Bucharest **September 2020 – July 2024**
Faculty of Automatic Control and Computers *Bucharest, Romania*

- Earned a **Bachelor's Degree** in Computer Science and **Engineering**, achieving a **GPA** of 9.805 / 10.00
- Relevant **coursework**: Artificial Intelligence, Machine Learning, Quantum Computing, Algorithms Analysis & Design, Compilers, Data Structures, Numerical Methods, Formal Languages & Automata Theory, and Programming Paradigms

Relevant Work Experience

POLYTECHNIC University of Bucharest **September 2024 – Present**
Associate Teaching Assistant and Collaborator of AI-MAS Laboratory *Bucharest, Romania*

- Taught students Data Structures & Algorithms, Machine Learning, Programming Paradigms, and Artificial Intelligence
- Building Deep Learning models for Computer Vision applications, focusing on Action Recognition and Spatio-Temporal Action Detection using multi-modal Visual and Skeleton-Based data
- Assisted in grading student projects and served as an invigilator alongside professors during midterms and final exams

Personal Projects

Neural ODE Generative Model with Quantum Vision Transformers | *TensorCircuit for Quantum, Jax* **July 2024**

- Implemented using **Jax** & **Flax** a *Generative neural network using Quantum* tested on **CIFAR10** and **IMDB** samples
- Designed a Variational Quantum Circuit in **TensorCircuit**, harnessing **Quantum Entanglement** through Bell states
- Created a Quantum Vision Transformer Architecture that leverages Runge-Kutta Numerical Methods for better scores
- Evaluated and compared it alongside a model presented at NeurIPS 2021, showing promising results in **Quantum ML**

IoT Platform using Microservices for Time Series Data | *MQTT, Grafana, Portainer, CI/CD, Flask* **June 2024**

- Implemented a *Platform* for manipulating Numerical Data coming from a large number of Internet of Things devices
- Deployed **Grafana** in a Docker environment to visualize data and gain analytical insights through edited dashboards
- Utilized **Portainer** in Docker Swarm to **monitor** Load Balancing effects of container **replicas** using **multiple** nodes
- Employed **GitLab's CI/CD** for further comprehending builds & tests automation and software development practices

COOL Compiler with ANTLR v4.0 Generator | *Lexer, Parser, Code Generation, Java, MIPS, COOL* **Feb 2024**

- Developed a **Java-based** *Compiler* for an Object-Oriented Programming language, incorporating **basic inheritance**
- Designed **Lexical Analysis** utilizing **ANTLR4.13** to construct a grammar that accurately recognizes language tokens
- Defined Resolution and Definition Pass traversals using **Visitor Pattern** for creating Syntactic and Semantic Analyzes
- Developed Code Generation for translating any COOL code into MIPS Assembly using the *SPIM* Simulator for testing

2016 Halite Bot | *Algorithm Design and Analysis, C++, Machine Learning, Artificial Intelligence* **May 2022**

- Implemented in **C++** a *Halite bot* using a **Runtime Engine** integrated within a **Framework** given by the organizers
- Processed in a **Greedy** way the cells with the highest scores first to let the bot conserve its strength score in the match
- Developed a **logic** such that if a border cell cannot attack, it will look for a neighboring cell with which it can combine
- Implemented a **surplus strength** redistribution algorithm that evenly allocates excess power score to neighboring cells

Awards

National Student Mathematics Competition "Traian Lalescu" **November 2021**
2^{nd} *Year Contestant* *Transilvania University of Brasov, Romania*

- Earned honorable mention in the **Complex Analysis** section at the **National phase** of the Mathematical competition

Skills

Technical Skills

- Intermediate Knowledge: Data Structures, Algorithms, C/C++, Python, Java, Networking, Numpy, Pandas, Pytorch
- Basic Knowledge: TensorFlow, Jax / Flax, TensorFlow Quantum, DevOps, CUDA, Flask, SQL, Haskell, Prolog, *React*

Languages

- Romanian: Native Speaker
- English: Professional Level
- French: Good Command