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 the **English** language
- Relevant coursework: Deep Neural Networks, Computer Vision, Knowledge Representation and Reasoning, Multi-Agent Systems, Type Systems and Functional Programming, Natural Language Processing, Symbolic and 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 **top-5** overall GPA of **9.805** / 10.00
- Relevant coursework: Artificial Intelligence, Machine Learning, Quantum Computing, Compilers, Algorithms Analysis and Design, Data Structures, Numerical Methods, Formal Languages and Automata Theory, Programming Paradigms

Relevant Work Experience

Tobii AB **July 2025 – September 2025**
Machine Learning Engineer Intern *Bucharest, Romania*

- Developing generative AI models to synthesize high-quality in-cabin passenger data for Occupant Monitoring Systems

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

- Leading lab sessions in Data Structures, Algorithms, Automata Theory, Artificial Intelligence, and Machine Learning
- Developed novel Deep Learning networks for Computer Vision using a **SlowFAST** model for Action Recognition and Spatio-Temporal Detection through multi-modal RGB video fusion and 3D skeleton data for Romanian Sign Language
- Achieved **87.85%** validation accuracy on a custom dataset of over 9000 annotated sequences across 5892 action classes

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 that leverages Runge-Kutta Numerical Methods with a gain of **2.5%** in results.

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.

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 committee.
- 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