Adrian Galik

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ABOUT ME:

Applied Mathematics Engineer specialising in **machine learning** and neural networks. Proficient in **statistical models** and their practical application to **data analysis** and engineering problem solving. Experience in implementing **numerical algorithms** and **differential equations** in optimization tasks. projects use a combination of solid mathematical foundations, well-designed architecture and the **Python** language as the main programming tool. Example implementations include the creation of a reinforcement learning agent for the game Pong, using three approaches with neural networks: **Deep Q-Learning** (DQN), **Advantage Actor-Critic** (A2C) and **Asynchronous Advantage Actor Critic** (A3C), as well as the implementation of the **SRCNN** convolutional network for image resolution enhancement.

TECHNICAL SKILLS:

- Programming languages: **Python** (main language 4+ years), **SQL** (2+ years), **R** (1+ years), **Julia** (Basic knowledge)
- Programming libraries: **NumPy, PyTorch, TensorFlow, Keras, Gymnasium, OpenCV, Scikit-Learn, Pandas, NetworkX, Matplotlib**
- Applications of deep machine learning algorithms. High familiarity with reinforcement learning algorithms
- High proficiency in model building and application of mathematical statistics methods with visualization. Strong knowledge of numerical algorithms and their applications. Ability to apply differential equations in practice
- Applications of data structures: **Stacks, Queues, Trees, Graphs**
- familiarity with cloud computing service: **GCP**
- Knowledge of data analysis and visualisation tools: **Power BI**
- Knowledge of creating and administering web pages: **HTML, CSS, JavaScript, React, Flask, PHP**
- Version control system: **Git**
- Operating System: **Linux, Windows**
- UNIX System Shell: **Bash**
- Virtualization and Isolation Environments: **Docker, VirtualBox**
- Framework supporting robot software development: **ROS2**

EXPERIENCE:

- **Internship at Colgate-Palmolive Company**, 07/2024 - 09/2024
  - Creating an interactive data visualization application in **Python**
  - Applying **OCR** machine vision techniques
  - Statistical analysis of data and graph-based visualization
  - Technical documentation for applications
- **Internship at Zapaśnik IT Company**, 10/2020 - 12/2020
  - Scripting in **Bash**
  - Interactive management of remote connections: **Putty**
- **Internship at Sports Media Company**, 03/2020 - 05/2020
  - Managing computer networks
  - Creating spreadsheets for product quantities and pricing: **Excel**

EDUCATION:

- **Computer Science - Master's Degree, Wrocław University of Science and Technology**, 03/2025 - currently
- **Applied Mathematics - Instructional Studies, Wrocław University of Science and Technology**, 10/2021 - 02/2025
  - **Thesis:** Performance of reinforcement learning methods in computer games
  - **Courses:** Algorithms and Data Structures, Numerical Methods, Differential Equations in Technology, Applied Statistics, statistical packages, databases
  - **Scientific Circle KN Robocik:** Creating algorithms for detecting the position of an underwater drone and operating the control in **ROS2 (Python)** technology, under the foreign **TAC Challenge** competition.
  - **Student activity:** Member of the Committee for Didactics and Student Rights
- **ICT and Electronics School Complex in Wroclaw, Technical School No. 7, IT technician**, 09/2017 - 04/2021

PROJECTS:

- **Engineering project** - Comparison of the effectiveness of reinforcement learning algorithms in the game **Pong**. Two approaches using neural networks were analysed: **Deep Q-Learning** and **A2C**. The project includes a comprehensive introduction to the topic along with an analysis of learning precess graphs. (Python, PyTorch, Gymnasium, OpenCV, NumPy, LaTeX)
- **Super-Resolution** - Implementation of a convolutional neural network **SRCNN** to enhance image resolution. The effect of the number of filters and depth of the network on the quality of reconstruction was analyzed. The project includes quality assessment of PSNR metrics and visual comparisons. (Python, TensorFlow, Keras, LaTeX)
- **RL Algorithm Optimization Project** - Analysis of the effect of hyperparameters and asynchronous programming on the performance of **A2C** and **A3C** algorithms in the Pong game. Comparison of training time, learning quality and performance stability. (Python, PyTorch, Gymnasium, LaTeX).
- **Numerical solution of Friedman's differential equation** - The numerical solution of the differential equation was created without the use of libraries. Calculation of the age of the world by numerical integration. Mathematical description of the project in Jupyter notebook with technical analysis. (Python)
- **Database for an automobile repair shop** - Creation of a database architecture and code to populate it. Report with statistical analysis of random data for various items and services. (SQL, Python)
- **Min-Max algorithm for chess**- Algorithmic approach to create a bot predicting several moves ahead. Using methods viz: Zobrist Hasing, transposition table, iterative deepening. Development of a GUI to play with the bot. (Python)
- **2D Arcade game** - An object-oriented game designed using the PyGame library to shoot down moving opponents. (Python, Pygame)

CERTIFICATES:

- Corporate Readiness Certificate 2024 - Data Science in practice
- Qualification EE.09, 2020 - Programming, creating and administering websites and databases
- Qualification EE.08, 2019 - Assembling and operating computer systems, peripheral equipment and networks

LANGUAGES:

- Polish native language
- English C1
- Spanish A1

INTERESTS:

- Machine learning
- Mathematics
- Astrophysics