Pie de Boer

Nothing is too challenging to learn...

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🔗 https://piedeboer96.github.io

Profiles

in Pie de Boer

⊙ piedeboer96

Summary

I have professional experience at Rabobank as a working student, where I focused on portfolio optimization using Python and MATLAB. I hold a Bachelor of Science in Data Science and Artificial Intelligence from a well-regarded university in the Netherlands. Throughout my career, I have built various projects, including chess engines, golf agents, and digital assistants (audio/speech/text), and gained hands-on experience with machine learning and deep learning. Additionally, I have contributed to state-of-the-art AI/Data Science research, working with models in PyTorch and Google Cloud on CUDA, specifically adapting them for ECG signal denoising.

Experience

Rabobank	Sep 2023 - Feb 2024
Working Student	Netherlands

Project: Quantum-Based Portfolio Optimization (Rabobank)

As part of a team, I contributed to Rabobank's project to enhance their quantum-based approach to non-linear portfolio optimization using D-Wave and Python. We leveraged the D-Wave API to run optimization algorithms on real quantum hardware, solving complex problems beyond the capabilities of traditional computing. The project also focused on sustainable investing, including meeting CO_2 emission targets. Quantum hardware enabled us to handle larger, more constrained optimization problems.

Technologies: Python, MATLAB (YALMIP), D-Wave, Unix
Domains: Investing, Finance, Statistics, Risk Management, Algorithms

Education

Maastricht University	Sep 2021 - Jun 2024
Data Science and Artificial Intelligence	Bachelor of Science
8.3/10	

🔗 https://curriculum.maastrichtuniversity.nl/education/bachelor/data-science-and-artificial-intelligence

Thesis: Conditional Diffusion Models for ECG Denoising (8.5/10)

Highlighted Courses: Calculus, Linear Algebra, Machine Learning, Data Analysis, Statistics and Simulation, Numerical Mathematics, Data Structures and Algorithms, Logic, Software Engineering, Embedded Systems and Robotics, Image- and Video Processing

Utrecht University	Sep 2016 - Jun 2017
Chemistry	Bachelor of Science
7.5/10	

Completed First Year (60 ECTS)

Highlighted Courses: Mechanics, Electromagnetism, Physical Chemistry,

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Programming Languages

Java
4 Years Experience
● ● ● ● ●
Gradle, Maven, Deep4j, JavaSound API, TarsosDSP, LibGDX, RestAPI, Swing, AWT, JavaFX, Spring

Python
3 Years Experience
● ● ● ● ●
TensorFlow, PyTorch, scikit-learn, Jupyter Notebook, Matplotlib, Seaborn, Scipy, Librosa, TQDM, OpenCV, Pandas, Plotly, XGBoost, Statsmodels

MATLAB
3 Years Experience
● ● ● ● ●

Bash
3 Years Experience
● ● ● ● ○

SQL
2 Years Experience
● ● ● ○ ○
MySQL, SQLAlchemy, JDBC

HTML/CSS
2 Years Experience
● ● ○ ○ ○

C++
1 Year Experience
● ○ ○ ○ ○
OpenCV, Arduino

R
1 Year Experience
● ○ ○ ○ ○

C#
1 Year Experience
● ○ ○ ○ ○
WPF, .NET 8, Visual Studio

Javascript
1 Year
● ○ ○ ○ ○
Node.js, React

Tools & Technologies

Cloud Infrastructure
GCP

Version Control Systems
Git, GitHub

Command Line Tools
Micro, Homebrew, Package Managment, Unix, Linux

Projects

Conditional Diffusion Models for ECG Denoising — Oct 2023 - Jun 2024

🔗 https://github.com/piedeboer96/ECG-Signal-Denoising

Developed a novel approach to ECG signal denoising by leveraging an image upscaling model (SR3), a conditional diffusion model. By transforming ECG signals into Gram Angular Fields, we were able to apply image-based techniques. Our research demonstrated superior performance compared to traditional signal processing methods.

Conditional Diffusion, Digital Filters, Moving Average, PyTorch, scikit-learn, Matplotlib, NumPy, Jupyter Notebook, Deep Learning Toolbox, DSP System Toolbox, Signal Processing Toolbox, Statistics and Machine Learning Toolbox

Multi-Modal Digital Assistant — Feb 2023 - Jun 2023

🔗 https://github.com/piedeboer96/Digital-Assistant-Audio-Processing

Developed a digital assistant (ChatBot) with speech, text, and vision interaction capabilities.

Mel-frequency Cepstral Coefficients (MFCC), Gaussian Mixture Models (GMM), Wav2Vec-2.0, Mozilla DeepSpeech, Haar Cascade Classifiers, Eigenfaces, FaceNet

Stochastic Chess — Sep 2022 - Jan 2023

🔗 https://github.com/piedeboer96/DiceChess

Developed agents for stochastic chess, where a die introduces randomness to determine allowed moves.

Genetic Algorithm (GA), Q-Learning, Hill Climbing, Beam Search, ExpectiMinMax

3D Golf Game — Feb 2022 - Jun 2022

🔗 https://github.com/piedeboer96/BingBoysGolf

Developed a physics engine and agents using advanced optimization methods to play golf on 3D terrain.

Particle Swarm Optimization (PSO), Genetic Algorithm (GA), Euler, Runge-Kutta, FloodFill, Simulated Annealing, Hill Climbing, BattleRoyalOptimization, Splines

Bin Packing — Sep 2021 - Jan 2022

🔗 https://github.com/piedeboer96/3D-BinPacking

Developed algorithms from scratch to pack 2D or 3D packages efficiently into a container.

Operation Research, Algorithm X (Dancing Links), Genetic Algorithm, Greedy Algorithm

Programs

Job Application Tracker — Sep 2024

Simple C# application build with .WPF on .NET8 to track job application progress.

Audio Display — Sep 2023

Developed a GUI-based spectrum analyzer and audio information display using Python, PyQt5, Tkinter, and Librosa.

References

Prof. Dr. Pietro Bonizzi (P.)
Thesis Supervisor

🔗 https://www.maastrichtuniversity.nl/p-bonizzi

Skills

Artificial Intelligence (AI)
Neural Networks (CNN), Computer Vision, Reinforcement Learning, AI Ethics, Robotics, Optimization, Image Recognition, Speech Processing, Knowledge Graphs, Generative AI, Digital Signal Processing

Data Science
Machine Learning (ML), Statistical Analysis, Data Visualization, Predictive Modelling, A/B Testing, Feature Engineering, Data Cleaning, Time Series Analysis, Regression Models, Classification Algorithms

Software Engineering
Object Oriented Programming (OOP), Agile Development, REST APIs, Software Testing (Unit Testing), Databases, Data Structures and Algorithms, Design Patterns

Soft Skills

Planning and Project Management
Gantt Chart, Trello, Agenda, Meeting, Minutes, Active Listening, Group Projects, Communication, Collaboration, Team Work, Leadership, Ownership, Note Taking, Time Management

Presenting and Reporting
Scientific Report, Communication, Research, Presentation Skills, Technical Writing, Verbal Communication

Scientific Research
State-of-the-art, Independent Research, Persistence

Problem Solving
Innovation, Creativity, Out-of-the-Box Thinking, Critical Thinking

Languages

English	German	Dutch
C2	C1 (Fluent)	C2 (Native)

French	Portuguese	
A1 (Basic)	A1 (Basic)	

Certifications

MATLAB Fundamentals	English Language Certificate (CEFR)
Mathworks	Pearson
Feb 2023	Sep 2021