



# Pie de Boer

Creative. People-Oriented. Problem Solver.

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🔗 <https://piedeboer96.github.io>

## Profiles

- [Pie de Boer](#)
- [piedeboer96](#)
- [pi.music.production](#)

## Summary

I have professional experience at Rabobank as a working student, focusing on portfolio optimization using Python and MATLAB. My Bachelor of Science in Data Science and Artificial Intelligence provided me with a strong foundation in statistics (probability, statistical analysis), mathematics (calculus, linear algebra, modeling), programming (Java, Python, MATLAB, SQL), and software engineering (Design Patterns). I have built various projects, including chess engines, golf agents, and digital assistants (audio/speech/text), and have hands-on experience with machine and deep learning. I have worked with state-of-the-art generative AI models in PyTorch and Google Cloud on CUDA, adapting these for ECG signal denoising, obtaining cutting-edge results. In my spare time, I pursue my passion for audio engineering and music production.

## Experience

**Rabobank**  
Working Student

Sep 2023 - Feb 2024  
Netherlands

**Description:** Leverage quantum hardware for Portfolio Optimization. Implemented Non-Linear Programming solution (MLP) using D-Wave API (Python). Improved run-times and provided optimized solutions for the client.

**Stack:** Python, MATLAB (YALMIP), D-Wave, Unix (Terminal)

## Education

**Maastricht University**  
Data Science and Artificial Intelligence  
8.3/10

Sep 2021 - Jun 2024  
Bachelor of Science

<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**  
Chemistry  
7.5/10

Sep 2016 - Jun 2017  
Bachelor of Science

Completed First Year (60 ECTS)

**Highlighted Courses:** Mechanics, Electromagnetism, Physical Chemistry, Analytical Chemistry, Quantum Chemistry

## 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  
● ● ● ● ●  
DSP System Toolbox, Signal Processing, Statistics and Machine Learning Toolbox, Deep Learning Toolbox, YALMIP

**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  
● ○ ○ ○ ○

**Tools & Technologies**

**Cloud Infrastructure**  
GCP

**Version Control Systems**  
Git, GitHub

**Reporting**  
LaTeX, Word, Powerpoint, LibreOffice

**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, such as adaptive filters, low-pass filters, and moving averages.

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

References

Prof. Dr. Pietro Bonizzi (P.)

Thesis Supervisor

<https://www.maastrichtuniversity.nl/p-bonizzi>

Guid Maes

Senior Software Engineer

<https://www.linkedin.com/in/guido-maes-3a844816b/>

Long time friend and experience software developer.

Sander Stokhof

Data Scientist

<https://github.com/MOVzeroOne>

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 Managment

Gantt Chart, Trello, Agenda, Meeting, Minutes, Notetaking, Active Listening, Group Projects, Communication, Collaboration, Time Managment, Team Work, Leadership, Ownership

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
C1	B2	Native

Certifications

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