OSCAR DEVOS

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PERSONAL PROFILE

Creative, determined Robotics Master's student on a mission to infuse AI, ML, and computer vision into mechanical systems for human-like intelligence. Adaptable across multilingual and cross-functional teams, shaped by diverse engineering experiences, I bring a hands-on, solution-driven approach to projects. Relentless persistence and strong interpersonal skills turn ambitious ideas into tangible results. Seeking a 3–6 month Fall/Winter 2025 internship in robotics, I'm eager to push boundaries and create transformative AI-based solutions.

EDUCATION

Master of Science (M.Sc) in Robotics *September 2024 – Ongoing*
Delft University of Technology

Bachelor of Science (B.Sc) in Mechanical Engineering *September 2020 – June 2024*
Delft University of Technology

Minor in Business Administration *September 2023 – June 2024*
Leiden University

High School Diploma *June 2020*
Sint-Michielscollege, Brasschaat, Belgium

PROJECTS

Motion Planning and Control for a Drone using Model Predictive Control *November 2024 – January 2024*
Planning and Decision Making *course project, TU Delft*

- Created URDF models from scratch to simulate a randomized city environment, stacking rooms dynamically to form multiple buildings
- Coded global path planning algorithms (**RRT** and **A***) **from scratch** in a custom-designed simulated environment
- Designed a convex **Model Predictive Controller** (MPC) to dynamically navigate a **non-convex** global path, leveraging a high-speed obstacle detection system for seamless transitions and constraint adherence

Autonomous Navigation System for a Mirte Robot in ROS2 *September 2024 – November 2024*
Robot Software Practicals *course project, TU Delft*

- Developed ROS-based autonomous navigation system in C++ for a Mirte Robot, utilizing LiDAR point cloud data and RealSense camera data for real-time **obstacle and pedestrian detection** in a Gazebo simulation
- Implemented pedestrian detection pipeline with camera data using **computer vision** package (OpenCV) in C++

Direct Air Capture Device *December 2023 – July 2024*
Personal Start-up Project

- Proposed and led the development of a solar-powered direct air capture device for household use, targeting reduced CO_2 emissions
- Researched and optimized a **solid sorbent-based TVSA process** using LEWATIT® VP OC 1065, applying heat/mass transfer theory, energy balances, and adsorption dynamics to design an efficient CO_2 capture system under standard atmospheric conditions
- Designed and prototyped a novel filter to minimize pressure drop, collaborating with TU Delft to refine sorbent bed geometry
- Pitched the idea at various events and funding opportunities, securing third place at Yes!Delft Startup Weekend and presenting at international forums, including Dutch-Israeli embassy collaborations, to attract grants, investors, and industry interest

Data-driven Analysis of Human Body Motion in Automated Cars *January 2024 – June 2024*
Supervisors: Meichen Guo, Chrysovalanto Messiou, Georgios Papaioannou, Yixuan Liu
Bachelor thesis

- Developed and validated a real-time head-neck model in **MATLAB/Simulink** using inverted pendulum dynamics and collected data
- Studied **PID(A) control** designs with time-delay effects, implementing feedback loops matching human motion in autonomous driving
- Applied **genetic algorithms** and **least-squares** optimization, tuning parameters to predict pitch angle accurately and reduce discomfort
- Compared analytical and **Simscape**-based approaches, highlighting trade-offs in complexity, simulation speed, and overall accuracy

Metamaterial Design with Machine Learning *April 2023 – June 2023*
Material Science *course project, TU Delft*

- Leveraged **CUDA** with **PyTorch** to train **forward/inverse neural networks**, predicting anisotropic stiffness from spinodoid designs
- Analyzed thousands of designs using statistical distributions and clustering, identifying geometry categories to guide $\mathbf{R}^2$ improvements
- Implemented inverse design to reconstruct feasible structures from target stiffness, enabling customization and material optimization

Design and Building of an Autonomous Cleaning Robot *February 2022 – April 2022*
Robotics *course project, TU Delft*

- Constructed a line-following robot with **IR and radar sensors**, servo gripper, and DIY wind sensor for autonomous package delivery
- Deployed a **Finite State Machine** in Python to switch between states (standby, pickup, wind detection, drop-off)

ADDITIONAL UNIVERSITY PROJECTS *2021–2022*

- Designed a direct air capture plant for process engineering, deriving energy equations, and analyzing heat/mass transfer processes
- Designed and built a CNC cutting machine in SolidWorks, constructed from sheet metal and controlled using **G-code**
- Designed and assembled a pole-climbing crane constructed from sheet metal, using Arduino for grip and height control

EXPERIENCE

Property Manager and Renovation Lead *Namur, Belgium*
Freelance *March 2021 – September 2024*

- Led renovation of seven apartments in a 1713-protected heritage building, **collaborating with contractors** to meet modern standards
- Secured tenants by prospecting leads, conducting viewings, and **negotiating** favorable lease agreements for maximum occupancy
- Resolved daily tenant concerns, enforced building rules, and implemented cost-effective improvements, such as secure entrances

FFV Sailing Instructor *Port-Blanc, France*
Centre Nautique de Port-Blanc — Mairie de Penvenan *July 2020 – Current*

- Taught over 150 students across four summers, adapting weekly practical lesson plans to windsurf, dinghy, and catamaran supports
- Attained CQPIV credential from FFV and French sport educator status, ensuring compliance with safety, training, and regulations
- Demonstrated **leadership** under challenging sea conditions, making rapid decisions to safeguard participants and equipment at all times

RELEVANT COURSES & TECHNICAL SKILLS

Robotics

Planning & Decision Making	Robot Dynamics & Control	Knowledge Representation & Symbolic Reasoning
Advanced Machine Perception	Machine Perception	Deep Reinforcement Learning

Computer Science

Machine Learning	Deep Learning	Object-Oriented Scientific Programming with C++

Mathematics

Differential Equations	Linear Algebra	Probability & Statistics	Numerical Analysis

Programming Languages and Softwares

Python (4+ years)	C++ (1+ year)	Robot Operating System (ROS2)	Linux	MATLAB	SOLIDWORKS

VOLUNTEERING

Scout Leader *Namur, Belgium*
Unite de La Pairelle *2022 – 2023*

- Led a troop of 25 teenagers (ages 16–17), organizing weekly meetings, summer camps abroad, and charity events

Red Cross Animator *Yvoir, Belgium*
Centre d'accueil "Bocq" *Summer 2018*

- Organized summer activities for 20 refugee children (ages 6–12), including sports, educational games, and creative workshops

Care Provider for Invalid People *Lourdes, France*
Les Equipes Saint-Michel *2018*

- Provided assistance to disabled individuals during a 10-day pilgrimage, including support with mobility, meals, and personal care

SKILLS

Hobbies: Passionate about aviation with 25 hours of flight experience and theoretical **PPL certification**; pursuing a full private pilot license on DA-40, sailing/wingfoiling, athletics

Tools: 3D printing, CNC programming, MIG welding, lathe operation, press brake, renovated a 1970s old-timer

Languages:

French: Native	***Dutch***: Full Proficiency	***English***: Full Proficiency