

# Joe Najm

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**Summary** — EPFL Master's graduate and Formula One engineer with a strong passion and interest for software development, computer vision, machine learning and data science, with experience in biomedical research and motorsport! [Eligible to work in Switzerland].

## Education

### Ecole Polytechnique Fédérale de Lausanne (EPFL)

*Master's of Science in Electrical Engineering with specialisation in signal, image and video processing*  
*Bachelor of Science in Electrical and Electronics Engineering*

2021-2024  
2018-2021

## Experience

### Audi Formula One Project (Sauber Motorsport)

*Performance Development Engineer*

Dec 2024 – Ongoing

- Main tasks: Webapp software developer. F1 Performance Engineer for Nico Hülkenberg specialised in live driving lines for Practice, Qualifying, and Race. Data acquisition of telemetry for competitors during live sessions.
- Developing live performance analysis webapp software for in-session data and laps comparison.
- Applying Machine Learning algorithms for data analysis on competitors.
- Analysing Nico Hülkenberg's driving lines live during sessions with competitors to improve laptime and driving technique.
- In charge of live data acquisition of competitors' telemetry (speed, throttle ...) live during each session.

### Audi Formula One Project (Sauber Motorsport)

*Data Analysis and Computer Vision Intern*

Sep 2023 – Sep 2024

- Main task: Extract trajectory information (Yaw Rate and velocity) from monocular on-board Formula One footage.
- Developed python based webapps for data visualisation and analysis of results for several departments.
- Applied Visual SLAM and Visual Odometry algorithms for State and Pose estimation in C++.
- Trained and Deployed deep networks for the automatic extraction of Yaw Rate and Velocity using Python and Pytorch.
- Developed python based graphic interfaces and webapps for data visualisation and analysis of results using "Gradio".
- Performed statistical analysis on the results to evaluate the robustness of the experimented methods.

### Centre hospitalier universitaire vaudois (CHUV)

*Student Research assistant at the Medical Image Analysis Laboratory (under Dr. Meritxell Bach Cuadra)*

Jul 2022 - May 2023

- Main task: improve the current network for the classification of brain lesions, and find a good and easy way to automatically deploy it to clinicians without prior coding knowledge required.
- Trained deep networks for the detection and classification of Multiple-Sclerosis lesions in brain MRI images with Pytorch.
- Developed a python based software tool to deploy the model to clinicians using docker. Software extracts a patch around a click, feeds it to the network and provide live feedback to the user (More details can be found on my website).

### EPFL Racing Team

*Head of Perception group - Driverless Division*

Sep 2021 - Aug 2023

- Main task: Supervised and led a team to develop the vision/perception pipeline for a self-driving racing car with important constraints: the code should be robust to potential sensor failures, accurate and run in real-time on an embedded computer (Nvidia Jetson Orin).
- Developed a real-time object detection and distance estimation algorithms, using a monocular camera and a LiDAR.
- Performed object and keypoints detection, as well as PnP for distance estimation using just a monocular camera.
- Performed Ground removal using Ransac, DBscan clustering, ego-motion correction on the LiDAR pointcloud.
- Performed sensor calibration (obtain intrinsic and extrinsic parameters) and sensor fusion using computer vision projections (3D-2D) to obtain better results.
- Deployed, tested and debugged the algorithms for realtime use on a Nvidia Jetson. More details available on my website

## Projects

### Android Applications developer

Sep 2023 – Present

- Independent android app developer during my free time, using Kotlin and Kotlin Jetpack-Compose.
- Full stack developer (UI and back-end).
- Online database (Firebase) and local (room database).
- Applications include a exercise/nutrition tracker, and medication expiry date tracker.
- All my projects are meant for daily use, open source and available on the project page of my website.

### ApiZoom

Feb 2021 – July 2021

- Bachelor thesis with Prof. J-Ph. Thiran. Main task: automatically detect toxic "bee-killer" parasites on bee-hive images.
- Successfully trained a YOLOv5 network for the automatic detection of the toxic varroa mites. More details over here.

## Skills

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**OS** Debian, Ubuntu, Windows, Docker

**Project management** GIT, Jira, Scrum Master

**Machine Learning** Pytorch, Scikit-learn

**Data analysis** SQL, NumPy, SciPy, Pandas, Plotly, Gradio

**Languages** Python, Typescript, C++, Kotlin, Matlab

**Computer Vision** OpenCV, Deep nets, Visual SLAM, 3D-2D