

Joe Najm

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Summary — EPFL Master's graduate with a strong passion and interest for computer vision, machine learning and data science, with previous experience in biomedical research and Formula One! *[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

2021-2024

Bachelor of Science in Electrical and Electronics Engineering

2018-2021

Experience

Audi Formula One Project (Sauber Motorsport)

Sep 2023 – Sep 2024

Data Analysis and Computer Vision Intern

- Main task: Extract trajectory information (Yaw Rate and velocity) from monocular on-board Formula One footage.
- 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)

Jul 2022 - May 2023

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

- 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 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).
- Published an abstract at the ECTRIMS 2023 conference, regarding the robustness of the deep model available over here.

EPFL Racing Team

Sep 2021 - Aug 2023

Head of Perception group - Driverless Division

- 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.
- Integrated robust and realtime algorithms to the main pipeline with ROS2.
- Deployed, tested and debugged the algorithms for realtime use on a Nvidia Jetson.
- Part of the squad that developed the first self-driving of our team's history! 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.
- 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

OS Debian, Ubuntu, Windows, Docker

Project management GIT, Jira, Scrum Master

Machine Learning Pytorch, Scikit-learn

Data analysis NumPy, SciPy, Pandas, Plotly, Gradio

Languages Python, C++, Kotlin, Matlab

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