# Quoc Cuong **LE**

## Research Scientist | Research engineer in Machine Learning & Computer Vision

linkedin.com/in/quoc-cuong-le-686791a2 quoccuongle.github.io
+33 7 81 69 36 32 quoccuong.le@outlook.com
92130 Issy-les-Moulineaux, France
Dual citizenship (French & Vietnamese)

Ph.D. in Machine Learning & Computer Vision with more than 3 years of experience at XXII Group, a Computer Vision startup based near Paris. As a research engineer, I hold a strong background in engineering principles, project leadership, and the effective application of research, as well as maintaining research skills, while keeping me up-to-date with the latest advancements in the fields via my attendance at major international conferences such as ICCV/ CVPR.

## Skills

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|---|---|
| Programming | **Python**, C/C++, CUDA |
| ML Frameworks | **Pytorch**, **Tensorflow 2**, JAX, MLflow, Open MMLab, Google's frameworks (Tensorflow Model Garden, Scenic), TensorRT, ONNX, Darknet |
| IDE | **Visual Studio Code**, JetBrain |
| DevOps/MLOps | **Docker, Docker compose, Portainer**, Apache Nifi, MLFlow, K8s |
| OS | Linux Ubuntu, Windows |
| Other | Mongo DB, SQL, Nvidia RAPIDS, FiftyOne, Slurm, bash, git |

## Professional Experience

**Current**
**December 2022**

**R&D Lead - Tracking algorithm development, XXII Group, France**

- Developing scalable multi-camera tracking systems for security applications, e.g. retail, infrastructure, quick-service-restaurant, and public surveillance.
- Benchmarking multi-camera tracking systems and automated evaluation process.
- Developing multi-modal non-biometric **re-Id**entification, image/video retrieval systems.
- Leading role in multi-team collaboration projects as an expert in tracking algorithm, as well as senior software developer.
- Participation in a consortium of EU Starlight project (codename H2020) as a partner providing vision-related technologies including Detection, Tracking and Re-Identification.
- Drafted system design in collaboration with functional architects

Python | Cython | Pytorch | Tensorflow 2 | FAISS | Tensorstore | OpenCV | Apache NiFi | CI/CD | Scrum/Agile

**Current**
**April 2022**

**Research Scientist - Machine Learning & Computer Vision, XXII Group, France**

- Real-time Multiple Object Tracking in multiple camera systems.
- Out-of-Distribution and Distribution Shift problems in Machine Learning and Computer Vision (e.g. object detection, segmentation)
- Applying vision-Language Pretrained models, e.g. CLIP (OpenAI), Flamingo (Deepmind), GLIP (Microsoft) for real-time Open-Vocabulary/ Zero/One/Few-shot Object Detection (named YOLO-CLIP)
- Re-Identification, Image/Video Retrieval algorithms/approaches

Python | Pytorch | Tensorflow 2 | JAX

**November 2022**
**April 2020**

**Research Engineer, XXII Group, France**

Scalable real-time solutions for Smart City such as traffic monitoring, incident detection, and other video surveillance applications.

- Developed a fast Multiple Object Tracking algorithm as a common shared library, which was used in all service projects, as well as, main products XXII-CORE.
- Developed unit and integration test that yields above 85% code coverage following SDLC's Agile Model.
- Developed a benchmarking system for video surveillance systems

Python | Cython | C/C++ | CI/CD | Docker | Gitlab | Sphinx-docs | Mongo DB | Scrum/Agile

Mars 2020 – November 2016 | **Ph.D. Candidate, Université Tours, France**
Laboratory of Fundamental and Applied Computer Science of Tours - EA 6300 - ERL CNRS 7002, France., Project LUMINEUX. **Keywords** : Camera calibration, Single Object Tracking, Multiple Object Tracking in Mono/Multi-view, Re-identification

- Single Object Tracking (Bayesian Sampling, Correlation Filters, Point-based tracking)
- Multiple Object Tracking (Bi-partite matching, Multiple Hypothesis Tracking, Graph cut)
- Online Multi-view Multi-Object Tracking via graph-based approaches
- Re-Identification, Image Retrieval

Matlab | Python | Pytorch | Caffe | C/C++

September 2016 – Mars 2016 | **Research Intern, CEA LIST, France**
Implementation of multiple signal interpolation methods to speed up Non-Destructive Testing (NDT) simulation of ultrasound echos in CIVA, a simulation and analysis software for NDT.

- State-of-the-Art study
- Implementation of a data interpolation method inspired by Plane-Wave Destruction filters used to characterize seismic data
- Implementation of Auto-Regressive–Moving-Average (ARMA) model for signal interpolation

Matlab

## Education

2016-2020 Ph.D. in Computer Vision, Université François Rabelais de Tours, France
Laboratory of Fundamental and Applied Computer Science of Tours - EA 6300 - ERL CNRS 7002

2011-2016 French Engineer's Degree, INSA Centre Val de Loire, France
Major in Industrial System Engineering | Minor in Automation System, Industrial informatics, and Instrumentation (rank #1)

2015-2016 Master Degree, Université d'Orléans, France
Major in Mechatronics, Control, Robotics, and Signal

## Scholarship & Award

2015-2016 Eiffel Scholarship for excellent foreign students
2014-2015 Scholarship of Odon Valet foundation
2009 Third prize in Physics National Contest for high school students

## Language

**English** Fluent/Proficient (TOIEC 975/990, TOEFL iBT, C1 English Cambridge Certificate)
**French** Fluent
**Vietnamese** Mother tongue

## Publications

### Conference Proceedings


1. Le, Quoc Cuong, Donatello Conte et Moncef Hidane (sept. 2018). "Online Multiple View Tracking : Targets Association Across Cameras". In : *6th Workshop on Activity Monitoring by Multiple Distributed Sensing (AMMDS 2018)*. Newcastle, United Kingdom. URL : `https://hal.science/hal-01880374`.

2. — (jan. 2021). "Unbalanced Optimal Transport in Multi-Camera Tracking Applications". In : *International Conference on Pattern Recognition*. T. 12665. ICPR 2021 : Pattern Recognition. ICPR International Workshops and Challenges. Milan, Italy : Springer International Publishing, p. 327-343. DOI : `10.1007/978-3-030-68821-9\_30`. URL : `https://hal.science/hal-03375834`.

3. Le, Quoc Cuong et Moncef Hidane (mars 2020). "Appearance features for online multiple camera multiple target tracking". In : *SAC '20 : 35th Annual ACM Symposium on Applied Computing*. Brno, Czech Republic. DOI : `10.1145/3341105.3373960`. URL : `https://hal.science/hal-03591527`.


## References


**Souheil Hanoune**
*CTO/CSO*, XXII Group
@ souheil.hanoune@xxii.fr
+33 6 65 73 47 94

**Moncef Hidane**
*Researcher/Professor*, INSA Centre Val de Loire
@ moncef.hidane@insa-cvl.fr
+33 XXXXXXXXXX