

# Hicham Randrianarivo

Senior Research Engineer working on Large language models for multimodal data

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## Profile

A Senior Research Engineer with a solid background in machine learning, computer vision, and information retrieval. Proven expertise in developing and leading innovative projects in both academic and industry settings.

## Key Skills

Deep Learning & Computer Vision	Expert in applying deep learning techniques for image understanding, image retrieval, and semantic segmentation. Proven track record of publications in these areas.
Remote Sensing & Geospatial Analysis	Strong background in remote sensing and geospatial analysis, with a focus on urban structures and satellite imagery.
Information Retrieval & Search Engines	Extensive experience in information retrieval and search engine technology, as demonstrated by numerous publications and projects.

## Experience

- Aug 2022 – Now **Senior Research Engineer, Huawei, Amsterdam**  
At Huawei, I am part of the Multimodal Team, delivering machine learning models for Huawei's search engine, Petal Search. Key achievements include:
- Development of multimodal large language models for video understanding, fine-tuning these models on private data to extract keywords and generate video summaries.
  - A project of an AI code assistant application based on CodeT5 and CodeLlama to improve the developers and datascientists in the Research Center.
  - Development of a POC for 3D object reconstruction using multiviews methods.
  - Collaborated extensively with multiple teams, providing expertise to enhance our software engineering processes.
- Jun 2017 – Aug 2022 **Research Engineer, Qwant, Paris**  
At Qwant, I was the technical lead for the image search engine product. I led a team of 5 people and we made significant contributions to several key projects:
- I led the development of a content-based image retrieval system for Qwant's image search engine, enhancing methods for large-scale indexation and researching on multimodal representation to improve image retrieval.
  - We created a satellite image search engine as part of an H2020 European project named **SnapEarth**. Our team was responsible for developing the development of EarthSignature (image interpretation and classification) and EarthSearch (image search) modules.
  - Led a research project in collaboration with Graphcore to evaluate the performance of the Graphcore C2 IPU for deep learning model inference (cf. [4]).

- Sep 2012 – Dec 2016 **PhD. student**, *Onera, the french aerospace lab.*, Paris  
Completed a Ph.D. focusing on the automatic interpretation of satellite images using a mixture of object detection models. Developed solid shape models for object detection and structural methods for superpixels classification to perform semantic segmentation.
- Mar 2012 – Sep 2012 **Research intern**, *Laboratory of Computer Sciences, Paris 6 (LIP6)*, Paris  
Conducted research on large-scale image classification and retrieval, developing methods for approximating kernel function to learn a classifier in linear time.
- Jul 2011 – Aug 201 **Research intern**, *ETIS (Information Processing and System Teams)*, Cergy-Pontoise  
Evaluated machine learning methods for image retrieval during this research internship.

## Education

- 2012 – 2016 **Phd**, *Conservatoire National des Arts et Métiers*, Paris  
PhD. in computer science. Statistical learning of semantics classes for aerial images interpretation.
- 2011 – 2012 **Master of Science**, *University of Cergy-Pontoise*, Cergy-Pontoise  
Master of science in Computer Vision and Machine Learning. Double degree with the engineering degree of ENSEA.
- 2009 – 2012 **Engineering degree**, *ENSEA*, Cergy-Pontoise  
Engineering degree with speciality in Applied Mathematics and Computer Vision.

## Languages

- French Mother Language  
English Proficient

## Publications

- [1] Nicolas Audebert, Alexandre Boulch, Hicham Randrianarivo, Bertrand Le Saux, Marin Ferecatu, Sébastien Lefevre, and Renaud Marlet. “Deep learning for urban remote sensing”. In: *2017 Joint Urban Remote Sensing Event (JURSE)*. IEEE. 2017, pp. 1–4.
- [2] Manuel Campos-Taberner, Adriana Romero-Soriano, Carlo Gatta, Gustau Camps-Valls, Adrien Lagrange, Bertrand Le Saux, Anne Beaupere, Alexandre Boulch, Adrien Chan-Hon-Tong, Stéphane Herbin, et al. “Processing of extremely high-resolution Lidar and RGB data: outcome of the 2015 IEEE GRSS data fusion contest–part a: 2-D contest”. In: *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 9.12 (2016), pp. 5547–5559.
- [3] Chen Dang, Hicham Randrianarivo, Raphaël Fournier-S’Niehotta, and Nicolas Audebert. “Web Image Context Extraction with Graph Neural Networks and Sentence Embeddings on the DOM tree”. In: *Joint European Conference on Machine Learning and Knowledge Discovery in Databases 3rd Workshop on Graph Embedding and Mining* (2021).
- [4] Ilyes Kacher, Maxime Portaz, Hicham Randrianarivo, and Sylvain Peyronnet. *Graphcore C2 Card performance for image-based deep learning application: A Report*. 2020. arXiv: [2002.11670](https://arxiv.org/abs/2002.11670) [cs.CV].
- [5] Adrien Lagrange, Bertrand Le Saux, Anne Beaupere, Alexandre Boulch, Adrien Chan-Hon-Tong, Stéphane Herbin, Hicham Randrianarivo, and Marin Ferecatu. “Benchmarking classification of earth-observation data: From learning explicit features to convolutional networks”. In:

2015 *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*. IEEE. 2015, pp. 4173–4176.

- [6] Bertrand Le Saux and Hicham Randrianarivo. “Urban change detection in SAR images by interactive learning”. In: *2013 IEEE International Geoscience and Remote Sensing Symposium-IGARSS*. IEEE. 2013, pp. 3990–3993.
- [7] Bertrand Le Saux, Hicham Randrianarivo, and Nicolas Audebert. *Christchurch Aerial Semantic Dataset*. Dec. 2019. DOI: [10.5281/zenodo.3566005](https://doi.org/10.5281/zenodo.3566005). URL: <https://doi.org/10.5281/zenodo.3566005>.
- [8] Adrien Nivaggioli and Hicham Randrianarivo. “Weakly supervised semantic segmentation of satellite images”. In: *2019 Joint urban remote sensing event (JURSE)*. IEEE. 2019, pp. 1–4.
- [9] Maxime Portaz, Adrien Nivaggioli, Hicham Randrianarivo, Ilyes Kacher, and Sylvain Peyronnet. “QISS: An Open Source Image Similarity Search Engine”. In: *Advances in Information Retrieval*. Springer International Publishing, 2020, p. 486.
- [10] Maxime Portaz, Hicham Randrianarivo, Adrien Nivaggioli, Estelle Maudet, Christophe Servan, and Sylvain Peyronnet. *Image search using multilingual texts: a cross-modal learning approach between image and text*. 2019. arXiv: [1903.11299](https://arxiv.org/abs/1903.11299) [cs.CV].
- [11] Hicham Randrianarivo. “Apprentissage statistique de classes sémantiques pour l’interprétation d’images aériennes”. PhD thesis. Conservatoire national des arts et métiers-CNAM, 2016.
- [12] Hicham Randrianarivo, Bertrand Le Saux, Nicolas Audebert, Michel Crucianu, and Marin Ferecatu. “Structural classifiers for contextual semantic labeling of aerial images”. In: 2016.
- [13] Hicham Randrianarivo, Bertrand Le Saux, Michel Crucianu, and Marin Ferecatu. “Discriminatively-trained model mixture for object detection in aerial images”. In: *Image Information Mining, Bucharest, Romania (2015)*.
- [14] Hicham Randrianarivo, Bertrand Le Saux, and Marin Ferecatu. “Multimodal classification with deformable part-based models for urban cartography”. In: *2014 IEEE Geoscience and Remote Sensing Symposium*. IEEE. 2014, pp. 203–206.
- [15] Hicham Randrianarivo, Bertrand Le Saux, and Marin Ferecatu. “Urban structure detection with deformable part-based models”. In: *2013 IEEE International Geoscience and Remote Sensing Symposium-IGARSS*. IEEE. 2013, pp. 200–203.