JORIS GUÉRIN

Post-doctoral researcher at ANITI / LAAS-CNRS

PERSONAL DATA

Situation	French, 28 years old (September 25 1992, Annecy, France), Married, 1 child
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QUALIFICATION - CONSEIL NATIONAL DES UNIVERSITÉS (CNU)

MCF section 27 (14/02/2019 - 31/12/2023)
MCF section 61 (20/01/2019 - 31/12/2023)

EDUCATION

PhD in Computer Science - Signal Processing 2015 - 2018
LISPEN laboratory - École Nationale Supérieure d'Arts et Métiers (ENSAM), Lille, France.

Thesis	"Machine learning improvements for robotic applications in an industrial context : case study of autonomous sorting", defended on December 10 2018, proposed by the jury for the *prix de thèse Pierre Bézier*
Advisors	O. Gibaru, S. Thiery, E. Nyiri
Jury	Y. Laptev (president), O. Pietquin (reviewer), J.P. Gazeau (reviewer), B. Boots, L. Natale, O. Gibaru

Master of Science in Industrial Engineering 2014 - 2015
Texas Tech University (TTU), Lubbock, Texas, USA

Courses	Linear Optimization, Convex Optimization, Nonlinear Optimization, Pattern Recognition, Control Theory for Humans, Risk Assessment, Risk Modeling & assessment, Industrial Cost Analysis, Statistical Analysis with Digital Simulation
GPA	4/4

Ingénieur Arts et Métiers (Master's degree) 2012 - 2015
École Nationale Supérieure d'Arts et Métiers, Cluny, France.

Classes Préparatoires aux Grandes Écoles - Mathématiques-Physique (MP) 2010 - 2012
Lycée La Martinière Monplaisir, Lyon, France.

ACADEMIC PROFESSIONAL EXPERIENCE

Post-doctoral researcher Nov 2020 - Current
Artificial and Natural Intelligence Toulouse Institute (ANITI), Toulouse, France.

Topic	*Runtime Verification for Critical Machine Learning Applications*
Advisors	J. Guiochet (LAAS-CNRS) & K. Delmas (ONERA)
Objective	Develop methods to ensure safety of complex cyber-physical systems using neural network components by analyzing predictions at inference time.

Post-doctoral researcher Dec 2019 - Oct 2020

Universidade Federal do Rio Grande do Norte (UFRN), Natal, Brazil.

Topic	*Object Detection for Autonomous Robotics Applications*
Advisor	L.M. Garcia Goncalves
Objective	Improve environmental monitoring using robotic systems.
Achievements	New approach to robust detection for objects under periodic motion.

Post-doctoral researcher Feb 2019 - Dec 2019

Media Lab - Universidade Federal Fluminense (UFF), Niterói, Brazil.

Topic	*Person Re-Identification for Practical Scenarios*
Advisors	E.W. Gonzalez Clua & J. Viterbo Filho
Objective	Develop new methods for person re-identification adapted to the practical context of person search in large networks of city surveillance cameras.
Achievements	New implementation framework and evaluation metrics for person search including the human monitoring agent in the loop.

Doctoral researcher Oct 2015 - Dec 2018

LISPEN laboratory - École Nationale Supérieure d'Arts et Métiers (ENSAM), Lille, France.

Topic	*Machine Learning for robotics applications*
Advisors	O. Gibaru, S. Thiery, E. Nyiri
Objective	Implementation of robotics applications with minimal human intervention.
Achievements	Smart sorting application using real objects clustering, Local Cartesian positioning learning.

Visiting Graduate Researcher Aug 2017 - Apr 2018

Robot Learning Laboratory - Georgia Institute of Technology, Atlanta, Georgia, USA

Topic	*Image clustering for robotics applications*
Advisor	B. Boots
Objective	Advances in unsupervised image classification, Application in robot decision making.
Achievements	Deep ensemble transfer clustering algorithm, Semantic view selection model.

Research assistant Sep 2014 - Jul 2015

Texas Tech University, Lubbock, Texas, USA

Topic	*Habitat volume optimization in spaceships*, project for Lockheed Martin at NASA JSC
Advisor	S.M Hsiang
Objective	Space arrangement of the different rooms during a spaceship design.
Achievements	Developed a preprocessing algorithm to bin-packing of soft objects.

OTHER PROFESSIONAL EXPERIENCE

Machine Learning external consultant Jun 2020 - Current

Dataclocker, Paris, France.

Description	Dataclocker is a startup developing business data analysis tools for shopping centers. As an external consultant I advise their research team on topics related to person counting from videos and sentiment analysis from comments on social networks.

Research Engineer Feb 2019 - Feb 2020

Isabo.ai, Lille, France.

Description	Isabo.ai was a startup developing tools for automatic quality control of industrial production lines using machine learning. As a research engineer, I worked on problems related to training robust object detection models using only synthetic images generated with CAD models.

TEACHING ACTIVITIES

Course work

- Introduction to Machine Learning 2016 - 2017
  École Nationale Supérieure d'Arts et Métiers (ENSAM), Lille, France.

Type	Lectures (CM)
Workload	38 hours
Level	Masters (SMILE, KIMP and ColRobot)
Classes size	Groups between 4 and 16 students

- Introduction to python programming 2015 - 2016
  École Nationale Supérieure d'Arts et Métiers (ENSAM), Lille, France.

Type	Laboratory work (TP)
Workload	88 hours
Level	Engineering school (1^{st} year)
Classes size	groups of $\sim$ 20 students per semester

Advising

PhD students

- Eduardo Andrade (Ongoing), co-advised at 50% with J. Viterbo Filho, U.F. Fluminense, *One-shot learning approaches for person re-identification*

Master students

- Felix O. Sumari (Ongoing), co-advised at 50% with E.W. Gonzalez Clua, U.F. Fluminense (UFF), *Towards practical implementations of person re-identification from full video frames*
- Luigy A. Machaca A. (Ongoing), co-advised at 50% with E.W. Gonzalez Clua, U.F. Fluminense (UFF), *Improving re-identification by generating tracklets and data association from surveillance videos*
- Jose M. Huaman C. (Ongoing), co-advised at 50% with E.W. Gonzalez Clua, U.F. Fluminense (UFF), *Analysis of different re-identification approaches over full video frames*
- Igor Garcia B.S. (Defended on 17/12/2020), co-advised at 50% with J. Viterbo Filho, U.F. Fluminense (UFF), *A systematic approach for object detection using deep learning and CAD models*

Students projects

- Master's final project - PJE (2016 - 2017), co-advised at 40% with S. Thiery and E. Nyiri, ENSAM Lille, *Review of robotic grasping methods based on 3D point clouds*
- Second year group project - PJT (2017-2018), co-advised at 40% with S. Thiery and E. Nyiri, ENSAM Lille, *Grasp detection using deep learning*
- Second year group project - PJT (2017-2018), co-advised at 25% with S. Thiery and E. Nyiri, ENSAM Lille, *Data augmentation for image clustering*
- Second year group project - PJT (2016-2017), co-advised at 50% with S. Thiery and E. Nyiri, ENSAM Lille, *Identification of superquadrics from 3D point clouds for grasp-zone identification*
- Second year group project - PJT (2016-2017), co-advised at 40% with S. Thiery and E. Nyiri, ENSAM Lille, *Transfer learning for robotics sorting*

Writing of teaching documents

- Lecture notes and accompanying code for the course *Introduction to Machine Learning: Python application using Scikit-learn*
- Slides and accompanying code for a short course on image clustering (see *Invited Talks*).
- 2 examination documents for python programming labs ("*sujets de TP*")

OTHER SCIENTIFIC ACTIVITIES

Invited Talks

- 13/10/2020, "Grouping Countries and Regions to Improve Covid-19 Dynamics Predictions", invited talk for the *Covid 19* graduate course from the Departamento de Engenharia de Computação e Automação (DCA), Universidade Federal do Rio Grande do Norte (UFRN), Natal, Brazil.
- 29/06/2020, "Robust vision for robotics: leveraging movement to improve perception skills", invited talk at the Humanoid Sensing and Perception group, Instituto Italiano di Tecnologia (IIT), Genova, Italia
- 22/05/2019, "Machine learning improvements for robotic applications in industrial context: case study of autonomous sorting", invited talk for the weekly seminars of the Instituto da Computação, Universidade Federal Fluminense (UFF), Niterói, Brazil.
- 18/03/2019, "Image clustering with deep feature extractors", 4 hours short course for the PPGC/UFF 2019 summer school, Instituto da Computação, Universidade Federal Fluminense (UFF), Niterói, Brazil.

Reviewer

Journals

- Applied Intelligence (APIN)
- Journal of Intelligent & Robotic Systems (JINT)
- The International Journal of Press/Politics (IJPP)

Conferences and workshops

- IEEE/IFIP International Conference on Dependable Systems and Networks (DSN) 2021
- Conference on Graphics, Patterns and Images (SIBGRAPI) 2019 & 2020
- NeurIPS 2020 workshop: Tackling Climate Change with Machine Learning
- ICLR 2020 workshop: Tackling Climate Change with Machine Learning
- ICML 2019 workshop: AI for Social Good

Participation to juries

- Jury member for the master thesis defense of Igor Garcia B.S. (17/12/2020), *A systematic approach for object detection using deep learning and CAD models*, Instituto da Computação, Universidade Federal Fluminense (UFF).
- Jury member for the PhD qualification of Diego Rocha Lima (10/02/2020), *A bi-objective vehicle routing problem that integrates routing operations into tactical grouping decisions*, Universidade Federal do Rio Grande do Norte (UFRN).

DISTINCTIONS AND COMPLEMENTARY FORMATIONS

Distinctions

- IEEE-IES Student Paper Travel Assistance Award at IECON 2016, Florence, Italy (13 grantees for 82 applicants)
- 2017 Fulbright Scholarship as a visiting student researcher (Georgia Tech Atlanta)

Complementary formations

- Participation to the "Statistical physics and machine learning back together" summer school, Cargèse, France
- Participation to VVV17 (Humanoid Robot Programming), S. Margherita, Italy
- Participation to Machine Learning Summer School 2016, Cadiz, Spain

OPEN-SOURCE CODE AND DATASETS

Code

- Regions clustering based on early transmission features of Covid-19, `https://github.com/jorisguerin/clustering_covid`

Datasets

- Semantic View Selection dataset, `https://github.com/jorisguerin/SemanticViewSelection_dataset`, *9112 images representing everyday objects under different poses, and observed under multiple views with a camera mounted on the end-effector of a robot manipulator.*
- Screw Drivers database for 3D stereo object localization, `https://github.com/jorisguerin/endToEnd_stereoLocalization`, *5008 pairs of stereo images with 3D position labels*
- Tool Database for image-set clustering, `https://github.com/jorisguerin/toolClustering_dataset`, *560 images of shopfloor objects under different background and lighting conditions*

PRACTICAL SKILLS

Computer science

Languages	PYTHON, C++, MATLAB, JAVA, VBA, LUA
Machine Learning	tensorflow, pytorch, keras, scikit-learn
Robotics	ROS, KUKA LBR iiwa programming
Softwares	Blender, V-REP

Scientific communication

Writing	LaTeX, TikZ
Video editing	Blender, CamStudio

Languages

FRENCH	Mother tongue
ENGLISH	Fluent
PORTUGUESE:	Fluent

PUBLICATIONS

Google Scholar: `https://scholar.google.fr/citations?user=gO-31VYAAAAJ&hl=fr&oi=sra`

Thesis

Guérin, J. (2018). Machine learning improvements for robotic applications in an industrial context : case study of autonomous sorting. *École Nationale Supérieure d'Arts et Métiers.*

Journals

Guérin, J., Thiery, S., Nyiri, E., Gibaru, O., & Boots, B. (2021). Combining pretrained CNN feature extractors to enhance clustering of complex natural images. *Neurocomputing*, 423, 551-571.

Sumari, F. O., Machaca, L., Huaman, J., Clua, E. W., & **Guérin, J.** (2020). Towards practical implementations of person re-identification from full video frames. *Pattern Recognition Letters*, 138, 513-519.

Nobre, R. L. G., Caliman, A., Cabral, C. R., de Carvalho Araújo, F., **Guérin, J.**, Dantas, F. D. C. C., Quesado, L. B., Venticinque, E. M., Guariento, R. D., Amado, A. M., Kelly, P., Vanni, M. J., & Carneiro, L. S. (2020). Precipitation, landscape properties and land use interactively affect water quality of tropical freshwaters. *Science of The Total Environment*, 716, 137044.

Pereira, I. G.*, **Guérin, J.***, Junior, A. G. S.*, Garcia, G. S.*, Prisco, P., Miani, A., Distante, C., & Goncalves, L. M. G. (2020). Forecasting Covid-19 dynamics in Brazil: a data driven approach. *International Journal of Environmental Research and Public Health*, 17, 5115.

Guérin, J., Thiery, S., Nyiri, E., & Gibaru, O. (2018). Unsupervised robotic sorting: Towards autonomous decision making robots. *International Journal of Artificial Intelligence & Applications (IJAIA)*, 9, 81-98.

Conferences

Guérin, J., & Boots, B. (2018, September). Improving Image Clustering With Multiple Pretrained CNN Feature Extractors. In *2018 British Machine Vision Conference (BMVC)* (pp. 51). BMVA. (Acceptance: 29.9%)

Guérin, J., Gibaru, O., Nyiri, E., Thieryl, S., & Boots, B. (2018, October). Semantically Meaningful View Selection. In 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (pp. 1061-1066). IEEE. (Acceptance: 46.7%)

Guérin, J., Canuto, A. M. D. P., & Concalves, L. M. G. (2020, December). Robust Detection of Objects under Periodic Motion with Gaussian Process Filtering. In 2020 IEEE International Conference On Machine Learning And Applications (ICMLA) (pp. 685-692). IEEE. (Full paper, Acceptance: 25%)

Guérin, J., Gibaru, O., Nyiri, E., & Thiery, S. (2016, October). Learning local trajectories for high precision robotic tasks: Application to KUKA LBR iiwa Cartesian positioning. In *IECON 2016-42nd Annual Conference of the IEEE Industrial Electronics Society* (pp. 5316-5321). IEEE.

Guérin, J., Gibaru, O., Nyiri, E., Thiery, S., & Palos, J. (2018, October). Automatic Construction of Real-World Datasets for 3D Object Localization using Two Cameras. In *IECON 2018-44th Annual Conference of the IEEE Industrial Electronics Society* (pp. 3655-3658). IEEE.

Andrade, E. D. O., Viterbo, J., Vasconcelos, C. N., **Guérin, J.**, & Bernardini, F. C. (2019). A Model Based on LSTM Neural Networks to Identify Five Different Types of Malware. In *2019 International Conference on Knowledge-Based and Intelligent Information & Engineering Systems (KES)* (pp. 182-191). Elsevier.

Guérin, J., Gibaru, O., Thiery, S., & Nyiri, E. (2018). CNN features are also great at unsupervised classification. In *2018 International Conference on Artificial Intelligence and Applications (AIFU)* (pp. 83-95). AIRCC.

Guérin, J., Gibaru, O., Thiery, S., & Nyiri, E. (2017). Clustering for different scales of measurement-the gap-ratio weighted k-means algorithm. In *2017 International Conference on Artificial Intelligence and Applications (AIAP)* (pp. 35-52). AIRCC.

Guérin, J., Gibaru, O., Thiery, S., & Nyiri, E. (2016, November). Locally optimal control under unknown dynamics with learnt cost function: application to industrial robot positioning. In *2016 European Workshop on Advanced Control and Diagnosis (ACD)* (p. 012036). IOP Publishing. (Acceptance: 71%)

Book chapters

Pereira, I. G., Junior, A. G. S., Aragão, D. P., de Oliveira, E. V., Bezerra, A. A., Pereira, F. A., Costa, J. G. F. S., Cuno, J. S., dos Santos, D. H., **Guérin, J.**, Conci, A., Clua, E. W. G., Distante, C., Gonçalves, L. M. G. (2021). Epidemiology forecasting of COVID-19 using AI - A Survey. To appear in *Computational Intelligence for COVID-19 and Future Pandemics: Emerging Applications and Strategies*, Pages 1-32, Disruptive Technologies and Digital Transformations for Society 5.0 Series, Springer.