Colin Decourt

Computer Vision Researcher

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Experience

ANITI - NXP Semiconductors *Toulouse, France*

PhD Student in Deep Learning *Oct 2020 - Dec 2023*

- Creation of a deep neural network architecture for object classification using radar data.
- Development of a lightweight Faster R-CNN based architecture for range-doppler spectrum features extraction and object detection.
- Creation of a memory-efficient architecture based on convolutions and convolutional recurrent neural networks for single-view (range-doppler, range-angle) or multi-view (range-azimuth-doppler tensors) object detection and segmentation.
- Development of a self-supervised learning framework for radar object detection using contrastive learning and generative methods.
- Accepted article at IEEE IV 2022 conference, another in review. See publications for further details.
- Assistant professor in computer vision (classification, detection, segmentation) and computer science (C and Python programming, algorithmic). Details are available here.
- Supervision of internships: Domain adaptation for automotive radar object detection (NXP Semiconductors, 2022); Development of a multi-sensor platform for automotive application (NXP Semiconductors, 2021).

NXP Semiconductors *Toulouse, France*

Research Engineer *Feb 2020-Aug 2020*

- Creation of simple algorithms for target detection and classification using FMCW radar data.
- Introduction to radar signal processing.
- Bibliography on AI for automotive radar.

Ecole de Technologie Supérieure *Montréal, Quebec, Canada*

Computer Vision Researcher *Jun 2019-Sep 2019*

- Research project about left ventricle segmentation in pediatric MRI for inter-ventricular communication detections.
- Creation of a generative adversarial network for left ventricle segmentation in pediatric MRI.
- Creation of a semi-supervised framework to reduce the number of annotated data for training.
- Introduction of a new weighted cross-entropy loss function using distance transform to improve segmentation performance.
- Accepted article in Computers in Biology and Medicine journal. See publications for further details.

Sogetrel *Bordeaux, France*

Activity Management Operator *Jun 2018-Sep 2018*

- Establishment and monitoring of technicians' reports following interventions on the Orange network.
- Links between customers, technicians and operators.

Publications

Published

C. Decourt, R. VanRullen, D. Salle, T. Oberlin. **DAROD: A Deep Automotive Radar Object Detector on Range-Doppler maps.** IEEE Intelligent Vehicles Symposium (IV), Aachen, Germany, 2022

C. Decourt, L. Duong.**Semi-supervised generative adversarial networks for the segmentation of the left ventricle in pediatric MRI**, Computers in Biology and Medicine, Volume 123, 103884, ISSN 0010-4825, 2020

In Review

C. Decourt, R. VanRullen, D. Salle, T. Oberlin. **A recurrent CNN for online object detection on raw radar frames**. arXiv preprint arXiv:2212.11172., 2022, IEEE Transactions on Intelligent Transportation Systems (T-ITS)

C. Decourt, R. VanRullen, D. Salle, T. Oberlin.**Leveraging Self-Supervised Instance Contrastive Learning for Radar Object Detection**. arXiv preprint arXiv:2402.08427., 2024, IEEE Intelligent Vehicles Symposium (IV)

Education

University of Toulouse 3 - Paul Sabatier *Toulouse, France*

PhD in Artificial Intelligence *2020 - 2023*

- Research topic: Multiple target extraction, identification and tracking for radar using AI.
- PhD as part of the ANITI program, in collaboration with NXP Semiconductors.
- **Advisors**: Rufin VanRullen (CNRS), Thomas Oberlin (ISAE-SUPAERO), Didier Salle (NXP Semiconductors)

Bordeaux Graduate Engineering School in Telecommunications (ENSEIRB-MATEMCA) *Bordeaux, France*

MSc in telecommunications, major artificial intelligence *2017 - 2020*

- Artificial intelligence (machine learning, computer vision, natural language processing, reinforcement learning)
- Signal and image processing
- Digital communications and networks
- Software engineering

Lycée Alphonse Daudet *Nîmes, France*

Undergraduate studies to prepare for competitive entrance exams to engineering schools. *2015 - 2017*

- Mathematics, Physics, French literature and English.

Skills

Languages: French (native), English (fluent), German (beginner)

Programming languages: Python, C/C++, Java, SQL

Deep Learning frameworks: PyTorch, PyTorch Lightning, Tensorflow, Keras

Software Development Frameworks: Linux, Docker, Singularity, Slurm, Bash, Git