

Postdoctoral position or Research Engineer - University of Orléans, France

Subject: Weakly supervised learning for multimodal underwater imaging data

Keywords: multimodal, weakly supervised learning, self supervised learning, object detection and classification

Place: LIFO - Laboratoire d'Informatique Fondamentale d'Orléans, France

Starting: 01/09/2022 (approximative). Length: 18 months.

Criteria of eligibility: have a PhD

Salaire (en fonction de l'expérience) : 2000€ à 2200€ net.

Context of the project

The post-doc position is proposed in the frame of a research project funded by the French Research Funding Agency (ANR), ROV-Chasseur. The work will be done in LIFO, a laboratory of the University of Orléans and INSA Centre-Val de Loire, and also be supervised by the partner LIS, Toulon (<https://www.lis-lab.fr/>).

This project is interested in working on technological challenges in the development and deployment of deep models on the platform of an ROV (Remotely Operated underwater Vehicle) working in an underwater environment. The objective of this project is to bring innovations in auto/weakly supervised learning and in the design of efficient deep models. These make it possible to overcome the challenges of designing an intelligent ROV for recognition tasks in an underwater environment. New databases for the detection and classification of specific underwater objects (mines, fish) are also built within the framework of this project to facilitate the learning of deep models as well as evaluation of various existing methods

The current postdoc or research engineer position concerns Work Package n°2 of the project, which investigates how to address the lack of annotated underwater data (RGB images, sonar images) by using self/weakly supervised learning approaches.

Description of the work

The present work focuses on the study of self-supervised methods to learn the semantic/structural representation of the seabed and on weakly supervised learning to build object detectors. To do this, we will use the information already presented in the data without the need for manual labels. Concretely, pretext tasks and self-label generation techniques are studied to find the best solution for these two types of data from the ROV:

- RGB Images/Vidéos
- Sound Images

Solutions to be investigated include, but are not limited to: image transformation techniques to generate automatic labels; pretext tasks research and deep architecture design in order to train models with limited or zero labels.

We wish to propose an approach to learn the presentation of the seabed and underwater environments which is beneficial for many applications, not only object

detection/segmentation (fish, mines) but also anomalous event detection, object tracking, etc. The position includes also the below tasks:

- Management of heterogeneous training data and labels
- Designing and evaluation of deep learning models (CNNs, Transformers, Autoencoders, etc.)
- Periodically present the progress to the group
- Writing of scientific reports and articles
- Collaborate with the team members via discussions, study groups, guiding students/ interns/research officers.

Job profile:

The candidate is requested to have a PhD, with a strong background in Computer Science/Mathematics/Statistics/Computer Vision or relevant fields. An important knowledge of Python is primordial. This position requests knowledge and methodologies in machine learning, computer vision.

- Knowledge and experience in deep learning
- Good communication skills, a team player and willing to share ideas and knowledge with peers .
- Good verbal and written communication and troubleshooting skills

Students expecting to finalise their degree in the coming months are also welcome to apply.

To apply or for further information please contact:

A CV (and any other documents) has to be sent to the following e-mail:
Vincent NGUYEN (vincent.nguyen@univ-orleans.fr)

The Orléans Fundamental Computing Laboratory (LIFO, EA 4022) is a laboratory of the University of Orléans and INSA Centre-Val de Loire. The recruited postdoc will join the CA team which is structured around three complementary axes:

- Constraints: discrete constraints, modelling, optimization in constraint programming.
- Machine learning: symbolic, numerical and statistical learning to automatically extract useful and actionable descriptions from masses of data.
- Automatic language processing (TAL)

The CA team has published articles in top tier conferences and journals such as : AAAI, IJCAI, PAKDD, IJCNN, ECAI, Artificial Intelligence, Neural Networks, Pattern Recognition, etc.

Orléans is a very beautiful city (120km from Paris, 1 hour by train), ranked second most attractive city in France.

(<https://france3-regions.francetvinfo.fr/centre-val-de-loire/loiret/orleans/orleans-classee-deuxieme-ville-la-plus-attractive-de-france-2494519.html>)