FRANCE ENERGIES MARINES

Post doctorate / Research Engineer position
Deep learning for marine megafauna monitoring from 360° video data (F/M)

O/Ref: FEM-SAS-2022-475
06/12/2022

France Energies Marines Institute

France Energies Marines (FEM) is the French Institute for Energy Transition dedicated to offshore renewable energies. Its mission: to define, set-up and apply a scientific and technical framework necessary to remove the obstacles facing this rapidly developing sector. With a multidisciplinary team of 60 employees and a model of public-private collaboration, the Institute has one purpose: R&D, whether collaborative or carried out as part of a service activity. France Energies Marines provides support for the various offshore renewable energy technologies by relying on four cross-disciplinary and complementary R&D programmes: site characterisation, design and monitoring of systems, environmental integration and farm optimisation.

Context and objectives

Offshore wind has emerged as one of the most dynamic technologies in the energy mix and is rapidly expanding. Offshore windfarms may have impacts on marine megafauna, that must be estimated and reduced in the context of environmental policies. Environmental platforms at sea are being increasingly developed and deployed to monitor variousenvironmental parameters, together with monitoring the marine megafauna.

The post doctorate will work in the « Environmental Integration of ORE » Program and contribute to the OWFSOMM project, which aims to standardise tools for monitoring marine megafauna at the scale of offshore windfarms.

One of the work-packages of this project is to develop deep learning frameworks for automatic detection of megafauna using multimodal data with the final aim of estimating high-level ecological indicators. Among the various data sources, 360° video signals appear as a valuable complementary source to other instruments to observe marine mammals and seabirds. Yet, their exploitation within an automatic detection framework remains challenging.

Indeed, they form a massive amount of data, considering multiple views which are recorded for days at a high framerate that requires efficient solutions to be designed and deployed. Besides, the optical nature of the sensor makes the task of object detection very sensitive to numerous artefacts, such as the weather conditions, the scene illumination, the state of the sea, that are all changing along the day. Finally, the very rare nature of the observations (only a few instances of marine megafauna are visible in hours of video footage) raises the issue of learning and recognition of very weak signals.

The objective of this position is thus to assess current deep networks for object detection/tracking in the context of marine megafauna monitoring from 360° video data, as well as to design novel solutions that cope with the specific issues of massive data, high variability, and low frequency of observations of the objects to be monitored.

Job description

In order to address the afore mentioned objectives, a work program is given below.

- Bibliographical study of deep learning-based methods for marine mammal detection and classification using (panoramic) video streams.
- Evaluation and benchmarking of state-of-the-art methods.
- Improvement/adaptation of existing models and/or development of new models for marine megafauna monitoring from 360° video data.
- Dissemination: recommendation report to the ORE sector, publication, source codes.

Profile and skills

Initial training

PhD in Computer Science or related with a specialization in Computer Vision.

Specific knowledge and experiences

Required:

- Experience in deep learning for computer vision,
- Excellent programming skills in Python (familiar with one of deep learning packages, such as PyTorch or Tensorflow, is a must),
- Experience with video data.
- Interest for applied environmental issues.

Desirable:

- Work experience and knowledge on marine megafauna,
- Knowledge of environmental and conservation issues in the context of the European Marine Directive Strategy Framework and OREs.

Professional Assets

- Great scientific rigor,
- Spirit of initiative and multidisciplinary openness,
- Taste for applied research (industrial research),
- Ease of expression, argumentation and communication in a partnership context,
- Taste for teamwork but ability to work autonomously as well.

Practical information

- **Type of contract:** fixed-term contract (CDD, "Contrat à Durée Déterminée »)
- **Duration:** 11 months (until dec. 2023 , end of OWFSOMM Project)
- **Status:** Post-doctoral fellow / Research Engineer.
- **Workplace:** The candidate will be hosted at France Energies Marines Headquarters, 525, avenue Alexis de Rochon, F-29280 Plouzané, OR at IRISA / UBS, Campus de Tohoannic, F-56000 Vannes. Travel expenses will be supported when in FEM headquarters, according to FEM policy)
- **Starting date:** 01/02/2023
- **Deadline for application:** 01/01/2023

This position is open to people with disabilities.

How to apply

- Applications must consist of a **CV** and a **cover letter**.
- In the case of a candidate being seconded by a member of France Energies Marines, the application must mention the agreement of the current employer.
- To apply, please go to the France Energies Marines website under the **Join Us** section.
- For further information, contact us via contactrh@france-energies-marines.org with the reference and the title of the job offer as subject.