S04/2026 – Open-Set Object Detection: challenging VLM to understand unknown objects & contexts

6-month internship @ CEA List

Internship context

Based in Saclay (Essonne), the LIST is one of the two institutes of CEA Tech, the Technological Research Division of the CEA. Dedicated to intelligent digital systems, its mission is to carry out technological developments of excellence on behalf of industrial partners, in order to create value.

Within the LIST, the Laboratory of Vision and Learning for Scene Analysis (LVA) conducts its research in the field of computer vision and artificial intelligence for the perception of intelligent and autonomous systems. The laboratory's research themes include visual recognition, behavior and activity analysis, large-scale automatic annotation, and perception and decision models.

Missions

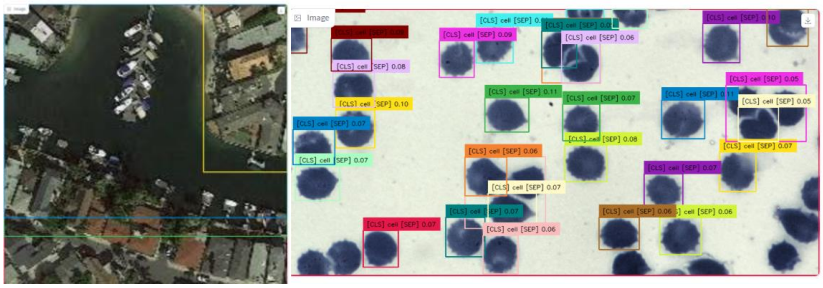
- Supervised deep learning models have demonstrated significant performances to detect a closed set of known annotated classes seen during training. But, how will they behave when **facing up to objects of unknown classes**?
- As their behaviour is uncertain when subject to never-before-seen classes and contexts (e.g. aerial, medical imaging...), we aim to develop **robust Open Set Object Detectors (OSOD)**, able to localise and classify any objects, no matter their classes are **known or unknown during training**, nor their domain.
- In specific domains, being able to provide semantic information about the unknown is also paramount and an understudied problem (e.g., characterizing the super-class of an unknown object).

Your missions within this internship are to:

- Study **state-of-the-art** methods of **Open Set Object Detection (OSOD)** as well as **Visual Language Models (VLM)** in the context of Open World containing both known and unknown objects;
- **Design** an object detector aware of the existence of the unknown, and able to describe the unknown by comparing it to or distinguishing it from what is known via certain characteristics that can be described textually;
- **Evaluate** the proposed method on recent OSOD benchmarks and compare to the state of the art;
- **Challenge** these methods by applying them to **new contexts** (e.g. aerial images, medical imaging);
- If relevant, submit your contributions to an international conference or workshop for **publication**.

Qualifications

- Students in their 5th year of studies (M2)
- Computer vision skills
- Machine learning skills (deep learning, VLM…)
- Python proficiency in a deep learning framework (especially PyTorch)



Grounding Dino tested on vehicle detection in an aerial image and cell detection in a medical image

Job-related benefits

Join CEA List and LVA as an intern to:

- Work in one of the most innovative research organizations in the world, addressing societal challenges to build the world of tomorrow
- Discover a rich ecosystem: privileged connections between the industrial and academic sectors
- Conduct research autonomously and creatively: encouragement to valorize results (scientific articles, patents, open-source codes...)
- Join a young and dynamic team
- Benefit from an internal computing infrastructure with more than 300 state-of-the-art GPUs
- Receive a stipend between €1300 and €1400 per month
- Have the opportunity to continue with a PhD or as a research engineer after the internship
- Have the possibility of remote work, receive a 75% reimbursement on public transportation costs, and benefit from the “mobili-jeune” aid to reduce rent costs…

To apply, contact the laboratory with a CV and cover letter: hejer.ammar@cea.fr; romaric.audigier@cea.fr; guillaume.lapouge@cea.fr
More details on https://kalisteo.cea.fr/index.php/apply-for-a-job/