Offer #2023-07013

Engineer position F/H – automatic detection of military vehicles in images and videos

Contract type: Fixed-term contract

Level of qualifications required: Graduate degree or equivalent

Function: Temporary scientific engineer

Level of experience: From 3 to 5 years

Context

This open position is part of a collaboration between the STARS team of Inria Sophia-Antipolis, the Direction Générale de l’Armement (DGA) of the French Defense ministry, and the Defense and Security department at Inria.

The aim of the project is to study state of the art algorithms for detection and identification, close to real-time, of military vehicles in images and video; to propose an implementation of these algorithms, possibly combining several techniques and/or models; and to evaluate this system. The evaluation of the system will not only consist of a global quantification of its performance, but also include a finer grained measure of its errors (false positives, silences) and deficits, as well as a measure of the cost of such errors for end users (time lost, danger risk, ...).

The goal of the project consists in applying recent advances in deep learning (in the field of computer vision for the automatic detection, classification and identification of objects in images and videos) to a specific domain while taking into account all its inherent constraints and difficulties (confidentiality and scarcity of training data, noise and interferences on the data, ...)

Assignment

The engineer will rely on the expertise of the STARS team (François Bremond) in the field of computer vision to try out different algorithms and combinations of algorithms for the automatic detection, classification and tracking of objects in images and videos. He/She will focus on boosting the performances of such models while taking into account specific difficulties such as:

- Low resolution
- Low contrast or lighting
- Occlusion
- Reduced number of training images
- Unusual point of view
- Camouflage

The engineer will have to define procedures and tools for the evaluation of these algorithms. The evaluation procedures will have to account for the number of classes and the type of classes, as well as the number of images required to efficiently train a model and obtain good performance on a specific class.

Recent technics and models for deep learning and data augmentation will be studied and proposed (such as using computer generated images or images generated from text prompts with diffusion models to enhance training datasets, ...) to answer the specific constraints of the domain and provide sufficient data for training the models.

Main activities

The main activities of the position include:

- Keeping up-to-date with the state of the art in computer vision and specifically automatic detection of objects, or any other domain relevant for this position.
- Develop a system for automatic detection of military vehicles with state-of-the-art performance.
- Propose a methodology for evaluating the performances of such a system that factors in domain
specific constraints, and use recent advances in deep learning and computer vision to boost the performances of object detection models and for data augmentation.
- Interact with partners of the project and provide expertise on subjects related to computer vision.

**Skills**

Qualities sought for this position include
- A Masters' degree or equivalent (engineering school) or a doctorate in the field of computer science, artificial intelligence, machine learning, deep learning or computer vision.
- A strong level in programming (python, git, ...)
- A previous experience in the field of deep learning (tensorflow, pytorch, cuda, ...) and an interest for the field of computer vision (OpenCV, YoloV8, ...)
- A willingness to diversify and learn new skills while applying state of the art algorithms to new domains.
- An interest for collaborative and multidisciplinary work.
- Ability to show initiative & creativity.

This position can be a good opportunity for candidates interested in the field of computer vision and/or deep learning, and can lead to other opportunities in academia (PhD, postdoc) for the successful candidate.

**Benefits package**

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Poste rattaché au siège dans les Yvelines mais localisé au centre Inria de L’université Côte d’Azur.

**General Information**

- **Town/city**: Sophia Antipolis
- **Inria Center**: Siège
- **Starting date**: 2024-07-01
- **Duration of contract**: 12 months
- **Deadline to apply**: 2024-06-12

**Contacts**

- **Inria Team**: MIS-DEFENSE (DIRECTION)
- **Recruiter**: Maillet Florence / florence.maillet@inria.fr

**About Inria**

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

**Warning**: you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

**Instruction to apply**

**Defence Security**: This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree.
of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

**Recruitment Policy:**
As part of its diversity policy, all Inria positions are accessible to people with disabilities.