Offer #2024-07150

Internship position F/M Learning a general representation for vehicle trajectories

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Fonction : Internship Research

Context

Work conditions:

- Start date: 01/04/2024 (negotiable)
- Duration of 6 months
- Remuneration: Legal minimum wage
- 5 RTT days and 17,5 vacation days
- Internship to take place at INRIA Paris (48 Rue Barrault, 75013 Paris), with possibility of home office during 1-2 days in the week.

Assignment

Previous works published by our team dealt with the clustering of trajectories for vehicles and pedestrians, together with the extraction of behaviors for vehicles [de Moura and Nashashibi, 2023] to transpose how real road users behave and interact to a simulated environment. Recently there have been a renew interest on deducing a more efficient comparison method for trajectories than the ones that rely on heuristic definition [Chang et al., 2023]: for example, [Zhou et al., 2023] introduce into the comparison of trajectories the road network graph itself using a multi-layer LSTM. In [Hoseini et al., 2021] the trajectories were clustered based on the transitive relations between then and [Bahari et al., 2021] implemented a component capable to offset the differences between predicted and observed trajectories with a data-driven learning residual block, allowing algorithms conceived for one environment to produce reliable results in a different one.

The main goal of the internship is to propose and implement some structure analogue to an embedding, able to generalize the training and data from specific scenarios to general ones, hence enabling the use of different sources of data to generate realistic agents for any environment. This component will be used in combination with the trajectory generator being develop at the moment, which will process the clustering data from [de Moura and Nashashibi, 2023] to generate vehicles with specific velocity profiles and that might interact with other road users in a certain way.

Main activities

We are looking for one motivated M2 student to accomplish the following objectives:

- Research the state of the art of vehicle trajectory generalization.
- Propose a method to generalize learned trajectories (position + velocity profile) for scenarios with different road structure.
- Test the approach with the data processed in recent works inside Carla simulator [Dosovitskiy et al., 2017].
- Depending on the quality of the results, publication on conference/journal may be considered.

Skills

Job requirements:

- Undergraduate on Computer Science or closely related fields.
- Excellent programming skills in C++ and python.
- Background in machine learning (reinforcement learning), simulation (Carla) and robotics; Knowledge of docker is a plus.
- Proficiency in written and spoken English language (not a hard constraint).

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 (after 6 months of employment)
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

General Information

- **Theme/Domain** : Robotics and Smart environments
  Software engineering (BAP E)
- **Town/city** : Paris
- **Inria Center** : Centre Inria de Paris
- **Starting date** : 2024-04-01
- **Duration of contract** : 6 months
- **Deadline to apply** : 2024-04-30

Contacts

- **Inria Team** : ASTRA
- **Recruiter** :
  De Moura Martins Gomes Nelson / nelson.demoura@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.