

Type d'offre : Corporate offer

Post date : 28.06.24

ENGIE Lab CRIGEN

Apprentice Engineer - Data analysis applied to wind turbine impacts

Informations générales

Contract type : Fixed-term contract

Contract length : 1/2 year(s)

Education level : BAC +4/+5 (Master, MBA)

Experience level : Junior (exp. < 3 years)

Contact :

[Apply](#)

Starting date : Mon 02/09/2024 - 12:00

ENGIE Lab CRIGEN :

ENGIE R&I has 5 research centers, including [ENGIE Crigen](#) :

ENGIE Lab CRIGEN is the ENGIE Group's R&D center dedicated to new energies (hydrogen, biogas and LNG), new uses for energy in tomorrow's cities, buildings and industry, and emerging technologies (computer science & AI, drones & robots, nanotechnologies & sensors).

ENGIE Lab CRIGEN conducts R&D projects and develops pilots for ENGIE's operational and corporate entities and external customers, with the aim of mastering tomorrow's technologies, bringing them to maturity, and preparing for the energy transition and the decarbonization of energy uses. Located in the Paris region, it employs 180 people. Its added value lies in innovation, transforming ideas and scientific knowledge into proven industrial applications or differentiating commercial offers.

ENGIE LAB CRIGEN is an inclusive company that values diversity of ideas and opinions, respects work-life balance and encourages flexibility.

Détail de l'offre (poste, mission, profil) :

Missions

You will be working in the Environment and Society Lab, at the interface of two research programs within ENGIE's Research and Innovation division, focusing on the assessment of risks associated with the development of wind power infrastructures on avifauna.

The development of wind power infrastructures is one of the pillars of the European energy decarbonization strategy, and is accompanied by an increased risk of collisions, particularly for avifauna.

The aim of this changeover is to:

- on the one hand, to lay the foundations for adaptation to climate change, taking into account the long-term evolution of meteorological events;
- secondly, within the EOLRAP project, as part of a public-private partnership between ENGIE and Aix-Marseille University, to model the flight behavior of birds of prey in the vicinity of wind turbines, based on the modeling of bird

flight behavior in a wind context (e.g., proportion of time spent in flight, distribution of flight heights) developed as part of a thesis (Schaub 2024). This modeling exploits a unique database compiling high spatial and temporal resolution GPS tracks collected on 480 individuals of 6 raptor species, which are among the birds most impacted by wind turbines in Europe. One of EOLRAP's two objectives is to evaluate strategies for shutting down wind turbines at calendar periods, times of day and during meteorological conditions when the probability of the species in question flying at rotor height, i.e. in the area where the risk of collision is highest (“static clamping”).

You will work with the post-doctoral fellow on this project to develop predictive learning models whose effectiveness will be compared with conventional modeling. The benefits in terms of collision risk reduction will be compared with the associated costs in terms of energy production, in search of the most advantageous compromise. Priority will be given to meteorological data, complementing the post-doc's work on flight data.

In computer science, the problem will be modeled as an optimization problem for which it is first necessary to predict the times and periods of flight of raptors and their probability of collision in order to optimize the operating time of the rotors of a wind farm during these periods, i.e. to dynamically reduce operation in order to maximize energy production while minimizing the risk of collision. To achieve this, it is necessary to employ deep learning techniques for prediction and reinforcement learning for optimization, in order to propose a predictive chain to industry professionals and validate it on the EOLRAP project data.

The central tasks of your work-study program will be :

- The collection of data relating to climatic conditions, prevailing winds, thermal currents, topography of overflow locations, positions and characteristics of wind turbines and energy production history corresponding to the positions and periods of GPS tracks from the EOLRAP project flight dataset;
- A state of the art of learning approaches applicable to the prediction of flight times and periods;

- A comparative experimental study of the learning models tested with the EOLRAP data and the data collected in step 1;
- A state of the art of reinforcement learning approaches applicable for optimizing the energy production of a modeled wind farm;
- A comparative experimental study of the reinforcement models tested with the data collected in step 1;
- The modeling and development of a model that combines the prediction of flight times and periods from EOLRAP data and the optimization of rotor operating time as a function of the predicted periods of flight at rotor height and the risk of collision.

Profile

Specialties

Mathematics and Computer Science
Data science, deep learning

Technical skills

- You have proven advanced programming skills (design and implementation) in Python, as well as theoretical and practical knowledge of deep and reinforcement learning methods;
- You also have general knowledge of data analysis and artificial intelligence;
- You have an interest in issues related to ecology, ornithology or environmental science.

Additional knowledge

Fluency in French and English: reading and writing reports and articles, interaction with non-French-speaking industrial partners.

Profile

- You are able to make proposals and work independently as part of a multidisciplinary team;
- You are curious and proactive about learning new skills required for your mission.

Practical information

Contract duration: 1/2 year(s)

We offer you the chance to work in our beautiful, modern premises, a stone's throw from the station and with excellent transport links (15 min from Gare du Nord via RER D - Tramway 11 - Metro 13 - bus lines 268 and 168). Your future working environment will encourage creativity and professional development, and promote exchanges between colleagues.

It will be possible to telework: if you wish, from the 3rd month of your work-study contract (1 day/week and a maximum of 45 days/year), subject to managerial and HR approval.

Thanks to your work-study status (under an apprenticeship contract), you may be eligible for certain grants (subject to conditions), including assistance with accommodation, travel expenses (home/company), (subsidies) meal expenses and a driving license (minimum of €500 since 01/01/2019). Finally, you will benefit from profit-sharing.

In addition to your annual leave, you will benefit from exam leave (5 days).

Location :

ENGIE Lab CRIGEN, 4 rue Joséphine Baker, 93240 STAINS

Access: 5 min from RER D Gare de Pierrefitte - Stains, 15 min from Gare du Nord

Lien vers l'offre sur le site dataia.eu :<https://da-cord-dev.peppercube.org/node/1096>