Job vacancy #2023-06850

Master internship — Predicting the occurrence of respiratory diseases in connected cattle farms using machine learning methods

Level of qualifications required: Graduate degree or equivalent

Fonction: Internship Research

About the research centre or Inria department

Le centre Inria de l'Université de Rennes est l'un des huit centres d'Inria et compte plus d'une trentaine d'équipes de recherche. Le centre Inria est un acteur majeur et reconnu dans le domaine des sciences numériques. Il est au cœur d'un riche écosystème de R&D et d'innovation : PME fortement innovantes, grands groupes industriels, pôles de compétitivité, acteurs de la recherche et de l'enseignement supérieur, laboratoires d'excellence, institut de recherche technologique.

Context

Team and management

- Supervisors & contact: Sébastien Picault (INRAE), Christine Largouet (IRISA/INRIA Rennes), sebastien.picault@inrae.fr, christine.largouet@irisa.fr
- Hosted by Dynamo research team, UMR 1300 BIOEPAR (INRAE, Oniris), Nantes
- The trainee will interact with researchers in other teams: LACODAM (IRISA, Rennes) and ImmunoCare (BIOEPAR, Nantes)

- Period of internship: 5 to 6 months, beginning from January to April 2024 according to the training schedule
- Keywords: machine learning, sensor data, respiratory disease modelling, precision medicine, decision support systems

Assignment

Main steps

1. Literature review on learning methods used in precision breeding
2. Training on the use of mechanistic models in the EMULSION open source software with a focus on BRD models
3. Descriptive analysis of field data collected in 2023, identification of the most appropriate time granularity, comparison of sensor data with other information collected
4. Implementation of machine learning methods to predict the occurrence of BRD from collar data, and comparison of their effectiveness
5. Prediction of the number of animals affected in a batch in order to integrate with BRD models and a decision support tool
6. Effective integration of these methods into a workflow for gathering data, producing scenarios for the models, launching simulations and recommending the most appropriate control strategies on the farms taking part in the experiment in 2024 (in collaboration with a research engineer from the DYNAMO team).

Main activities

- Develop programs and applications with a focus on BRD models
- Implementation of machine learning methods to predict the occurrence of BRD
- Prediction of the number of animals affected in a batch in order to integrate with BRD models and a decision support tool

Skills

- Master 2 level in computer science/bioinformatics/data science or equivalent
- Good knowledge of the main machine learning methods
- Good knowledge of statistical methods (descriptive statistics, statistical models)
- Writing skills, ability to read scientific articles in English

**Remuneration**

Selon les modalités de la convention

**General Information**

- **Theme/Domain:** Modeling and Control for Life Sciences
  Software engineering (BAP E)
- **Town/city:** Nantes
- **Inria Center:** Centre Inria de l'Université de Rennes
- **Starting date:** 2024-02-01
- **Duration of contract:** 6 months
- **Deadline to apply:** 2023-12-26

**Contacts**

- **Inria Team:** LACODAM
- **Recruiter:** Largouet Christine / Christine.Largouet@irisa.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.

**The keys to success**

- An interest in epidemiology, animal welfare and disease control, as well as in an interdisciplinary working environment
- Be a driving force behind proposals on the methods to be used and the characteristics of the data available
- Teamwork skills

**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**

Merci de déposer en ligne CV, lettre de motivation et éventuelles recommandations

Pour tout renseignement contacter christine.largouet@irisa.fr

**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.