

Postdoc position in statistics, INRA-ENVT, Toulouse (France).

Duration: 2 years.

Requirement: PhD degree in mathematics or statistics.

Starting date: September 1, 2017.

Context: This postdoc position is part of a project called "PigletDetect". This project is funded by the Carnot Institute (<http://www.instituts-carnot.eu/en/carnot-institute/icsa>). This project gathers one research teams, one professional institute (IFIP - The French Pork and Pig Institute) and one manufacturer (ASSERVA).

Description: The modernisation of food production systems is characterized by the development of Precision Livestock Farming (PLF). PLF systems aim to offer a real time monitoring and managing system for the farmer, providing a real-time warning of a problem so that immediate action can be taken (Berckmans, 2014). The individual behaviours of pigs are linked to the health status, welfare or productivity problems. Analysis of these individual behaviours could allow these problems to be detected upon occurrence of a pathology and even before the first symptoms are visible by an operator. The main objective of this project is to early detect the diseased piglets from an innovative real-time analysis of their individual food and water consumptions.

The continuous monitoring of individual water and food consumption will be performed by the IFIP, on healthy and diseased pigs. The objective is to generate time series of individual consumption behaviour. Real water/food consumption and weight will be measured using ASSERVA material and the experimental setting will allow testing different conditions, mainly normal and altered health status. Data will be collected on more than one thousand pigs during 56 days.

The combination of the information brought by the water and the food consumptions permits an early detection of the disease using multivariate reference intervals (Concordet and Servien, 2014) based on well-known linear/nonlinear mixed effects models (Davidian and Giltinan, 1995; Verbeke and Molenberghs, 2000). Then, the health status from each individual signals will be derived based on hidden Markov processes (Aparna et al., 2014; Pastor et al., 2014; Laffont et al., 2014) applied to real-time signals. Other methods based on machine learning could also be tested. Then, a statistical learning method will also be proposed to minimize the two errors of detection for the specific conditions of the breed.

Finally, these results will be implemented as a brick of a management system devoted to breeders in a strong interaction with the other partners of the project.

Skills: A strong background in statistics and applied mathematics is required, together with an experience in computer programming. An interest for applications with real data is also more than welcome.

Location: The position can be held in the Toxalim Unit (INRA-ENVT) in Toulouse, France. Visits to the 2 other partners in Rennes will be planned.

Gross salary: 2627.15€ a month.

Contact:

● Rémi Servien (PhD, INRA Researcher, UMR Toxalim) < remi.servien@toulouse.inra.fr >

- Didier Concordet (HdR, Full professor at ENVT, UMR Toxalim) < d.concordet@envt.fr >

Application:

A full application consists of ONE SINGLE PDF file which contains

- (1) a comprehensive CV,
- (2) reference letters (if any).

Please, submit your application via email to the two contacts above.

Applications will be accepted until the position is filled, but all applications received by July 15, 2017 will receive full consideration.