Description de l’employeur

Université Côte d’Azur (UCA) est une communauté d’universités et d’établissements (ComUE) à vocation Recherche créée en 2015, formée de 13 membres et regroupant plus de 30 000 étudiants. Elle réunit l’Université Nice Sophia Antipolis, des EPST et plusieurs autres acteurs concourant à la formation supérieure et à la recherche dans le département des Alpes-Maritimes. Lauréate de l’appel à projet IDEX en 2016 avec le projet UCA JEDI, elle a pour ambition d’accroître la visibilité du site et son rayonnement national et international et de figurer à terme parmi les 10 universités françaises de recherche comparables aux meilleures universités du monde.

Descriptif du poste

Contexte de la mission

Agriculture faces the challenges to feed more and more people while limiting the use of chemical products. MYCOPHYTO proposes concrete solutions via bio-stimulants, relying on a symbiotic association between fungus and plants, i.e., mycorrhiza. After successful results with local partners, the next step is to use machine learning to extend the customization of mycorrhiza inoculation of plants.

Based on experimental data as well as open source data (meteorology, metagenomics, etc.), a first problem is to fuse these heterogeneous data sources. A second layer is to predict the important characteristics for cropping at a given location. On top of that, robust optimization is needed to select the best cropping system.

Such toolchains have been successfully developed to create materials or polymers. Despite those advances, the biological context possesses a number of features complexifying the application of those methods:

- the growth of plants depends on a high number of experimental and environmental conditions, which are uncontrolled in outside experiments;
- experimental data are intrinsically noisy, incomplete and heterogeneous;
- experiments can take months, hence data are relatively scarce.

The focus will be on probabilistic methods, able to propagate and quantify the uncertainty at the various scales.

References
Missions principales

To tackle these problems, the goal of this project is to develop:

- multi-resolution prediction and clustering tools;
- sensitivity analysis and dimension reduction techniques on heterogeneous data;
- parsimonious high-dimensional robust optimization techniques.

During the project the candidate will:

- learn about Bayesian optimization, modeling of noisy data and advanced statistical learning methods;
- deploy methodology for direct use, on real data;
- collaborate with biologists on the application, and computer scientists on the construction of a data base;
- write papers, communicate and present results at workshops, conferences, etc;
- interact with INRIA students and researchers, participate in the scientific life of the team.

Profil du candidat

PhD in Statistics, Machine Learning or Applied Mathematics.

Qualités et compétences requises

Connaissances :
Background in Statistical and Machine Learning. Experience in uncertainty quantification, A/B testing and/or optimization techniques is considered an additional plus.

Compétences opérationnelles :
Knowledge of R, Python, C++.

Compétences comportementales :
Strong interest for biological applications.

Localisation du poste et horaires

UCA-Inria Sophia Antipolis-Méditerranée, équipe projet ACUMES

Contrat

12 months + 6 additional months with MYCOPHYTO(and possible longer term perspectives)

Candidature

The position will remain open until filled. Please send electronic application including CV, a statement of research interests, contact details of reference persons, and PhD reports (if available) to:
Dr. Mickaël Binois E-mail: mickael.binois@inria.fr