

Position Offered: UNIVERSITY GRADUATE

Project: *Application of supervised machine learning in the exploration and resolution of evolutionary scenarios*

Technological and scientific fields: Principal: Artificial Intelligence. Others: Massive data and information processing technologies. Computacional Biology.

Location: Madrid, Comunidad Autónoma de Madrid, Real Jardín Botánico (RJB), CSIC, <https://rjb.csic.es>

Research Group/PI: Evolutionary plant biology: patterns, processes and mechanisms (PEBG) / Isabel Sanmartín / <https://rjb.csic.es/personal-cientifico/isabel-sanmartin-bastida>

PROJECT SUMMARY

Supervised" machine learning (ML) is a subfield of AI in which algorithms trained with "labeled" data from simulations learn to solve complex problems, which escape classical statistical inference methods. The objective of the contract is to train the candidate in a growing field such as the application of ML in evolutionary biology. The project will analyze the mathematical basis of statistical models for their translation to a new ML-based framework. The use of different algorithms such as decision trees and different neural network architectures will be explored, as well as representation languages for evolutionary data and biological traits. Existing simulators will be compared in order to develop a generative neural network-based simulator that captures the complexity of statistically complex models.

PROFESSIONAL PROFILE

Minimum requirements:

Graduate in Data Science and Artificial Intelligence or Graduate in Software Engineering or Graduate in Biology or Biological Sciences or Computer Engineering or Graduate in Technologies for the Information Society. Medium-high level in English language. Experience in programming and data processing. Knowledge of Python and R programming languages.

Merits to be considered:

Experience in the field of artificial intelligence. Experience with machine learning libraries: as Tensorflow/Keras/Sklearn/PyTorch. Knowledge of Bayesian Inference tools.

WHAT IS OFFERED

The project will have an impact on digital competencies in the field of machine learning. The increase in the amount of available data has introduced new challenges in evolutionary biology that require the development of more sophisticated data modeling methods. Current methods are based on statistical inference techniques, but suffer from problems of computational intractability. The project will introduce the candidate to an expanding field, with projections in epidemiology, demography, and community ecology. The training plan includes statistical modeling of evolutionary scenarios; development of simulation algorithms and coding languages; exploration of AI architectures in classification and parameter estimation (90 ECTS). Attendance to accredited specialization courses at national/international universities (77 ECTS), and training stays with prestigious researchers in AI and statistical inference (60 ECTS). Dual supervision at RJB-CSIC and Universidad Politécnica de Madrid.

Contract conditions:

Indefinite contract for a University Graduate associated with the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary (37.000 € - 41.000 €).

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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