Postdoc position at Météo-France (CNRM) in Artificial Intelligence for Numerical Weather Prediction

Position
Application deadline: 12 July 2024
Duration of contract : 24 months
Expected starting date : October 2024
Location : Toulouse, France
Department : Research

Context
This position is part of the Chair EXPLEARTH, endorsed by the ANITI Institute (https://aniti.univ-toulouse.fr/). The main objective of EXPLEARTH is to develop a new generation of weather prediction systems, based on hybridisation of traditional physical models and state-of-the art ML methods, allowing for increased accuracy and timeliness in a cost-effective way.

Objectives
Currently operational weather forecasts rely on physically-based modelling approaches, and Numerical Weather Prediction (NWP) models are operated to determine atmospheric conditions for the next hours and days. The configuration choices of NWP models are still strongly constrained by computational resources, which implies in particular limitations on the horizontal resolution. Current operational systems run with a resolution around 10 km at the global scale, and around 1 km at the regional scale, at best.
A cheaper alternative to the explicit increase of the computational grid (also known as *dynamical downscaling*) is *statistical downscaling*, which aims at learning a relationship between coarse-scale and finer-scale forecasts. This downscaling task is very similar to super resolution in computer vision.
The aim of the position is to develop and evaluate state-of-the-art ML methods for statiscal downscaling applied to the Arome forecasting model operational at Météo-France.

Required skills
The ideal candidate would have the following qualifications :

- A PhD degree in atmospheric sciences, statistics or artificial intelligence
- A strong background in deep learning algorithms, in particular convolutional neural networks and deep generative models (GANs, diffusion models)
- Experience in geophysical problems would be appreciated, at least a strong interest for applied research in atmopsheric physics is highly recommended
- Proficiency with Python programming and AI librairies (tensorflow, PyTorch)
- Experience with processing large volumes of data
- Experience of working in a Linux-based environment
- Aptitude for scientific work, written and oral communication in English, meetings abroad possible
- A scientific curiosity, autonomy, rigor in the interpretation of the results

Practical aspects
This work will be carried on at the National Centre for Meteorological Research (CNRM), in Toulouse, France. The EXPLEARTH project includes partnerships with CERFACS, EVIDEN, and the Toulouse Institute of Mathematics, among others. The candidate will work in close collaboration with the partners, and will contribute to ANITI activities.
The successful candidate will benefit from the Meteo-France/CNRM computational facilities and will have access to the forecasts datasets of Météo-France.

The net monthly salary will be between 2400 and 3700 euros according to experience. This includes French social security (health insurance).

Application procedure

Interested candidates should send the following documents by e-mail to laure.raynaud@meteo.fr,

- A curriculum vitae detailing experience and technical skills
- Motivation letter explaining interests for the job
- Recommendation letters will be appreciated