

Keynote: Advancing Precipitation Estimation and Prediction through Deep Learning at Météo-France

Tuesday 18 March 2025 09:15 (30 minutes)

This presentation will showcase three innovative projects developed at Météo-France's Artificial Intelligence Laboratory, aimed at improving precipitation estimation and prediction using state-of-the-art deep learning techniques.

The first project, Espresso, focuses on satellite-based precipitation estimation. Leveraging deep learning, Espresso enables accurate retrieval of precipitation by integrating multispectral satellite data and high-resolution ground truth. This product, developed jointly with Météo-France's Operations department, is now used daily by forecasters in overseas territories that are not covered by radar.

The second project explores short-term precipitation forecasting using Google DeepMind's DGMR model. By adapting this generative approach to Météo-France's operational context, we aim to provide rapid and reliable precipitation nowcasts, crucial for extreme weather events. This project is currently under evaluation by our Operations department.

Finally, I will discuss our medium-range forecasting project, which employs a deep learning model designed to emulate Météo-France's high-resolution AROME model. This research project, under development in collaboration with the French National Research Center for Meteorology, trains a deep neural network on 20 parameters of AROME analyses to make 1-hour timestep forecasts. The model can then be applied to generate forecasts of any length in just a few seconds. This method could reduce computational costs while maintaining competitive accuracy, offering a promising alternative for medium-term precipitation forecasting.

These projects underline the potential of AI to revolutionize meteorological practices, balancing computational efficiency with prediction accuracy.

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