HAMLET
How to Apply Machine Learning to Experimental & Theoretical PHYSICS
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Data-driven modelling for limited area forecasting

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Recently proposed Neural-LAM forecasting models (https://arxiv.org/abs/2309.17370, https://arxiv.org/abs/2406.04759) bring state-of-the-art graph-based approaches to Limited Area Modeling (LAM). The models generate and use an area-restricted graph and take forcing inputs from a host model to handle the boundary conditions. Initial promising results have motivated interest in developing the approach further. To this end, a cross-national collaborative community has been formed (https://github.com/mllam). We report ongoing work from this community to 1) survey available and relevant reanalysis datasets for training, 2) transform these source datasets to common zarr-based training-ready datasets, on 3) preliminary results applying the Neural-LAM to new spatial domains, and on 4) research questions around global-modal coupling and ensemble forecast predictions currently planned to be tackled within the community. Within the community we are developing a common tooling and infrastructure to share training datasets, and working on shared verification tooling targeting metrics relevant for kilometre-scale forecasts, both of these developments we will detail. The flexible and modular codebase for training and evaluating LAM models is available in an open source repository that welcomes contributions.

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