Report

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Summary

Tasks Status

Task	Status	Link
Escrever projeto		
Criar toy model		

Learned Concepts

Key insights from recent studies:

- Flow anisotropies (v_0, v_1, v_2) and collective behavior (correlations) provide evidence for the emergence of a hydrodynamic phase in heavy ion collisions [**noronha˙progress˙2024**].
- Although hydrodynamics is characterized by a short applicability timescale (low Reynolds number), collective behavior is still observed in small systems, including proton–nucleus collisions, in recent experiments [**noronha˙progress˙2024**, **paquet˙characterizing˙nodate**].

Tasks Planned

Task	Due Date

Selected Paper

The promises and pitfalls of deep kernel learning

Sebastian W. Ober, Carl E. Rasmussen, Mark van der Wilk *Proceedings of the Thirty-Seventh Conference on Uncertainty in Artificial Intelligence*, PMLR 161:1206-1216, 2021.

Abstract

Deep kernel learning and related techniques promise to combine the representational power of neural networks with the reliable uncertainty estimates of Gaussian processes. One crucial aspect of these models is an expectation that, because they are treated as Gaussian process models optimized using the marginal likelihood, they are protected from overfitting. However, we identify pathological behavior, including overfitting, on a simple toy example. We explore this pathology, explaining its origins and considering how it applies to real datasets. Through careful experimentation on UCI datasets, CIFAR-10, and the UTKFace dataset, we find that the overfitting from overparameterized deep kernel learning, in which the model is “somewhat Bayesian”, can in certain scenarios be worse than that from not being Bayesian at all. However, we find that a fully Bayesian treatment of deep kernel learning can rectify this overfitting and obtain the desired performance improvements over standard neural networks and Gaussian processes.

Figure: The promises and pitfalls of deep kernel learning” (Ober et al., 2021), providing a critical analysis of the strengths, limitations, and failure modes of deep kernel learning models.

References