

PiAI Seminar Series: Physics informed AI in Plasma Science
10:00-11:00, 18 May 2020 (CEST:UTC+2)
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Web Seminar

A Bayesian Approach to Artificial Neural Networks

Udo von Toussaint,

Max Planck Institute for Plasma Physics, 85748 Garching, Germany

Artificial Neural networks (ANN) are famous for their advantageous flexibility for problems when there is insufficient knowledge to set up a proper model. On the other hand, this flexibility can cause overfitting and can hamper the generalization and stability of ANNs. Many approaches to regularize ANNs have been suggested (e.g. L1- or L2-norm based regularization) but most of them are based on ad hoc arguments. Employing the principle of transformation invariance, a general prior for feed-forward networks can be derived. This regularization prior not only favours cell and layer pruning but enables also a consistent Bayesian approach: Relying on Occam's razor we demonstrate (as a proof of concept) how an ANN can be applied even in the absence of available training data. The relation to the concept of automatic relevance detection will be discussed.

hamaguch@ppl.eng.osaka-u.ac.jp