

A dynamical systems approach to outlier robust machine learning

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We consider a typical problem of machine learning – the reconstruction of probability distributions of observed spatially distributed data. We introduce the so-called gradient conjugate prior update and study the induced dynamical system. We will explain the dynamics of the parameters and show how one can use insights from the dynamical behavior to recover the ground truth distribution in a way that is robust against outliers. The developed approach carries over to artificial neural networks.

References

- [1] P. Gurevich and H. Stuke, Gradient Conjugate Priors and Deep Neural Networks, *arXiv:1802.02643 [math.ST]* (2019).
- [2] P. Gurevich and H. Stuke, Robustness Against Outliers For Deep Neural Networks By Gradient Conjugate Priors, *arXiv:1905.08464 [stat.ML]* (2019).