Towards a mathematical framework to inform neural network modelling via polynomial regression

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Abstract-

Even when polynomial regression is explored by building an explicit expression for the coefficients of a polynomial regression from the weights of a given neural network, using a regression problems. The validity of the proposed method depends on different factors like the distribution of the activation function. The performance of this method is empirically tested via simulation of synthetic data generated from polynomials to train neural networks with different structures and hyperparameters, showing that almost identical predictions can be obtained when certain conditions are met. Lastly, when learning from polynomial generated data, the proposed method produces polynomials that approximate correctly the data locally.

Index Terms- Polynomial regressionNeural networksMachine learning

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