Langer, Sophie

Analysis of the rate of convergence of fully connected deep neural network regression estimates with smooth activation function. (English) [Zbl 1460.62159]

There is an investigation on regression estimators based on deep neural networks (DNN). In a previous article, [the author and M. Kohler, “On the rate of convergence of fully connected deep neural network regression estimates”, Preprint, arXiv:1908.11133], neural networks with rectified linear unit (ReLU) activation function have been considered. The question here is, if the same rate of convergence for fully connected deep neural networks regression estimators with smooth activation function – the sigmoid – can be achieved. Indeed, the main result of the present paper, proves that under a set of sufficient conditions, the $L_2$ -errors of least squares neural network regression estimators based on a set of fully connected DNNs with a fixed number of layers, achieve a similar rate of convergence as in the mentioned article.

Reviewer: Claudia Simionescu-Badea (Wien)

MSC:

62M45 Neural nets and related approaches to inference from stochastic processes
62G08 Nonparametric regression and quantile regression
41A25 Rate of convergence, degree of approximation
68T07 Artificial neural networks and deep learning
82C32 Neural nets applied to problems in time-dependent statistical mechanics

Keywords:
curse of dimensionality; deep learning; neural networks; nonparametric regression; rate of convergence

Full Text: DOI arXiv

References:


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