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**Topological approaches to deep learning.** (English) Zbl 1441.68220

Baas, Nils (ed.) et al., Topological data analysis. Proceedings of the Abel symposium 2018, Geiranger, Norway, June 4–8, 2018. Cham: Springer. Abel Symp. 15, 119-146 (2020).

**Summary:** In this work we introduce an algebraic formalism to describe and construct deep learning architectures as well as actions on them. We show how our algebraic formalism in conjunction with topological data analysis enables the construction of neural network architectures from a priori geometries, geometries obtained from data analysis, and purely data driven geometries. We also demonstrate how these techniques can improve the transparency and performance of deep neural networks.

For the entire collection see [[Zbl 1448.62008](#)].

**MSC:**

[68T07](#) Artificial neural networks and deep learning

[55N31](#) Persistent homology and applications, topological data analysis

Cited in 1 Document

**Software:**

[CIFAR](#); [ImageNet](#); [MNIST](#)

**Full Text:** [DOI](#)

**References:**

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