

Understanding Neural Networks via Polyhedral Geometry

Abstract:

Neural networks with rectified linear unit (ReLU) activations are one of the standard models in modern machine learning. Despite their practical importance, fundamental theoretical questions concerning ReLU networks remain open until today. For instance, what is the precise set of (piecewise linear) functions representable by ReLU networks with a given depth? And what functions can we represent with polynomial-size neural networks? In this talk I will explain how we can use techniques from polyhedral geometry and combinatorial optimization to make progress towards resolving these questions.

Based on joint works with Amitabh Basu, Marco Di Summa, Christian Haase, Georg Loho, Leon Sering, and Martin Skutella.