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SPEAKER TITLES/ABSTRACTS

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"ReLu regression: Complexity and Approximation Algorithms"

ReLU regression problem is related to fundamental tasks in machine learning, such as training deep neural networks and performing variable selection in embedding using neural networks. We study this problem from the algorithmic complexity perspective and how to possibly solve the non-convex problem more efficiently and reliably. First, we show that ReLu regression is NP-hard in general. When the number of features is p, and the number of samples is n, there exists a polynomial algorithm that achieves the global optimal solution in O(n^p) running time. Second, we present an integer programming (IP) framework, which can produce dual bounds and feasible upper bounds. Moreover, we present a polynomial-time iterative n-Approximation Algorithm based on convex relaxation and statistical intuition, which performs well in practice, as demonstrated by numerical studies.

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