Deep neural network learning of functions with distributed singularities
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One of the few problem cases where deep neural networks are provably superior to all classical machine learning techniques is those where the functions to be learned exhibit structured singularities, i.e., jumps along curves of some form of low complexity. This situation is encountered in virtually all classification problems due to the discrete nature of labels. In this context, precisely identifying the effect of regularity assumptions of the decision boundary, the relationship with noise- and margin conditions, and the effect on learnability, especially in modern overparameterized regimes, is of very high theoretical interest.

For this project, I am looking for a highly motivated student with an interest (but not necessarily with comprehensive background) in machine learning, probability theory, statistical methods, and functional analysis.