

ABSTRACT

Layers of Rectifier Networks as Space Foldings

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The representational power of a neural network has important consequences from a statistical viewpoint. It is possible to define complexity measures that tightly relate the representational power of a hypothesis set and the statistical complexity of the learning problem (at least in theory, leaving aside parametrization and optimization considerations, which are very important in practice).

Layers of a network may map several inputs to the same output. All inputs that map to the same value at an intermediate layer will undergo the same computations at deeper layers. In turn, the behaviors computed at deeper layers replicate numerous times over the input space.

In this report we discuss the linear regions computed by the layers of a network as a complexity measure from a theoretical point of view and later we compute these regions and the linear maps associated with the parameters of the networks on different datasets.