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# Unsupervised DeepView: Global Explainability of Uncertainties for High Dimensional Data

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In recent years, more and more visualization methods for explanations of artificial intelligence have been proposed that focus on untangling black box models for single instances of the data set. While the focus often lies on supervised learning algorithms, the study of uncertainty estimations in the unsupervised domain for high-dimensional data sets in the explainability domain has been neglected so far. As a result, existing visualization methods struggle to visualize global uncertainty patterns over whole datasets.

We propose Unsupervised DeepView, the first global uncertainty visualization method for high dimensional data based on a novel unsupervised proxy for local uncertainties. In this paper, we exploit the mathematical notion of local intrinsic dimensionality as a measure of local data complexity. As a label-agnostic measure of model uncertainty in unsupervised machine learning, it shows two highly desirable features: It can be used for global structure visualization as well as for the detection of local adversarials. In our empirical evaluation, we demonstrate its ability both in visualizations and quantitative analysis for unsupervised models on multiple datasets.

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