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# Metric Space Magnitude for Evaluating the Diversity of Latent Representations

The magnitude of a metric space is a recently-established invariant, providing a measure of the 'effective size' of a space across multiple scales while also capturing numerous geometrical properties. We develop a family of magnitude-based measures of the intrinsic diversity of latent representations. Our measures are provably stable under perturbations of the data, can be efficiently calculated, and enable a rigorous multi-scale comparison of latent representations across multiple scales of similarity. We show the utility and superior performance of our measures in an experimental suite that comprises different domains and tasks including the evaluation of generative models for text, image, and graph data. Further, we discuss the role of evaluating and preserving diversity and hence magnitude in the context of representation learning for health data.

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