Revealing Latent Hierarchical Structures in High-Dimensional Data Using Hyperbolic Representations

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Abstract. Understanding and accurately representing hierarchical data is crucial across various fields. In this talk, using concepts and tools from manifold learning, I will present a new method for embedding hierarchical data into hyperbolic space. The new method is computationally efficient, deterministic, and provably recovers the underlying hierarchical structure. In addition, I will present a new tree Wasserstein distance for high dimensional data with a latent feature hierarchy. I will demonstrate the efficacy of the proposed methods and their advantages compared to existing methods on graph embedding benchmarks and several hierarchical datasets that involve word documents and single-cell RNA-sequencing.