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Inferential diffusions as a tool for geometrization of digital data sets. Preliminary report.

We describe methodologies for introducing Geometry and harmonic Analysis on digital data sets. We use diffusion semigroups to generate various multiscale inference (or affinity) geometries in order to organize and build data based ontologies and languages. The spectral theory of the generating Markov process is directly linked to geometry and scale organization , and leads to powerful multiscale tools for the analysis of data matrices viewed as functions on the tensor product of the columns and rows, diffusion graphs. We will provide applications to questionnaires ,hyperspectral medical data, text documents, etc. (Received September 21, 2007)