Why we need low dimension data?

Often, the physical system of interest may be naturally represented by a partial differential equation (PDE) in a few spatial variables. If data are collected from a numerical discretization or from experimental measurements on a spatial grid, then the state dimension n may be prohibitively large. For example, in fluid dynamics, even simple 2D and 3D flows may require tens of thousands up to billions of variables to represent the discretized system. [1]

What are the common dimensionality reduction methods?

1. **Autoencoder**

[1] @article{brunton2016discovering,

title={Discovering governing equations from data by sparse identification of nonlinear dynamical systems},

author={Brunton, Steven L and Proctor, Joshua L and Kutz, J Nathan},

journal={Proceedings of the national academy of sciences},

volume={113},

number={15},

pages={3932--3937},

year={2016},

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