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skedm: Empirical Dynamic Modeling

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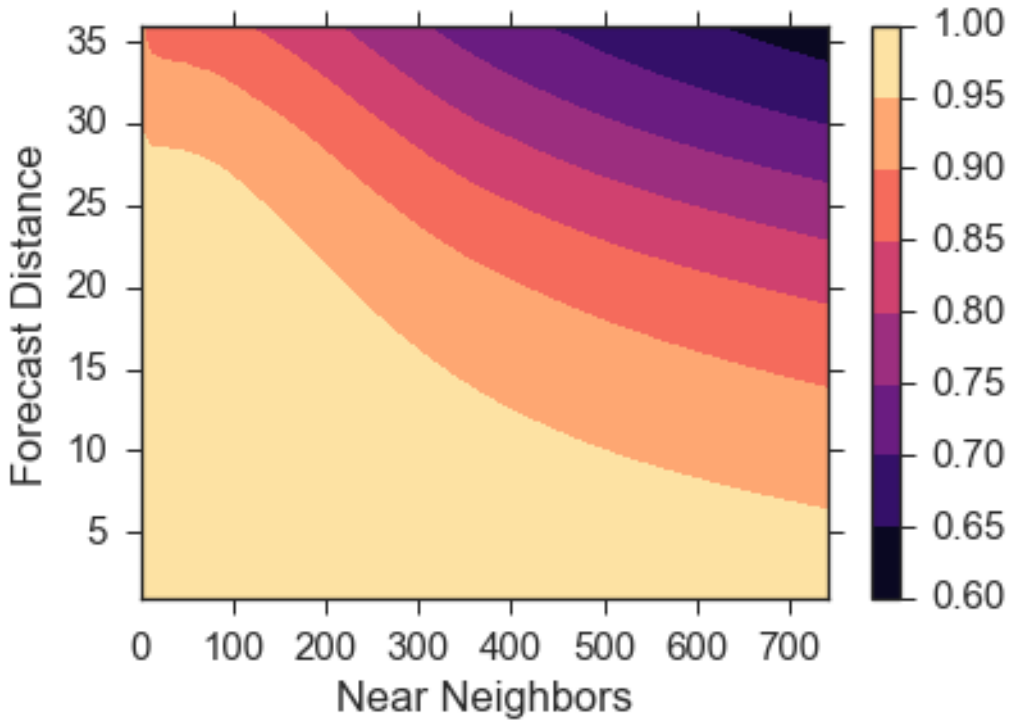
Software

- Review
- Repository
- Archive

Summary

This python package implements nonlinear time series analysis techniques, also referred to as empirical dynamic modeling, based on many of the workflows and routines within TISEAN(Hegger and Schreiber 1999) and (Ye et al. 2017). The package provides a modern api, is written in pure python, and provides additional analysis routines not provided by TISEAN. skedm is capable of reconstructing state spaces from one, two, and even three-dimensional series. Additionally, it provides various methods for analyzing the evolution of nearby neighbors in the reconstructed state spaces. skedm also includes numerous one, two, and three-dimensional synthetic datasets for researchers to explore.

The code makes use of scikit-learn's (Pedregosa et al. 2011) efficient near neighbor implementation, and allows users familiar with the scikit-learn's API (Buitinck et al. 2013) to easily use skedm.



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References

Buitinck, Lars, Gilles Louppe, Mathieu Blondel, Fabian Pedregosa, Andreas Mueller, Olivier Grisel, Vlad Niculae, et al. 2013. "API Design for Machine Learning Software: Experiences from the Scikit-Learn Project." *arXiv Preprint arXiv:1309.0238*.

Hegger, Holger Kantz, Rainer, and Thomas Schreiber. 1999. "Practical Implementation of Nonlinear Time Series Methods: The Tisean Package." *Chaos: An Interdisciplinary Journal of Nonlinear Science* 9.2: 413–35.

Pedregosa, Fabian, Gaél Varoquaux, Alexandre Gramfort, Vincent Michel, Bertrand Thirion, Olivier Grisel, Mathieu Blondel, et al. 2011. "Scikit-Learn: Machine Learning in Python." *The Journal of Machine Learning Research* 12. JMLR. org: 2825–30.

Ye, Hao, Jun Cai, Adam Clark, janecowles, Oliver Keyes, and Ethan White. 2017. "Ha0ye/rEDM: Added Readme." doi:10.5281/zenodo.376663.