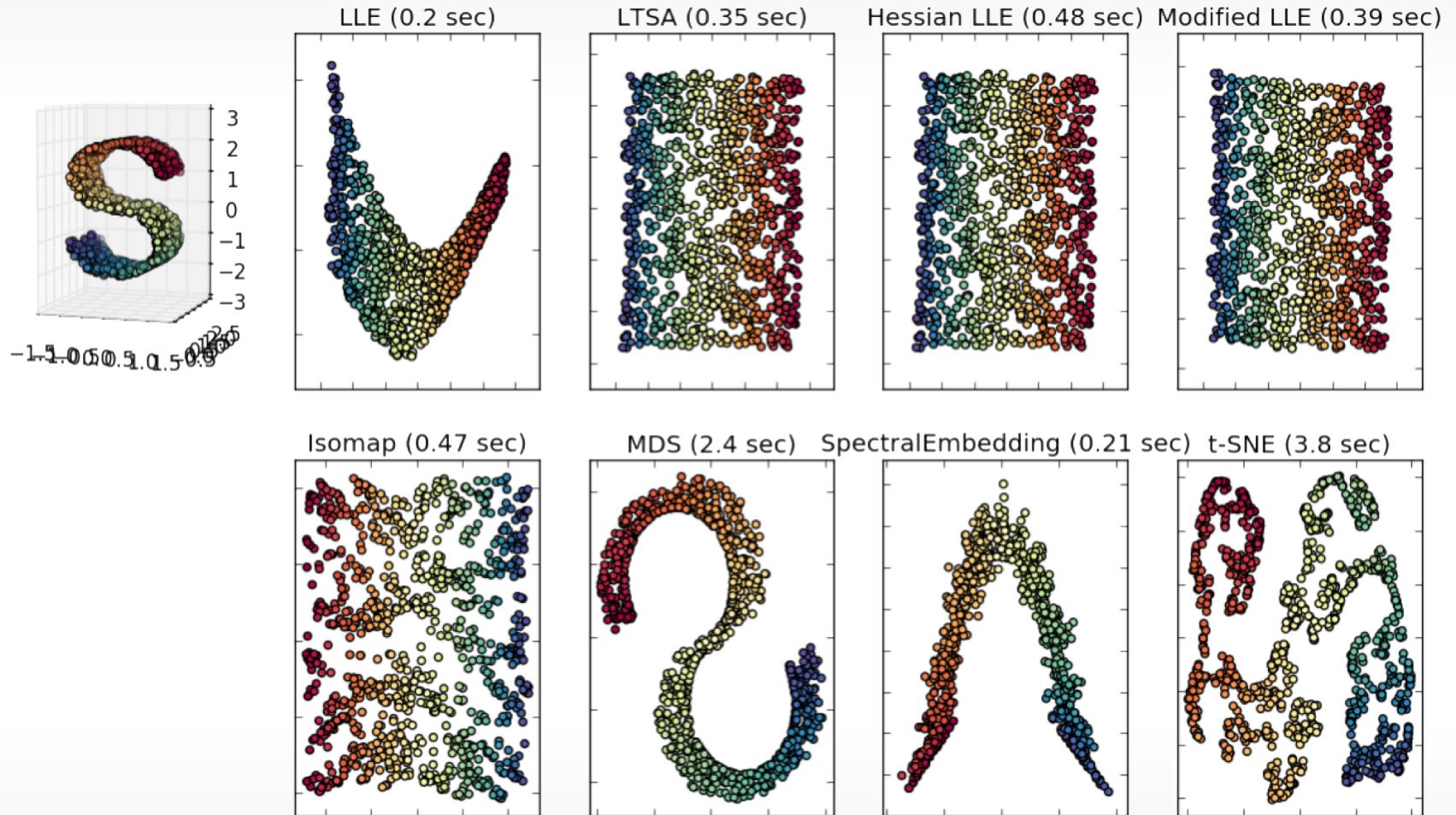


tSNE

Manifold learning methods

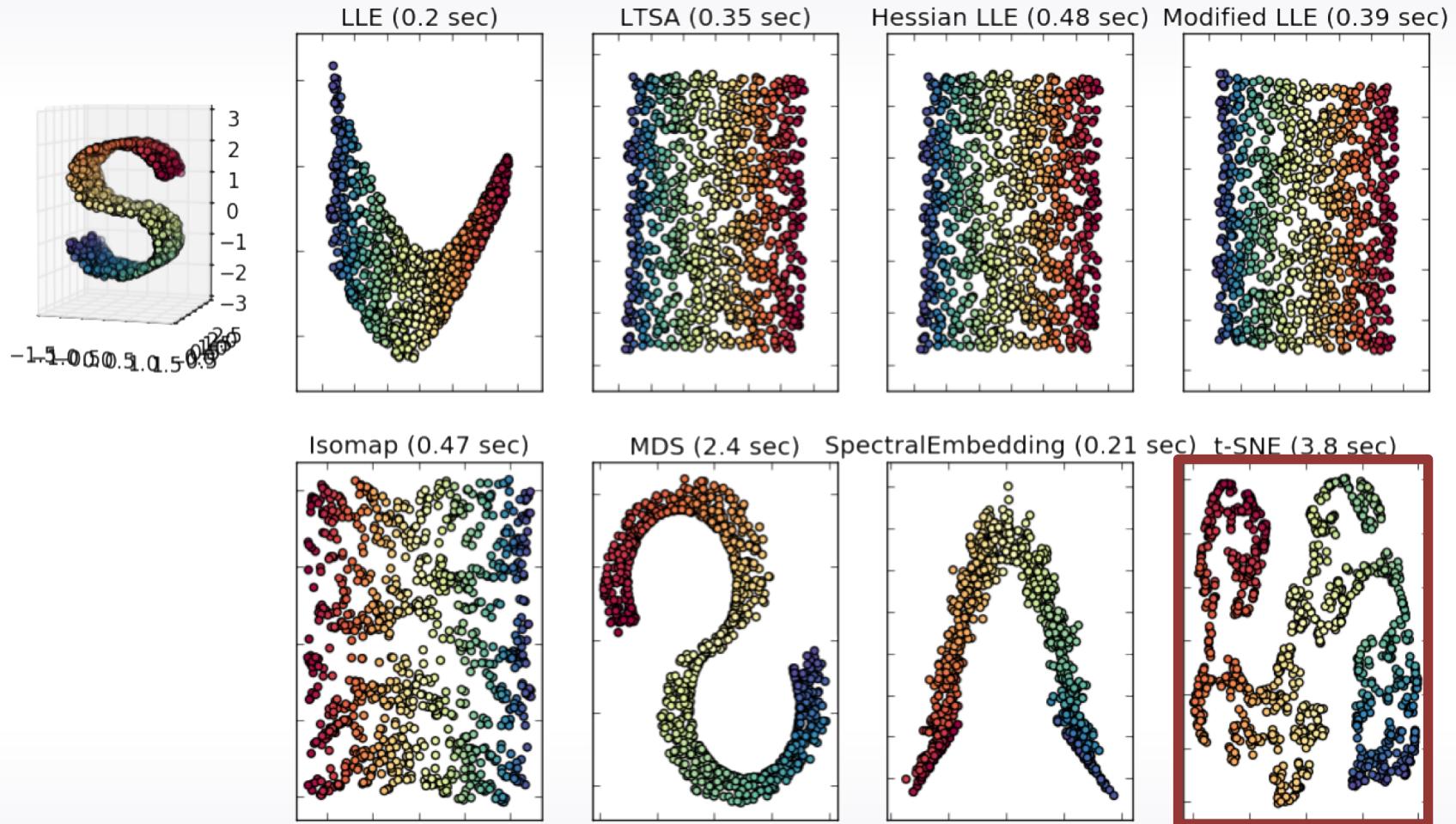
Manifold Learning with 1000 points, 10 neighbors



Comparison of Manifold Learning methods, http://scikitlearn.org/stable/auto_examples/manifold/plot_compare_methods.html#sphx-glr-auto-examples-manifold-plot-compare-methods-py

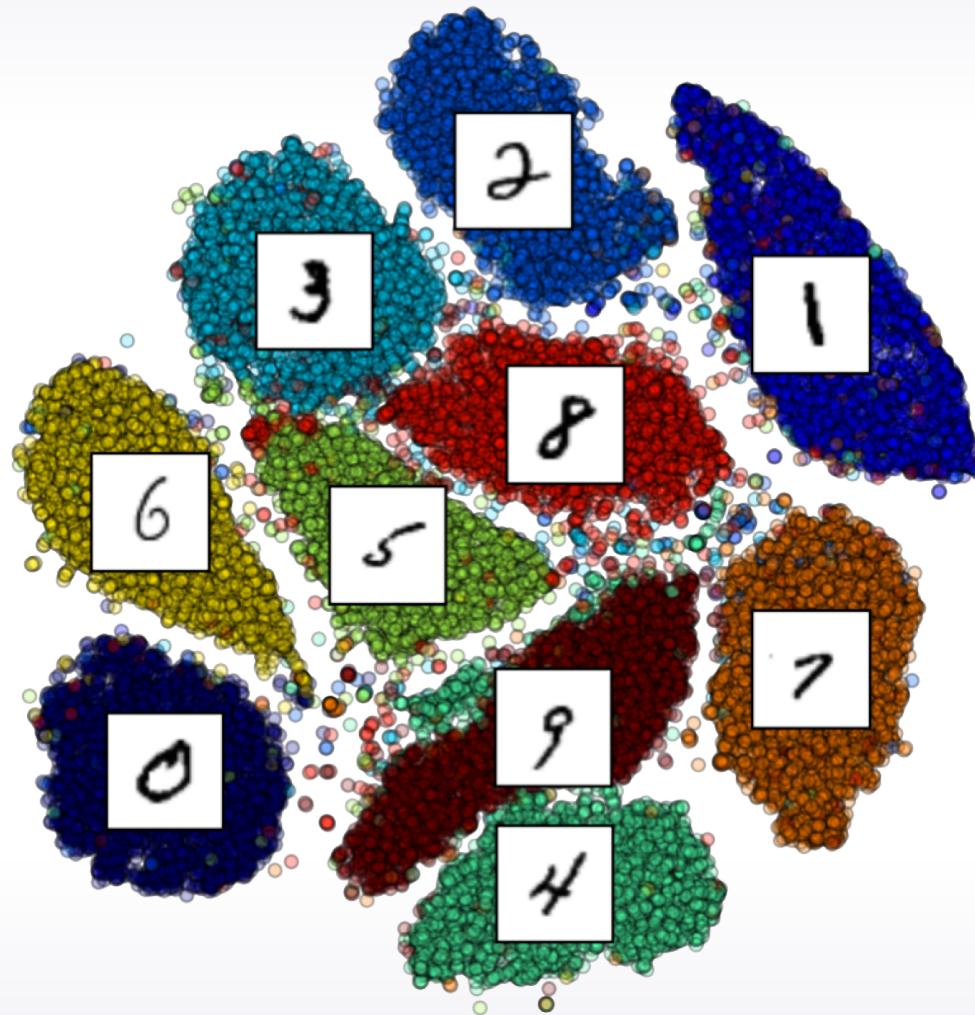
Manifold learning methods

Manifold Learning with 1000 points, 10 neighbors

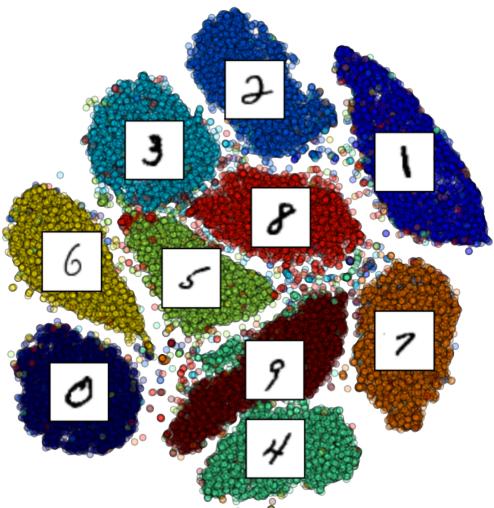


Comparison of Manifold Learning methods, http://scikitlearn.org/stable/auto_examples/manifold/plot_compare_methods.html#sphx-glr-auto-examples-manifold-plot-compare-methods-py

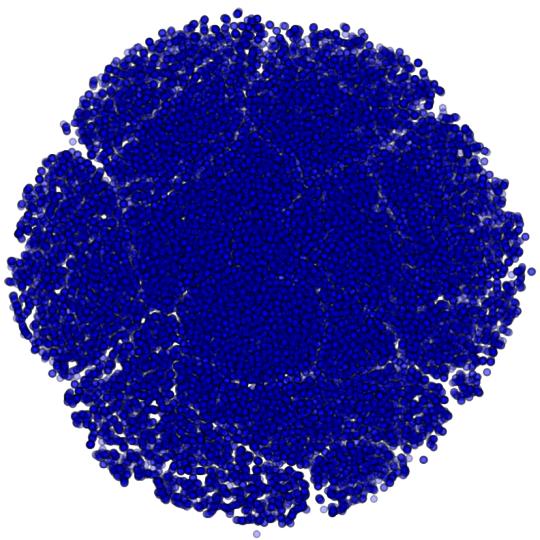
Example: tSNE on MNIST



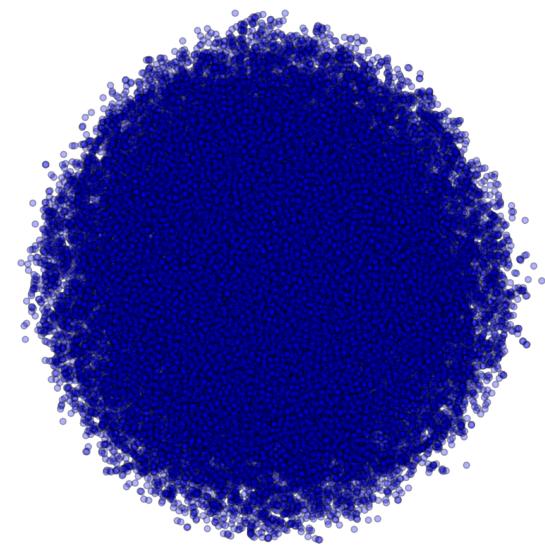
Interpretation of tSNE



MNIST

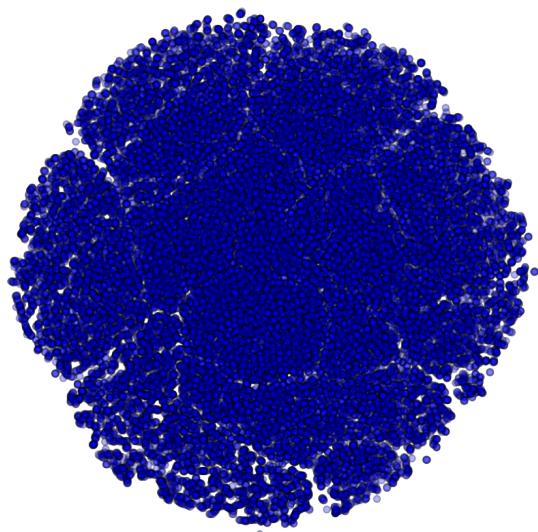


MNIST

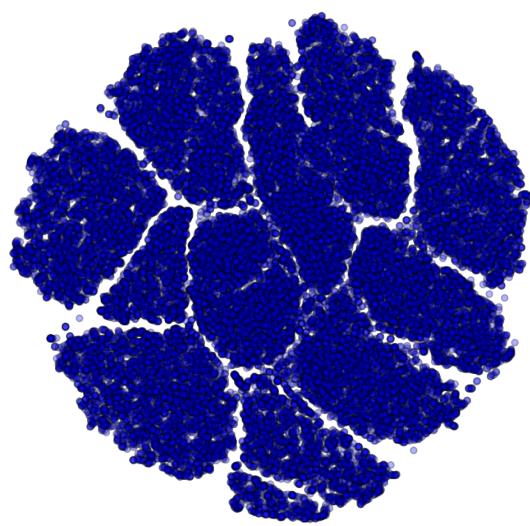


Random Values

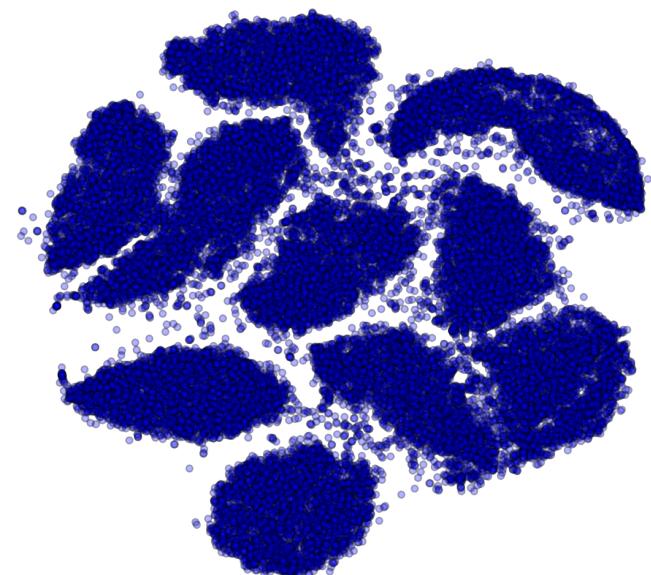
MNIST: different perplexities



Perplexity=3



Perplexity=10

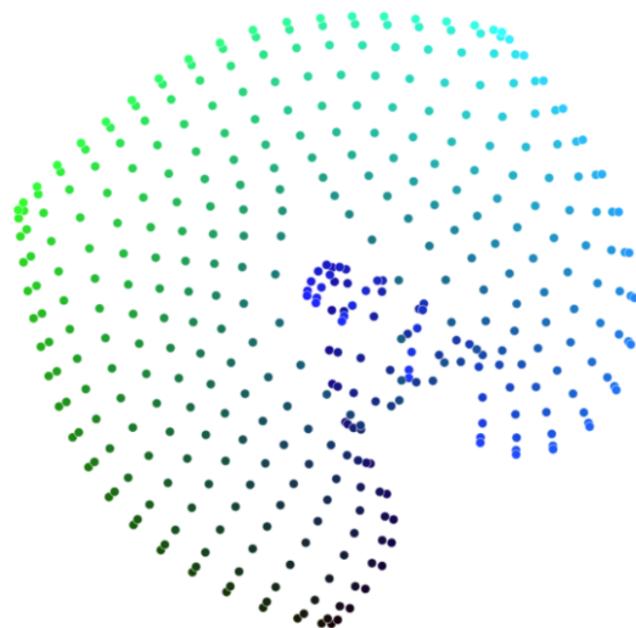


Perplexity=150

Interactive Example

How to Use t-SNE Effectively

Although extremely useful for visualizing high-dimensional data, t-SNE plots can sometimes be mysterious or misleading. By exploring how it behaves in simple cases, we can learn to use it more effectively.



Points Per Side 20

Perplexity 8

Epsilon 1

Step
140

A square grid with equal spacing between points.
Try convergence at different sizes.

Share this view

Practical Notes

- Result heavily depends on hyperparameters (perplexity)
 - Good practice is to use several projections with different perplexities (5-100)
- Due to stochastic nature, tSNE provides different projections even for the same data\hyperparams
 - Train and test should be projected together
- tSNE runs for a long time with a big number of features
 - it is common to do dimensionality reduction before projection.

Practical Notes

- Implementation of tSNE can be found in sklearn library.
- But personally I prefer you use stand-alone implementation python package tsne due to its' faster speed.

Conclusion

- tSNE is a great tool for visualization
- It can be used as feature as well
- Be careful with interpretation of results
- Try different perplexities