Graphs in Machine Learning

Spectral Clustering: Examples

1D Examples and Understanding

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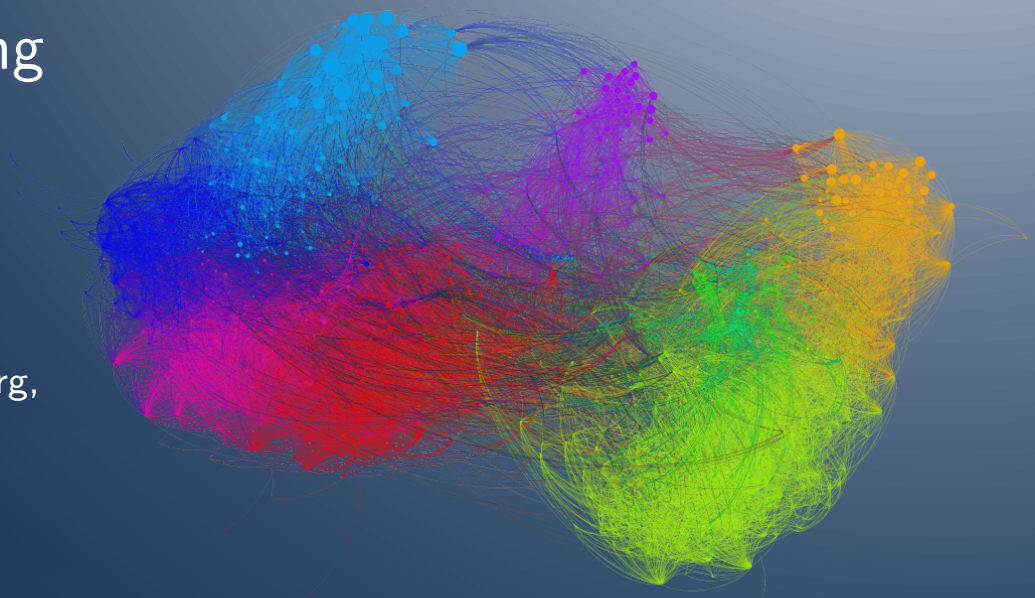
Partially based on material by: Ulrike von Luxburg, Gary Miller, Doyle & Schnell, Daniel Spielman

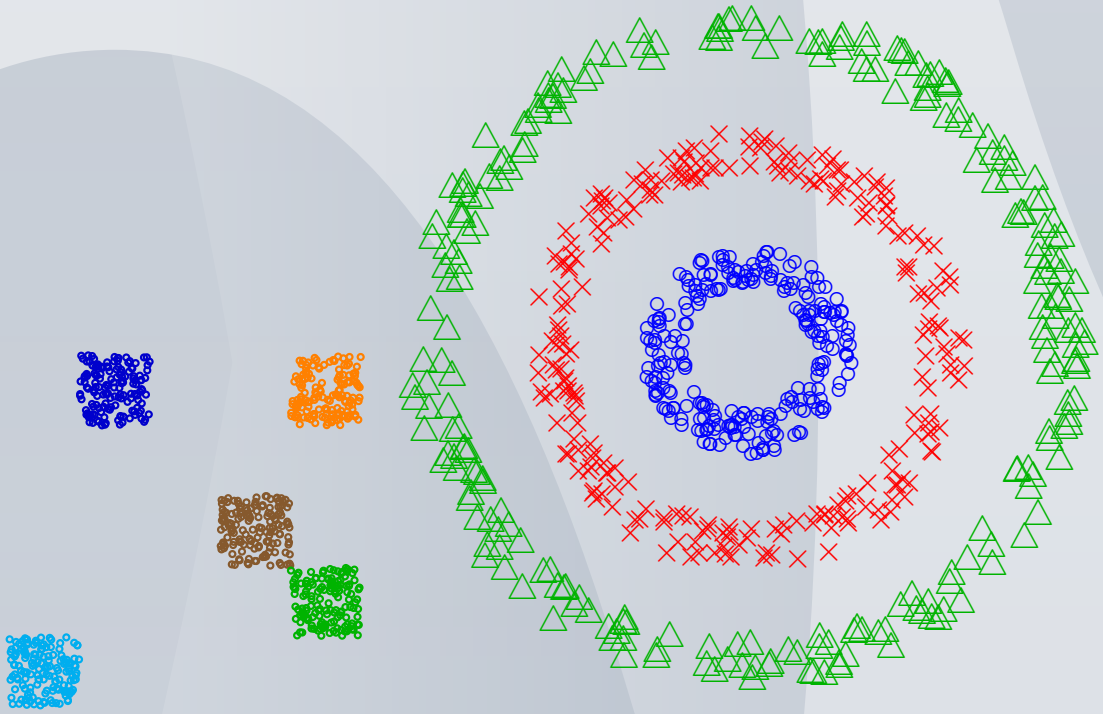


Spectral Clustering: Understanding

Compactness vs. **Connectivity**

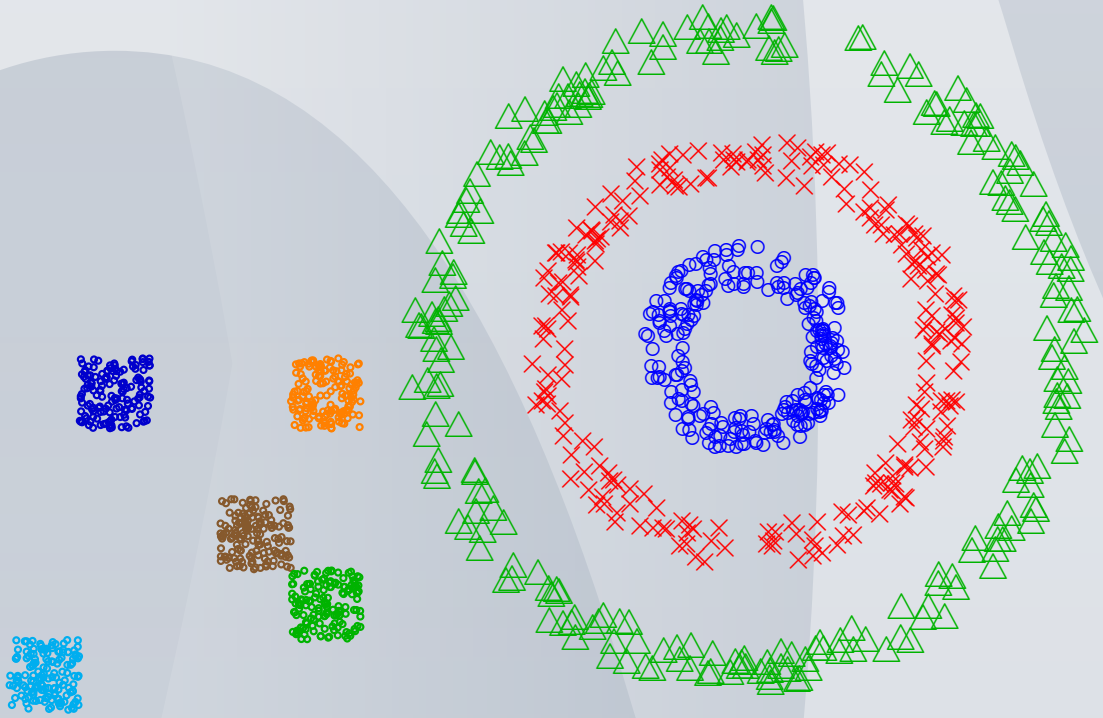
Spectral Clustering: Understanding

Compactness vs. **Connectivity**



Spectral Clustering: Understanding

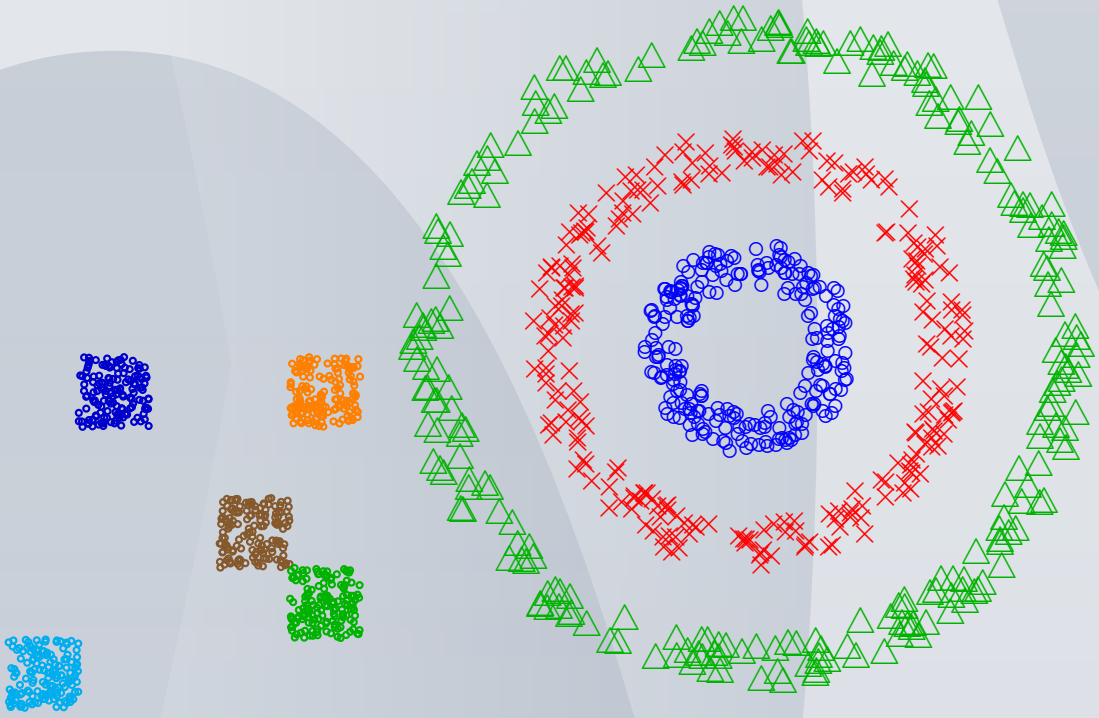
Compactness vs. **Connectivity**



For which kind of data we can use one vs. the other?

Spectral Clustering: Understanding

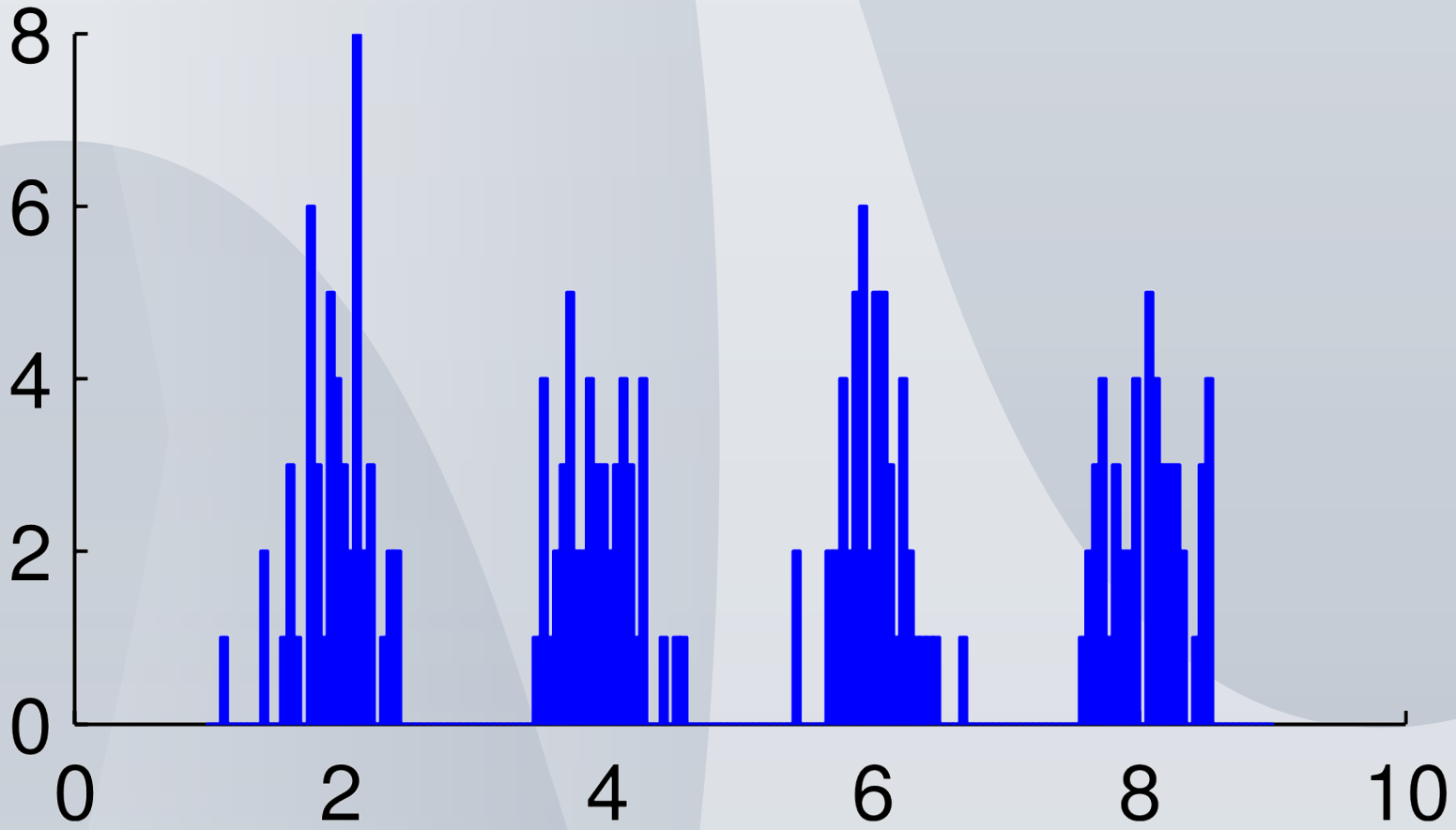
Compactness vs. **Connectivity**



For which kind of data we can use one vs. the other?

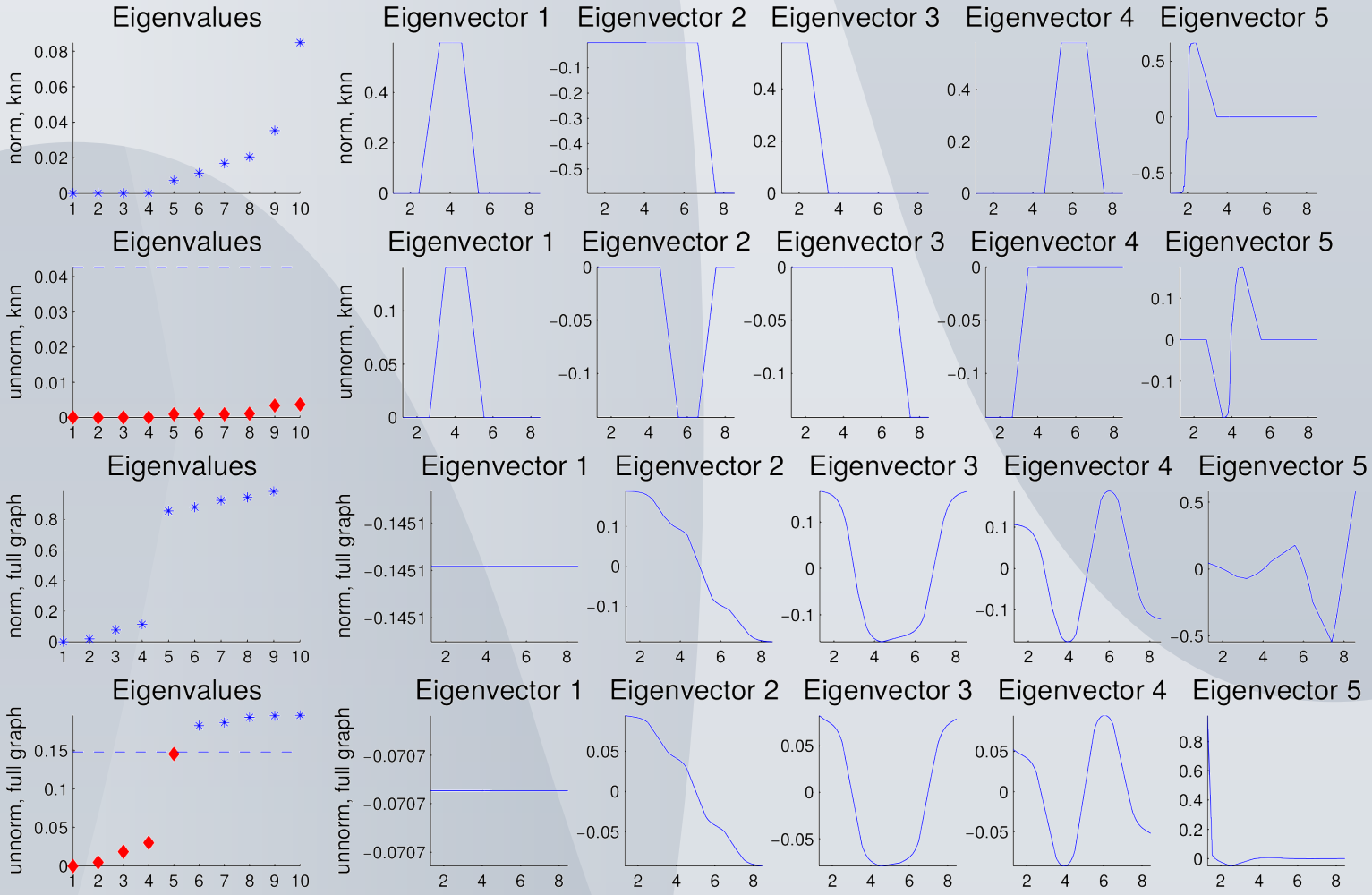
Any disadvantages of spectral clustering?

Spectral Clustering: 1D Example - Histogram



http://www.informatik.uni-hamburg.de/ML/contents/people/luxburg/publications/Luxburg07_tutorial.pdf

Spectral Clustering: 1D Example - Eigenvectors



Source: von Luxburg (2007)

Spectral Clustering: Bibliography

- **Meila & Shi (2001)** – A random walks view of spectral segmentation
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  IEEE Transactions on Pattern Analysis and Machine Intelligence, 22(8):888–905
- Things can go wrong with the relaxation: **Spielman & Teng (2007)** – Spectral partitioning works: Planar graphs and finite element meshes
  Linear Algebra and Its Applications, 421:284–305

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https://misovalko.github.io/mva-ml-graphs.html