javaPlex — a research platform for persistent homology

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javaPlex history

Stanford software packages for persistent homology and topological data analysis:

2000-2006 Plex
C++ with Matlab bindings
Vin de Silva, Patrick Perry.

2008-2010 jPlex
Java – for easier Matlab integration
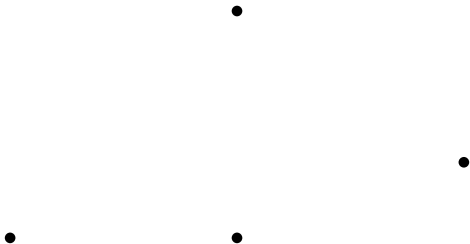Harlan Sexton, Mikael Vejdemo-Johansson, Henry Adams.

2010- javaPlex
Java – for easier extension and development
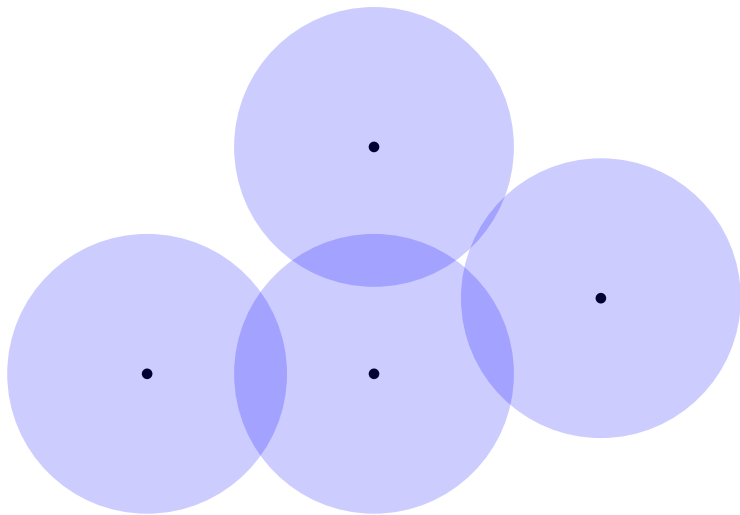Andrew Tausz, Mikael Vejdemo-Johansson, Henry Adams.

Persistent homology

- Point cloud data generates...
- Filtered simplicial complex computes...
- Persistent homology groups described by...
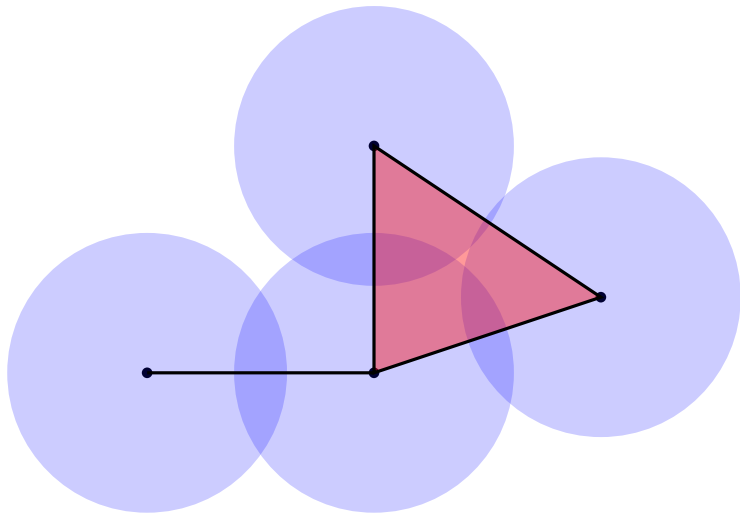- Barcode pictures encoding...
- Estimated topological features

Vietoris-Rips complex

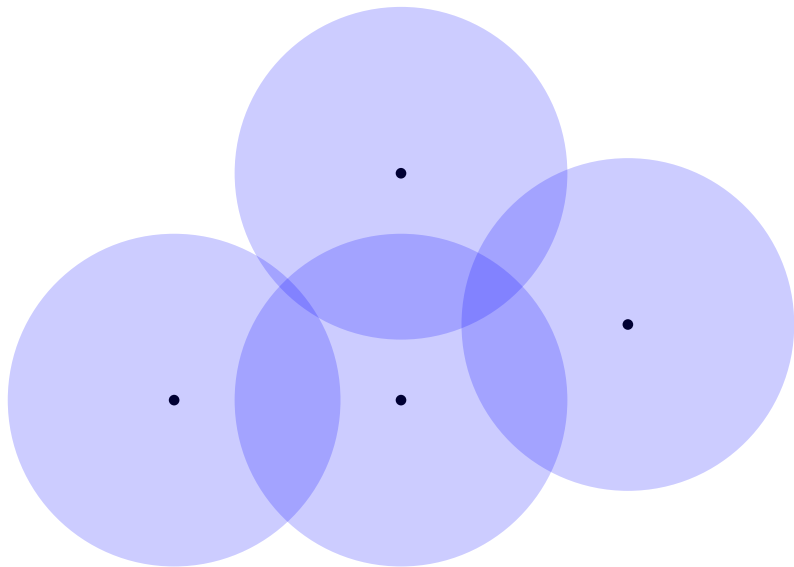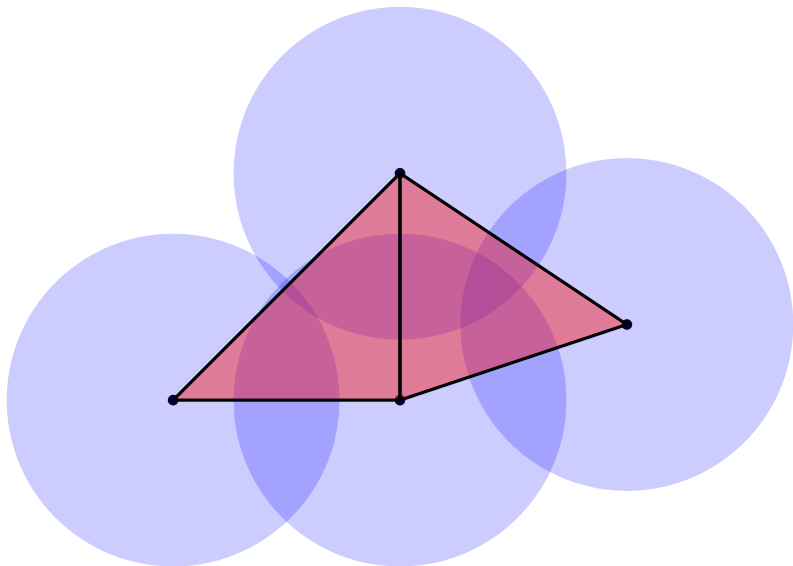# Vietoris-Rips complex

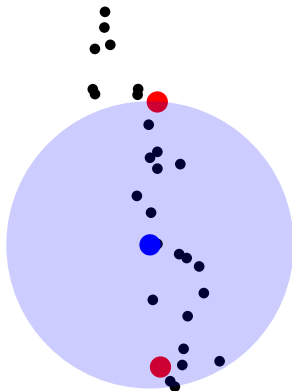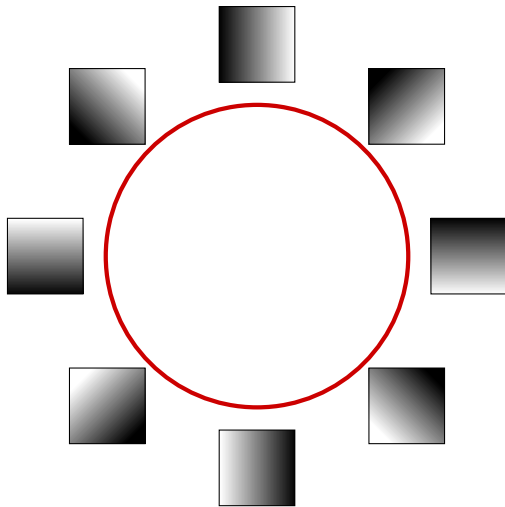# Vietoris-Rips complex

Vietoris-Rips complex

Vietoris-Rips complex

Witness-complex

Image patches

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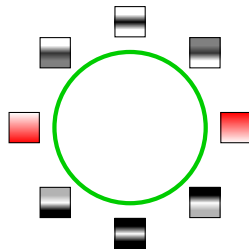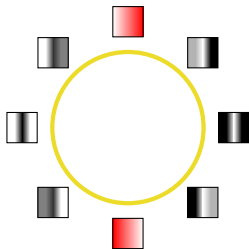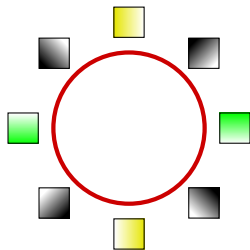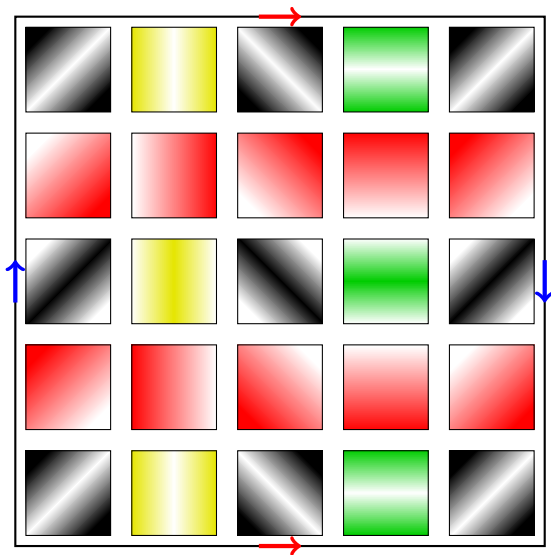# Image patches

Interoperability

- Matlab
- Jython
- Processing (see GTS demo session!)
- Mathematica
- Scala
- ... anything JVM really