



Distinguished Lecture Series

Persistent Homology for Images



Monday, January 10th, 2011 10:00am
Auditorium 106 at New IIS Building

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Abstract

Three-dimensional images pose their own challenges to using persistent homology in their analysis:

- (i) large size of input;
- (ii) cubical cells with degenerate connections;
- (iii) preference for level rather than sublevel sets.

To address them, we describe a fast hierarchical algorithm for computing persistence, turning an oct-tree approximations of the image into its dual complex. Using a simulated perturbation of the input voxels, we guarantee that the dual complex is unambiguous, and keeping the oct-tree balanced, we get it geometrically realized in space. Using these tools, we generate triangle diagrams that encode the homology classes of all level sets in the image, as well their robustness, which is defined as the amount of perturbation of function values necessary to kill the class.

For more information: <http://www.iis.sinica.edu.tw/>

