SPEAKER:

Qiang Ye, University of Kentucky

TITLE:

Hessian Eigenmap Method for Dimension Reduction of Data

ABSTRACT:

Given a set of high dimensional data, the problem of dimension reduction is to find $g : R^m \to R^d$ (with $d \ll m$) that maps each data point to a low dimensional parametrization vector so that certain geometric properties or structure of the original data set are preserved. Assuming that the data points are sampled from a d-dimensional parameterized manifold $M = \psi(C)$ defined by a local isometry $\psi : R^d \to R^m$, the Hessian Eigenmap method introduces a Hessian functional defined for functions $f : M \to R$ and uses its null space to recover the d component functions of ψ^{-1}. A discretization of the Hessain functional has also been introduced to work with discrete data but the original theory does not apply. In this talk, we shall first discuss the Hessian Eigenmap method in the continuous setting and then present a discrete version together with an analysis.