

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**Image Segmentation Methods Based  
on Centroidal Voronoi Tessellation  
and Its Variants**

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计算数学所报告厅

## **Abstract:**

Centroidal Voronoi tessellations (CVTs) are special Voronoi tessellations whose generators are also the centers of mass (centroids) of the Voronoi regions with respect to a given density function and CVT-based methodologies have been proven to be very useful in many diverse applications in science and engineering. In this talk we will review recent advances of image segmentation methods based on CVT and its variants. In the context of image processing, the classic CVT model reduces to the well-known k-means algorithm that minimizes the classic clustering (similarity) energy. This model lacks a regularization term and thus often produces too many details. The edge-weighted CVT (EWCVT) model beautifully combines the global color/intensity information and the physical information by adding a edge-based regularity term in the classic CVT model. It works very well in general but sometimes has difficulties in segmenting images with strong background inhomogeneity. The local variation and edge-weighted CVT (LVEWCVT) model improves the EWCVT model on this issue by replacing the classic clustering energy by the local variation energy. We will illustrate these interesting segmentation methods through extensive examples.

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