Computational Geometry - Video course

NPTEL

http://nptel.ac.in

Computer Science and Engineering

COURSE OUTLINE

The course covers lessons in Introduction using Basic Visibility Problems , The Maximal Points Problem , The Plane Sweep Technique and applications ,Convex Hull Different Paradigms and Quickhull , Dual Transformation and Applications , Lower Bounds on Algebraic tree model , Point Location and Triangulation , Voronoi Diagram and Delaunay Triangulation , Randomized Incremental Construction and Random Sampling , Arrangements and Levels , Range Searching , Clustering Point Sets using Quadtrees and Applications , Epsilon-Nets VC Dimension and Applications , Shape Analysis and Shape Comparison .

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COURSE DETAIL

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1	Introduction
2	Visibility Problems
3	2D Maxima
4	Line Sweep Method
5	Segment Intersection Problem
6	Line Sweep: Rectangle Union
7	Convex Hull
8	Convex Hull Contd
9	Quick Hull

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10	More Convex Hull Algorithms
11	Intersection of Half Planes and Duality
12	Intersection of Half Planes and Duality Contd
13	Lower Bounds
14	Planar Point Location
15	Point Location and Triangulation Contd...
16	Triangulation of Arbitrary Polygon.
17	Voronoi Diagram : Properties
18	Voronoi Diagram Construction
19	Delaunay Triangulation.
20	Quick sort and Backward Analysis
21	Generalized RIC
22	RIC Continued
23	Arrangements
24	Zone Theorem and Application
25	Levels
26	Range Searching : Introduction
27	Orthogonal Range searching
28	Priority Search Trees
29	Non - Orthogonal Range Searching
30	Half - Plane Range Query
31	Well Separated Partitioning
32	Quadtrees Epsilon -WSPD
33	Construction of Epsilon - WSPD
34	Epsilon - WSPD to Geometric Spanner
35	Epsilon-Nets & VC Dimension
36	Epsilon-Nets & VC Dimension contd
37	Geometric Set Cover
38	Geometric Set Cover (with Bounded VC Dimension)
39	Shape Representation
40	Shape Comparison