CS 478
Computational Geometry

Project Proposal

Implementing Three Voronoi Diagram Computation Algorithms and Comparing Their Performance

Group Members
Mehmet Kaan Örnek - 21901637
Göksu Şenerkek - 21803341
Project Proposal

The aim of the proposed project is to develop a program that can compute and display a set of points' 2D Voronoi Diagram using three different methods to be compared: the Randomized Incremental Algorithm, Fortune's Algorithm, and The Flipping Algorithm. Python will be used to implement the software.

A user will be able to enter a collection of points and select one of three algorithms to calculate the Voronoi Diagram using the program's interactive graphical user interface (GUI). The GUI will show the Voronoi Diagram with the various regions represented by various colors. The user can pan around the diagram, zoom in and out, and save it as a picture using the application.

Each algorithm will be properly studied and understood before being implemented in Python as part of the program. To show the diagram and carry out geometric calculations, we plan to utilize a variety of libraries that Python provides like Matplotlib and NumPy. We will utilize a variety of test situations, including a huge number of randomly generated points, to evaluate the program's accuracy and effectiveness. Then, we will compare the findings to those of known Voronoi diagrams.

The proposed projects will provide users a tool for computing and visualizing Voronoi Diagrams. They can select the best method for their unique needs by utilizing three different algorithms, and the interactive GUI will make it simple to visualize and analyze the results.