Course: 60607A - ALGORITHMS FOR OPTIMIZATION AND BIG DATA ANALYSIS

Project group members:

- Mohammad Abbas Meghani: 11266035
- Zyad Benameur: 11120164

Title: Analysis of convex hull algorithms

Description:

Convex hull for points in a 2-dimensional plane, is the smallest convex polygon that could be made using those points. This polygon should include all the points on or within its confines. In informal terms, imagine stretching a rubber band so that it surrounds an entire set of points in S, releasing it makes it taut and this shape represents the convex hull of S.[1] These algorithms have some very important applications in data science. In an optimization setting, a convex version of the problem can effectively make a complex problem easier to solve. In machine learning, it can be used for preprocessing data, an important example being image classification, where a relaxed shape is drawn to create an easier to process image. There are a lot of algorithms used to create a convex hull. We will explore some of these algorithms like divide and conquer, Graham scan, etc and compare them and variations within them to find out their advantages and disadvantage. The goal is to use this project to better understand what complexity different algorithms will have and what means could be utilized to better adapt to the problem.

[1] de Berg et al. (2008), p. 3.