Computational Geometry Project

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1) Project Info (# 7 in pdf)

[1] Project title : Heuristic algorithm to find a good set of "packing" rectangles

[2] Project goal: Devising heuristic algorithm, Compute and analyze area of "packing" rectangles

[3] URL of project idea page :

1. https://link.springer.com/content/pdf/10.1007/s00493-015-3006-1.pdf

2. https://github.com/Mokhwalee/Moka

3) Project Explanation

[1] Assumption

1) Let $S = \{p_1, \dots, p_n\}$ be the set of n points within the unit square and $(0,0) \in S$.

2) $U = \{(x, y) : 0 \le x \le 1, 0 \le y \le 1\}$, in the plane.

[2] Definition

: A rectangle R_i is valid $\leftrightarrow$ p_i is the bottom left corner of R_i and no other point $p_j \in S$ lies interior to R_i.

[3] Goal

1) Find a set of valid rectangles that forms a "packing" of maximum possible area.

2) Prove that the area is at least ½.

3) Prove whether we can always achieve positive area at least ε.

2) Language

: MATLAB or C++

4) Coding Plan and Methods

[Step 1] Read paper "Packing Anchored Rectangles" and its references.

[Step 2] Write "ReadMe" text file for overall explanation for this project

[Step 3] Algorithm will be done based on Chap.2 in the paper : Constructing a rectangle packing

[Step 4] Analysis of area will be done based on Chap.3 in the paper : Analysis of TilePacking

[Step 5] Include animation and demo in algorithm 'TilePacking'. Video can be recorded if needed.

[Step 6] Submit the code on GitHub repository and unit tests will be added accordingly.