

Syslab Journal Entry 1

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1 Project Description

Compact packing of irregular objects has become a larger issue as overpopulation and the expansion of shipping products due to online shopping increases concern about the storage of large amounts of objects in a given space. In order to better understand how to deal with this in 3 dimensions, an algorithm utilized for packing two dimensional objects that cannot be rotated attempts to pack objects by representing them in a rectilinear form (i. E. a pixelated form) and dropping them tetris-style into a container in order to minimize the height of the pile of dropped objects. For my project, I hope to modify this algorithm to allow objects to be rotated by introducing multiple rectilinear representations of each object corresponding to different rotations of the object and using the algorithm to test which rotation gives the optimal packing.

2 Markers of success

My first marker of success is if I can input several images of objects against white backgrounds and have my program produce additional images corresponding to different rotations of each object and convert these images into matrices of 1s and 0s such that the nonzero entries of each matrix correspond to pixels filled in by the object.

3 Obstacles

A major obstacle that I will have to deal with is making sure my program gives an efficient packing of objects while also making sure that its run time is not too large. More specifically, my project may be computationally expensive so I may need to further modify my algorithm than I initially proposed in order to prevent this. Additionally, both rotating an object and representing it rectilinearly might lead to a representation that is not representative of the original object, so I may need to improve my method of representing rotations of objects.

4 Materials Needed

For this project, I am interested in using image processing libraries to convert images of objects into arrays that correspond to rectilinear representations of the object. Additionally, I will need to find large data sets of png images of objects in order to test this algorithm. I'm also interested in using tensor flow for a modification I hope to make to my project.

5 Modifications

I am currently concerned that my project is not difficult enough, and a modification I would like to make is to utilize this modified algorithm to figure out what order the objects should be packed in to provide the best possible packing. In order to make this modification, I want to use a neural net with weights based on the areas of different objects relative to one another to find out which permutation of the list of objects from largest to smallest provides the best possible packing order.