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CS378 Problem Set 1 Part 2

Part II

5.1

a. Original Image

b. Resized Image

c. Simple Resampling

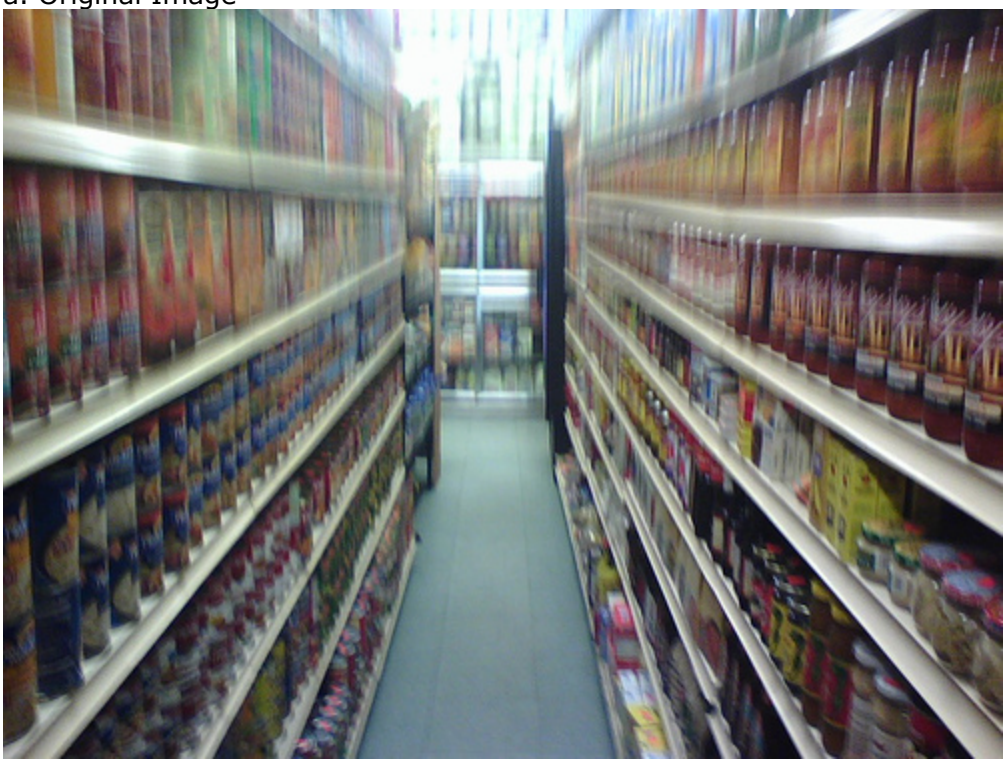
d. Dimensions
375x500 to 275x350

e. Reduction/Enlargement Sequence
ReduceWidth by 100 pixels
ReduceHeight by 150 pixels

f. Explanation
I'm just trying a straightforward application of the two reductions one after another. It seems to have turned out quite well in this image, without any glaring artifacts. The humans and the seals remain about the same size with the bulk of the seams chosen from the sky and the sand on the beach resulting in a fairly unsurprising result.

5.2

a. Original Image



b. Resized Image

c. Simple Resampling

d. Dimensions
375x500 to 275x400 pixels

e. Reduction/Enlargement Sequence
Alternate between horizontal seam cut and vertical seam cut

f. Explanation
This is a pretty bad reduction, with plenty of artifacts. Because the image is very blurred. many vertical seams were chosen from the items further down the aisle, distorting the aisle. The blurring also caused many horizontal lines to be chosen through the cans and bottles, squishing them and distorting the racks of items.

5.3

a. Original Image

b. Resized Image

c. Simple Resampling

d. Dimensions
375x500 to 275x400 pixels

e. Reduction/Enlargement Sequence
Alternate between horizontal seam cut and vertical seam cut

f. Explanation
The lowest energy path definitely seem to be the trees - the resulting image has extremely emaciated trees, especially the rightmost tree which is completely removed, but otherwise the picture looks mostly artifact-free.

5.4

a. Original Image

b. Resized Image

c. Simple Resampling

d. Dimensions
375x500 to 275x400 pixels

e. Reduction/Enlargement Sequence
Alternate between horizontal seam cut and vertical seam cut

f. Explanation
Major artifact at the bridge of the roof and it appears like the algorithm really doesn't like cutting out bumpy textures (perhaps if I applied a Gaussian filter I would have better results). Also, the cat has been compressed and the wood planks are now non-existent (most likely due to the roof's texture). All-in-all a fairly awkward looking result.

5.5

a. Original Image

b. Resized Image

c. Simple Resampling

d. Dimensions

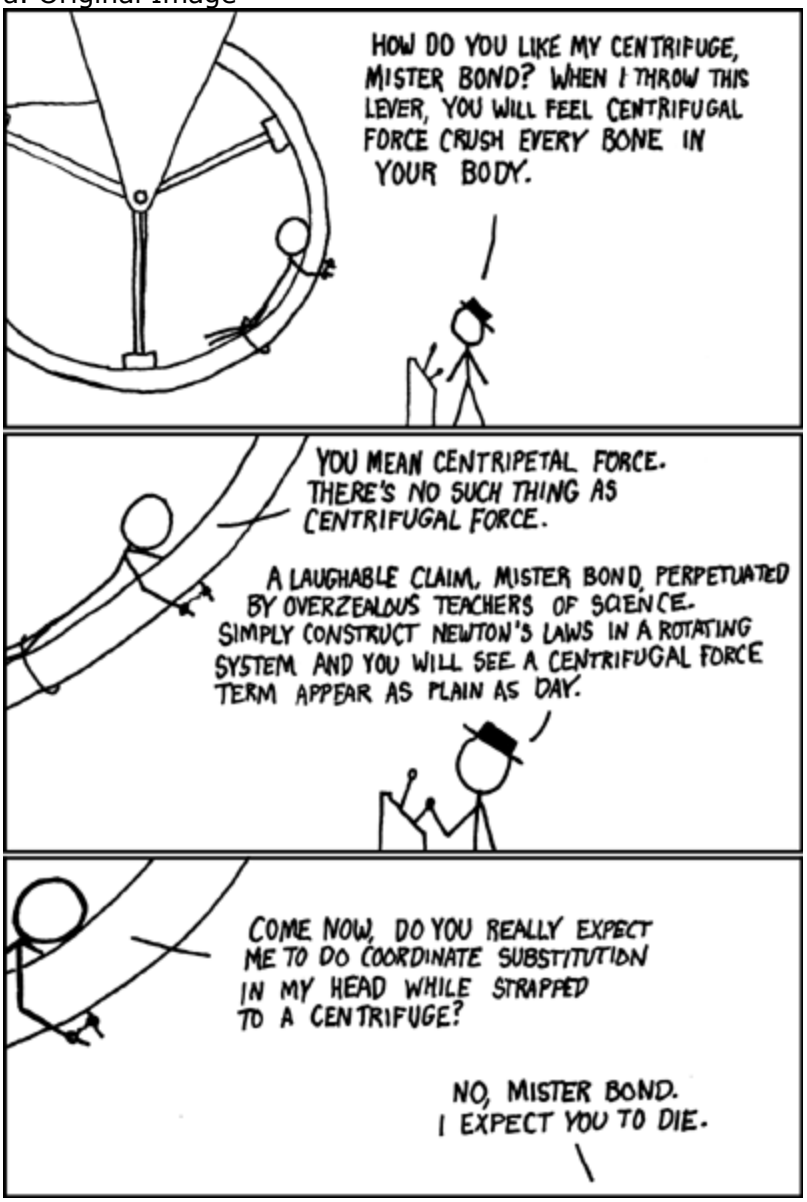
318x500 to 318x350 pixels

e. Reduction/Enlargement Sequence
Straight vertical cuts

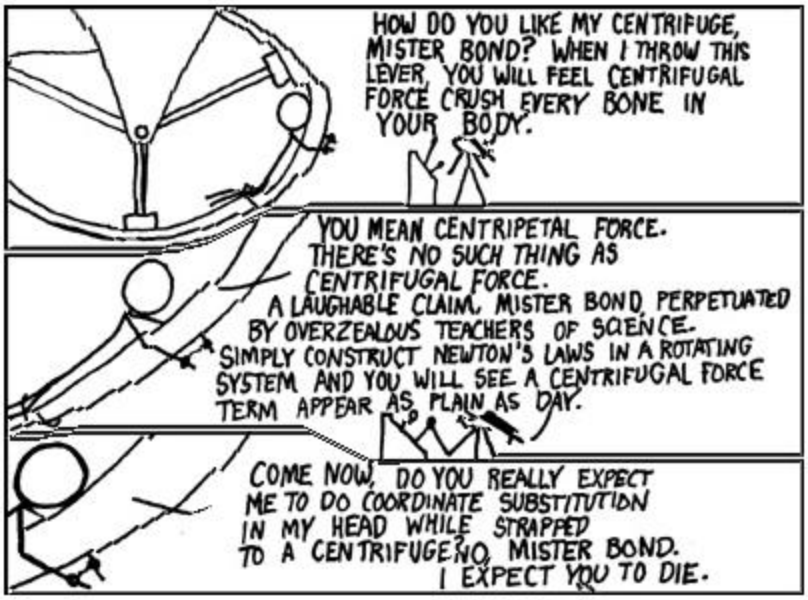
f. Explanation
Lots of low-energy seams to be found here, a perfect candidate for this algorithm. The boat is preserved and the humans are mostly preserved (note the artifacts around the first man's jeans) and even the beach's angle remains relatively intact.

5.6

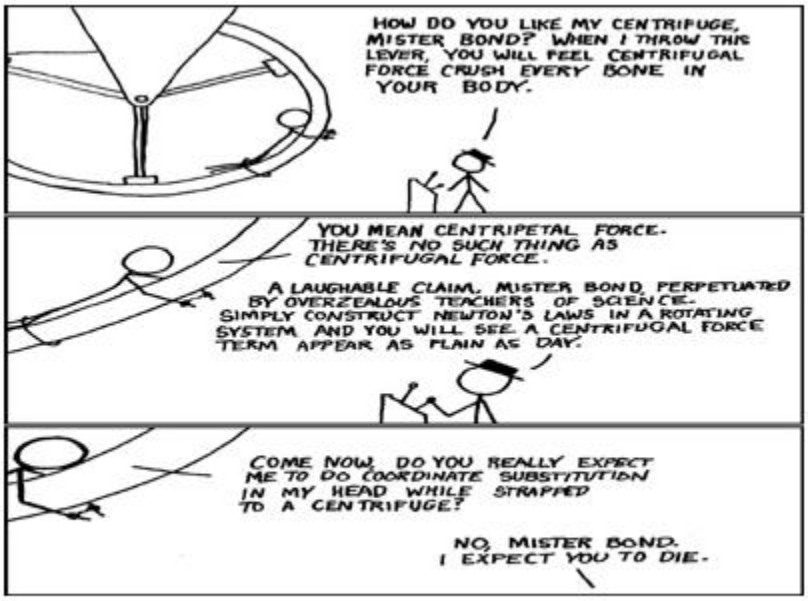
a. Original Image



b. Resized Image



c. Simple Resampling



d. Dimensions
595x400 to 295x400

e. Reduction/Enlargement Sequence
Straight sequence of reduceheight

f. Explanation
Comics don't seem to take well to compression, but it seems like the algorithm makes a valiant attempt. The text seems to have the highest energy, and the resulting image reflects that fact by preserving the size of the image. However, the cartoon characters don't seem to be as lucky (low density of lines) and get cut rather quickly after the whitespace.

Attributions:
seals.jpg is provided by allotrope.
trees.jpg is provided by russelljsmith.
groceries.jpg is provided by The Consumerist.
centrifugal_force is provided by xkcd.com
boat is provided by skipnclick
catsanddogs.jpg is provided by akatrya.

Bonus

I implemented bonus problem #1.

To run this algorithm, create a removal mask rm of zeroes, with ones on the pixels marked for deletion.
Removal(image, removalmask) will delete vertical seams until all marked pixels are deleted.

To implement this, I created a modified seam removal algorithm that takes in a removal mask, and adjusts the energy map to make the removal pixels extremely low (negative) energy. The removal function loops over the seam removal algorithm, removing seams from both the removal mask and the image, until there are no more marked pixels in the removal mask.

Limitations - the removal mask must be manually made. Also, the removal algorithm only uses vertical seams or horizontal seams to accomplish the removal. I assume much cleaner removal could be obtained with an optimization of the order of seam removal, but I was not able to complete that bonus on time.

Relevant M Files:
removal.m
cutgrayseam.m
verticalseamremoval.m
horizontalseamremoval.m

Example: I attempted to delete the man on the right - artifacts remain since my mask was fairly unclean, but it gives you a good idea of what is possible.


RX77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