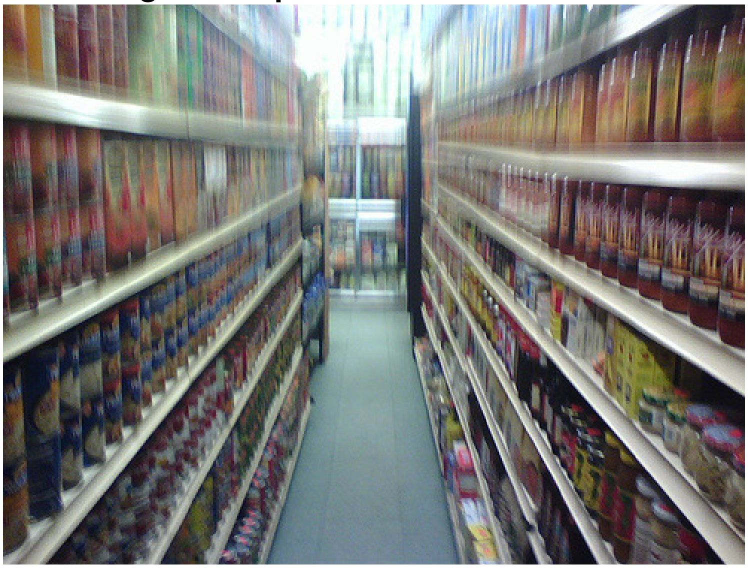
Yu-Ting Peng

5. **The Original – Input: 500*375**



A, B:

Output: 300*375

Sequence: remove 200 seams from width

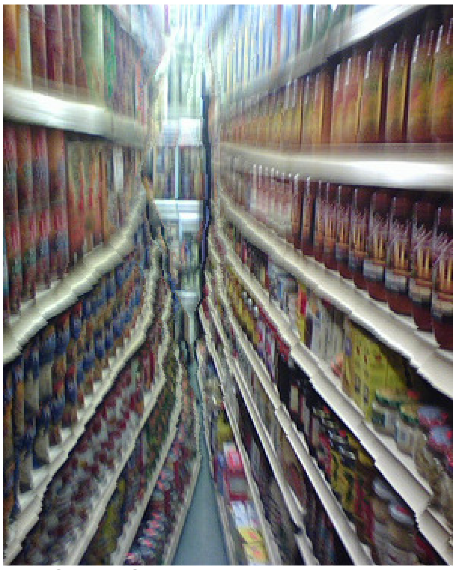
Explanation: This is a failed seam carving example. Seam carving tried to remove the path and the faraway shelves which are blurry. The computed seams are not straight lines therefore cutting off the seams made the shelves crooked and warped.

C, D:

Output: 500*175

Sequence: remove 200 seams from height

Explanation: This is also a failed seam carving example. Seam carving tried to remove the upper part of the bookcase which is blurry. But as explained above, the seam carving resulted in failure because the straight lines are not retained.

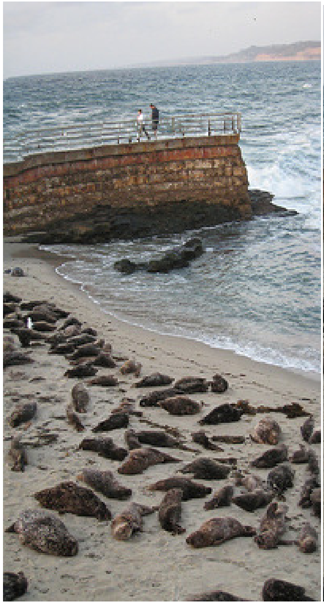


A. Seam Carving

B. Resizing

C. Seam Carving

D. Resizing



A. Seam Carving

B. Resizing

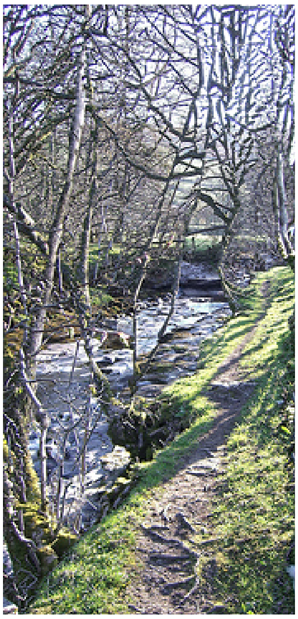
The Original – Input: 500*375

C. Seam Carving

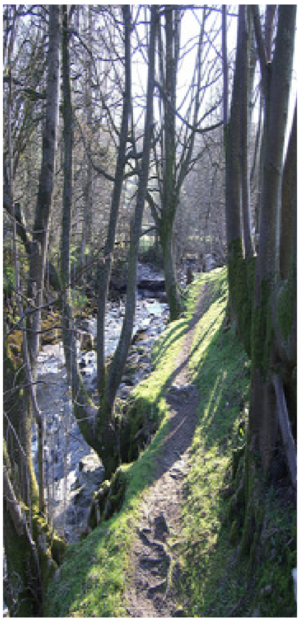
D. Resizing

<u>A, B:</u>
Output: 200*375
Sequence: remove 300 seams from width
Explanation: This is a good example of seam carving. Seam carving cut out the spaces between the seals and retained the two people and the seals in their original shapes while simple resizing reshaped the people and seals.

<u>C, D:</u>
Output: 500*200
Sequence: remove 175 seams from height
Explanation: This one is also a good example of seam carving. Seam carving cut out the unimportant spaces of sands and retained the people and the seals in their original shapes while resizing made the people and especially the seals into strange shapes.



A. Seam Carving



B. Resizing

The Original – Input: 500*375

C. Seam Carving

D. Resizing

<u>A, B:</u>
Output: 180*375
Sequence: remove 320 seams from width
Explanation: This is a good example of seam carving. Seam carving removed the tree to the right and made the trunks and braches narrower. Using simple resizing made the image blurry while seam carving retained the details.

<u>C, D:</u>
Output: 500*165
Sequence: remove 210 seams from height
Explanation: This one is failed example of using seam carving. Seam carving tends to cut off thicker trunks and retain the thin branches and root. Consequently this deformed the shape of the trees.

The Original – Input: 800*600 (from NESCAFE)

A. Seam Carving

B. Resizing

A, B:

Output: 420*600

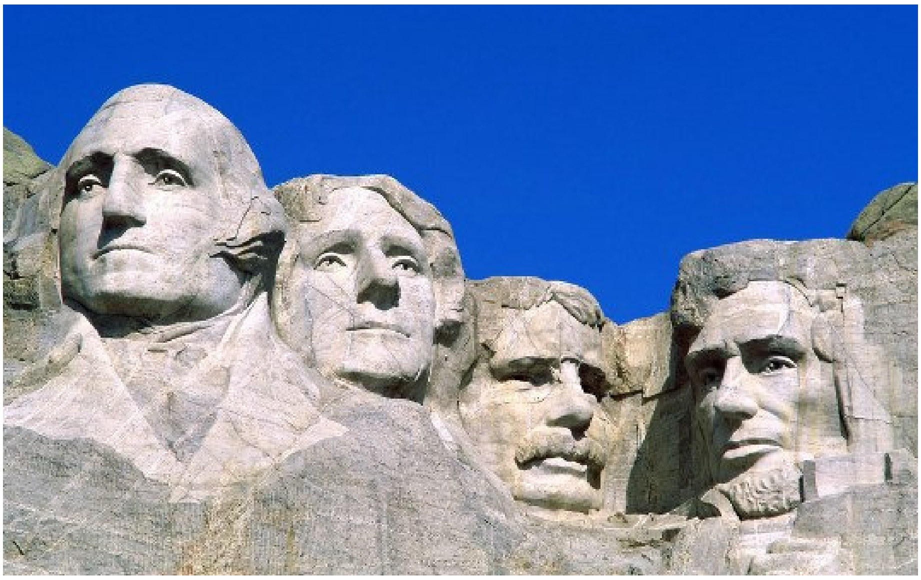
Sequence: remove 380 seams from width

Explanation: Seam carving removed the spaces between the little pandas in the background which preserved the shapes of the pandas in the background. However, seam carving also made the main panda in the front become slimmer in an abnormal way. The new panda in the front has the same sized eyes and nose on a much smaller face.

The Original

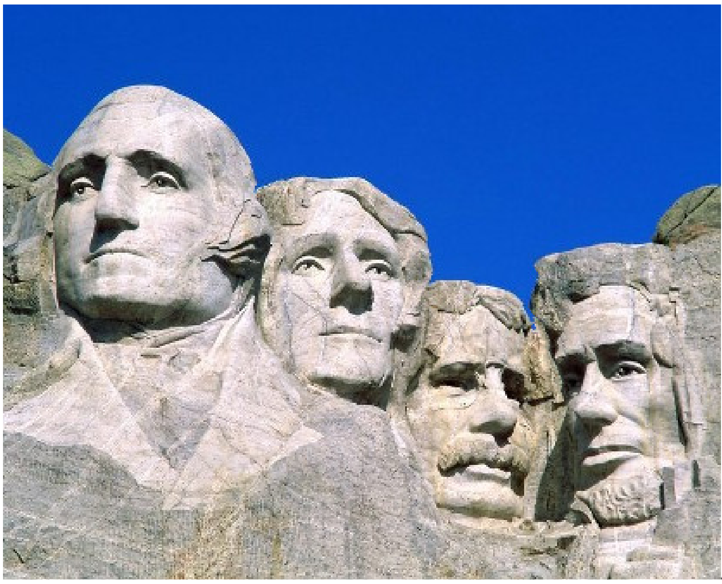
- Input: 536*336

http://upload.wikimedia.org/wikipedia/commons/1/10/Mount_Rushmore_National_Memorial.jpg

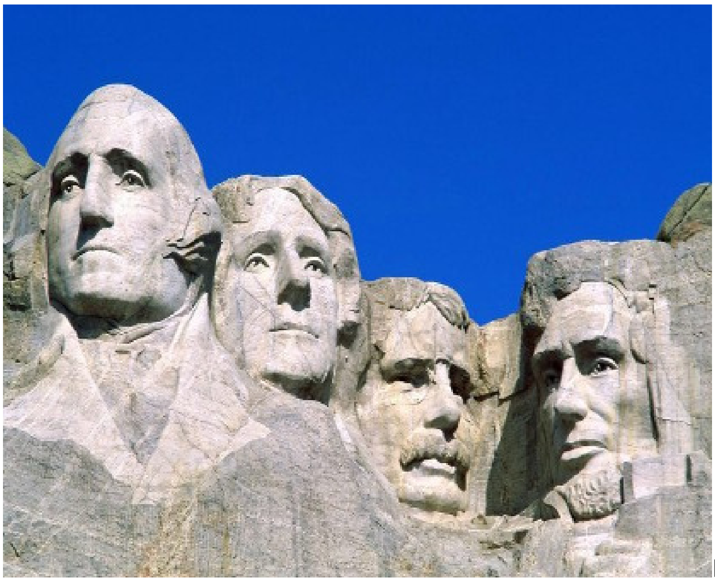


<u>A, B:</u>

Output: 416*336
Sequence: remove 120 seams from width
Explanation: Seam carving cut the space between the two faces in the right and retained the four faces in their original sizes while resizing reshaped every face.



A. Seam Carving



B. Resizing

The Original Input: 341*523

A.

B.

C.

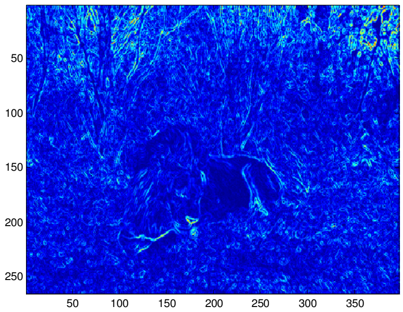
D.

A, B:
Output: 141*523
Sequence: remove 200 seams from width
Explanation: This is a bad example of seam carving. Though the face is informative enough to be retained, the hair and the shoulders were cut off since the background has more details than them.

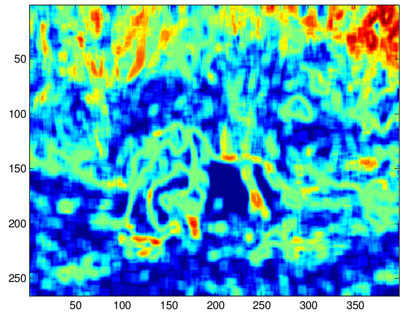
C, D:
Output: 341*263
Sequence: remove 260 seams from width
Explanation: Seam carving retained her face perfectly. This can explain why people tend to focus on her face since it contains lots of information where other places do not. Using resizing on this one made her face out of shape and lose the details on her face.

III. Extra credit **No.2.**

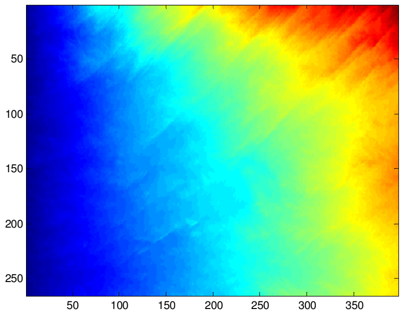
Original Input - 397*265
http://www.digitaljournal.com/image/52707



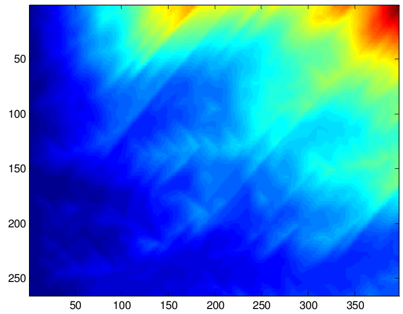
A.



B.

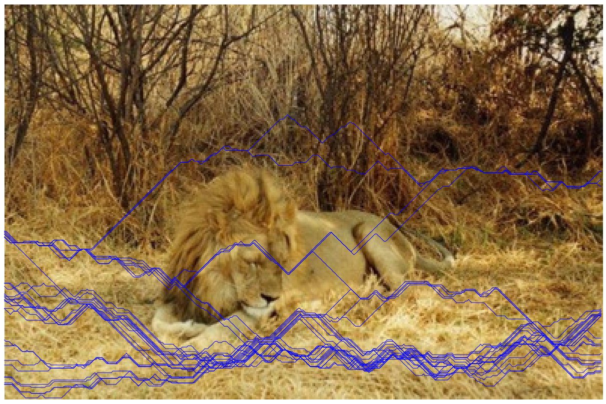


C



D

E



F

G

H

The first column used gradient magnitude as the energy function. The second column used entropy as the energy function. The first row is the output of the energy function. The second row is the cumulative horizontal minimum energy maps. The third row shows the first 30 horizontal seams chosen for removal. The last row is the result after removing 70 horizontal seams. Gradient magnitude only sees the difference between each pixel, therefore it can't really tell where the lion is and where the grass is in this image. The grass and the lion have almost the same brightness. We can see that the lion didn't get much energy in figure A and C. In figure E, we can see seams cross the lion just like it doesn't exist. In figure G, trees haven't been cut and the lion has deformed because of seam carving. The energy of a pixel in the entropy function is lower if the distribution of all the pixels in the local window is fairly uniform; It is higher if all the pixels in the window vary a lot. Here I used a 9-by-9 neighborhood around each pixel as the window size. Using entropy on this image is relatively successful. We cannot see clearly that lion got higher energy in figure B and D, but we can still see that the lion did get some energy. In figure F we can even see that the seams avoid crossing the lion. In figure H, we can see that the lion is mostly preserved.