Content Aware Image Resizing

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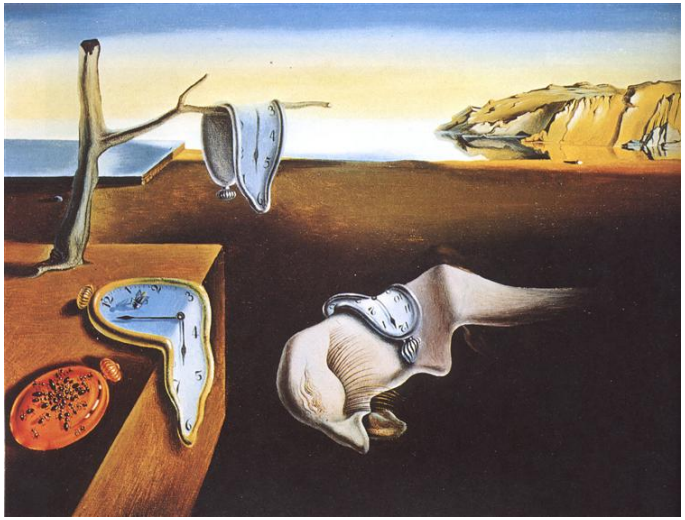
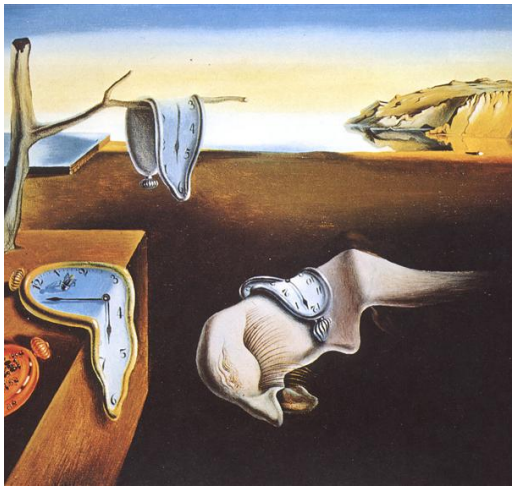
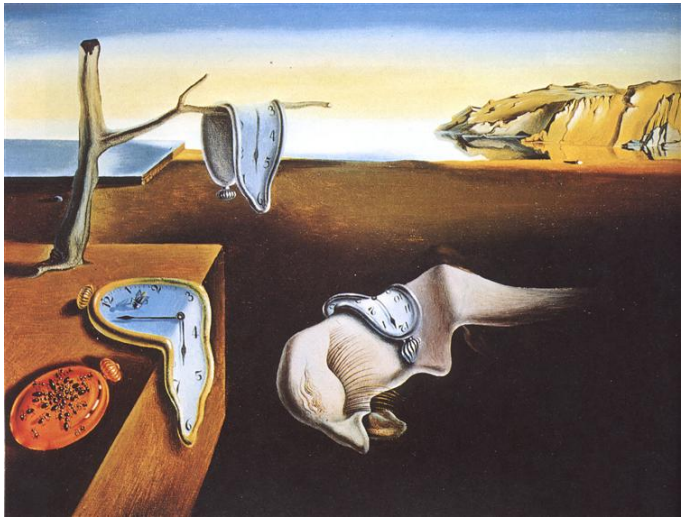
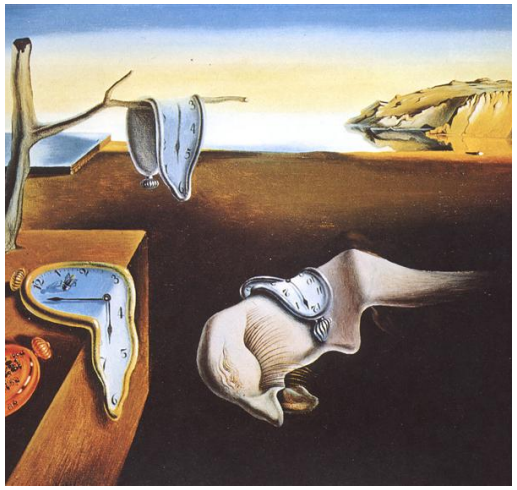
How do we resize an image?





Content aware resizing



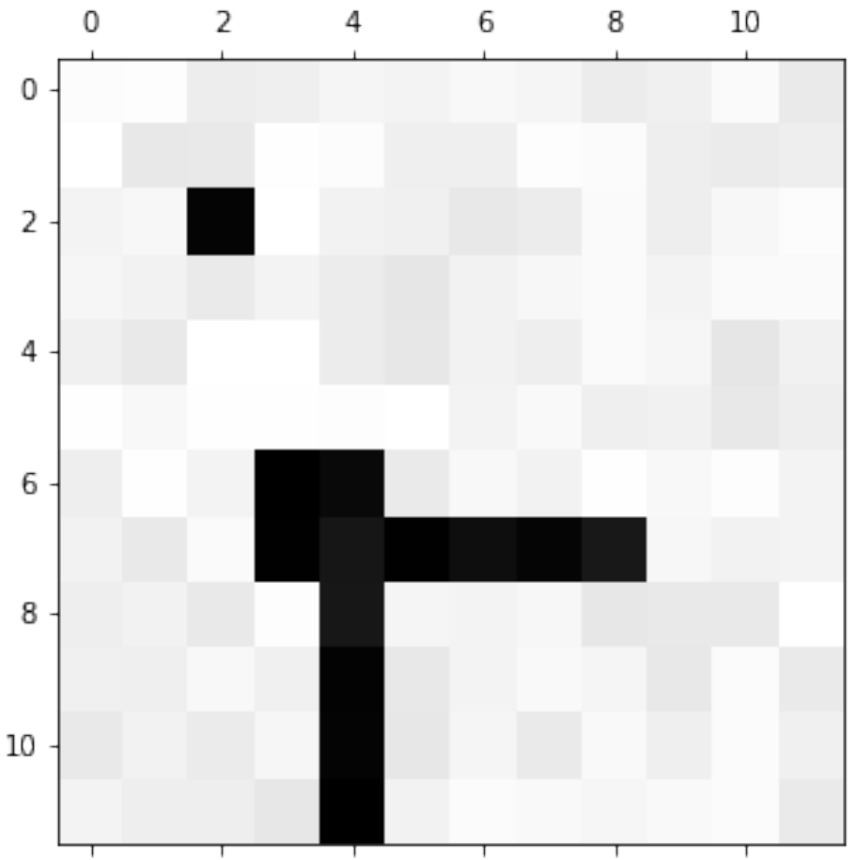


What are the steps of the problem?

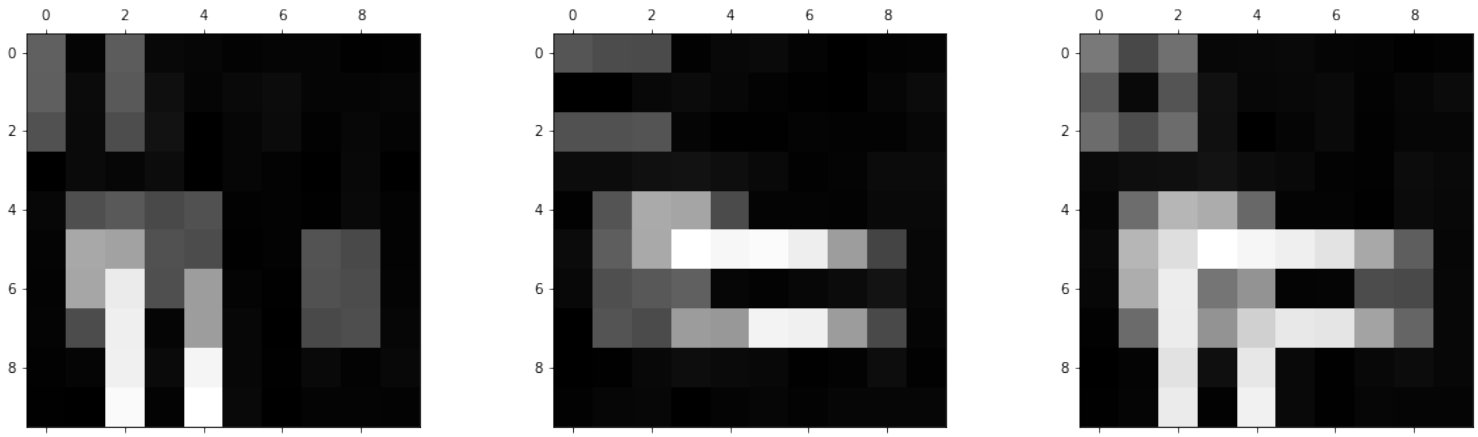
1. Find the features in the image
2. Find a line that goes around these features to cut out
3. Cut out the line
4. Repeat 1-3 until we reach the size we want

Detecting Features

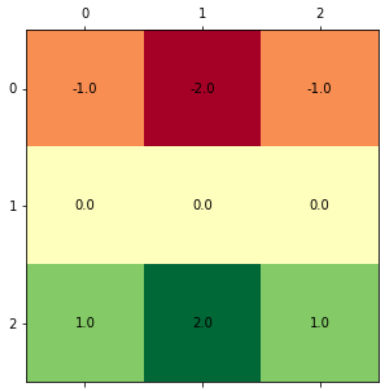
How do we indicate what parts of an image are important?

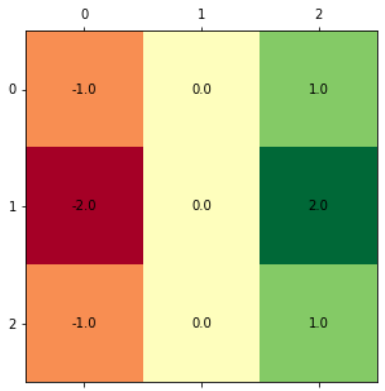


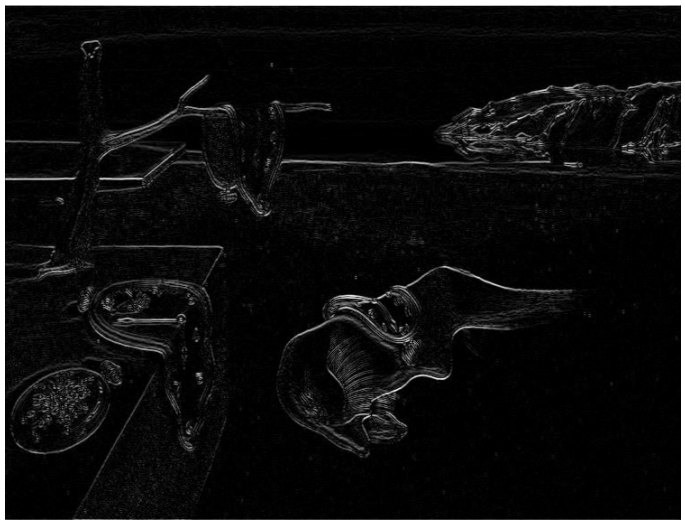
Convolution



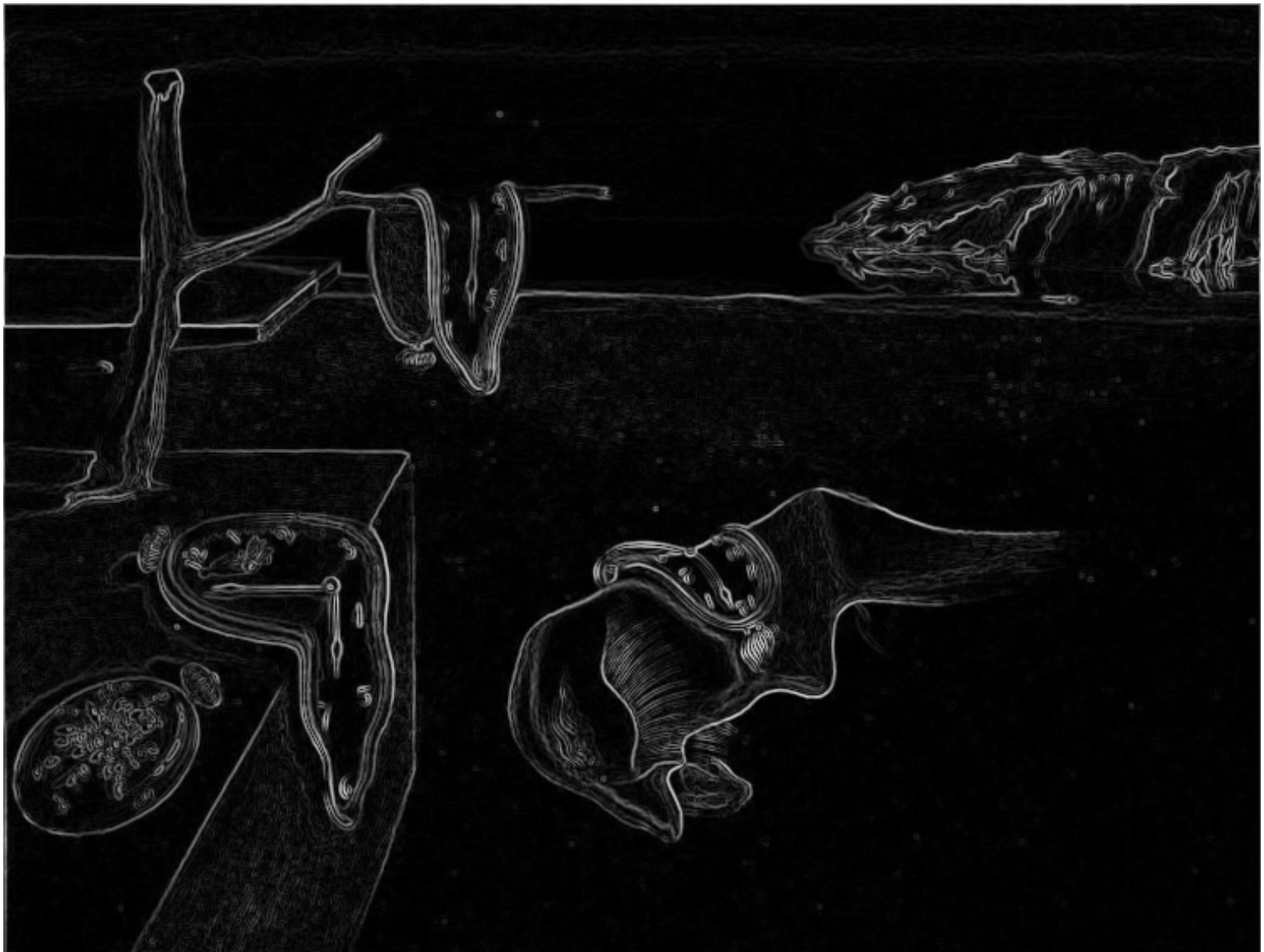
Sobel Filters







Edges

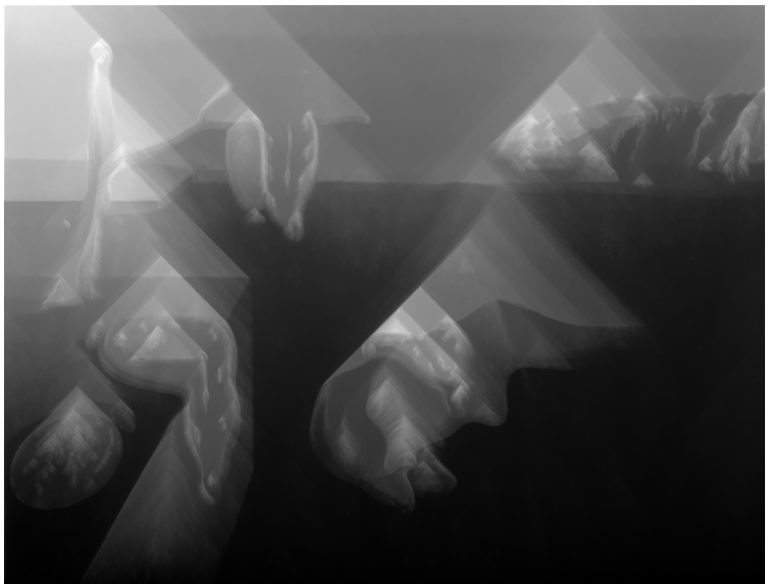


How do we find the minimum 'energy'?

1. Start at the bottom
2. For each row set each pixel to be the sum of the energy of that pixel plus lowest energy pixel below it
3. Repeat until we reach the top of the image

In practice we also want to keep track of the direction of the next pixel too.

Results



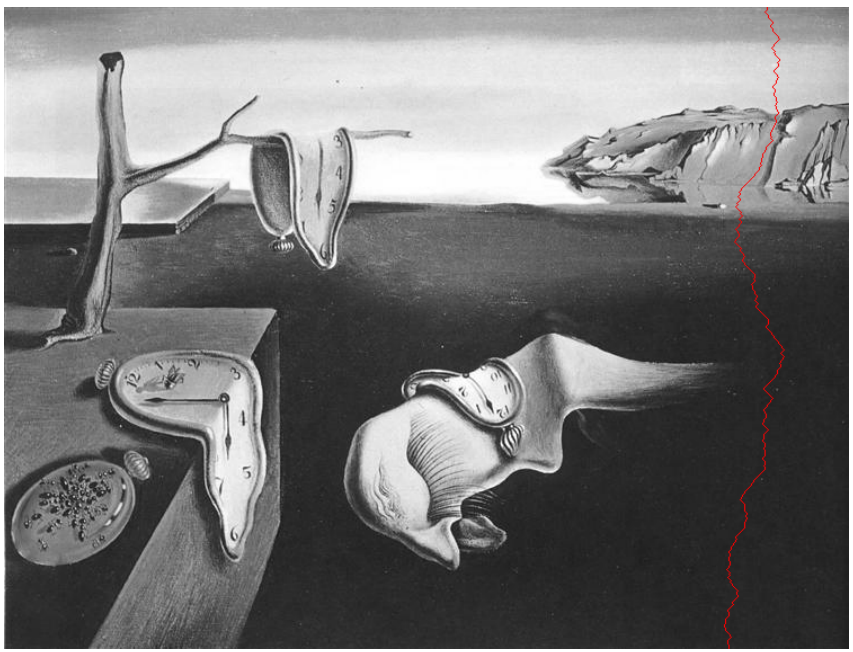
Cutting out the seam

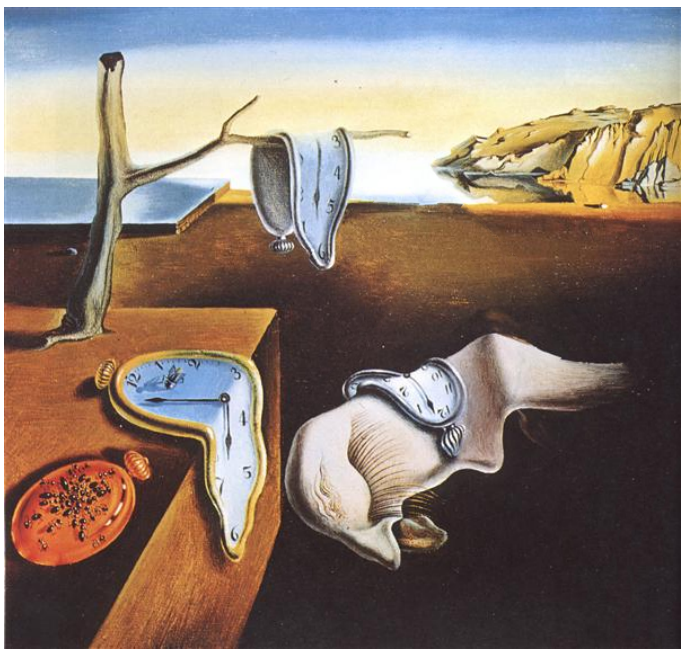
First find the seam to cut out. Which pixels does it pass through?

1. Find the pixel in the top row of the energy map with the lowest value.
2. Work your way down using the direction map to tell you which way to go.

Then remove those pixels from the image.

Results





Links

- Github repo
- Original paper
- More examples
- Online code walk through
- Video explanation