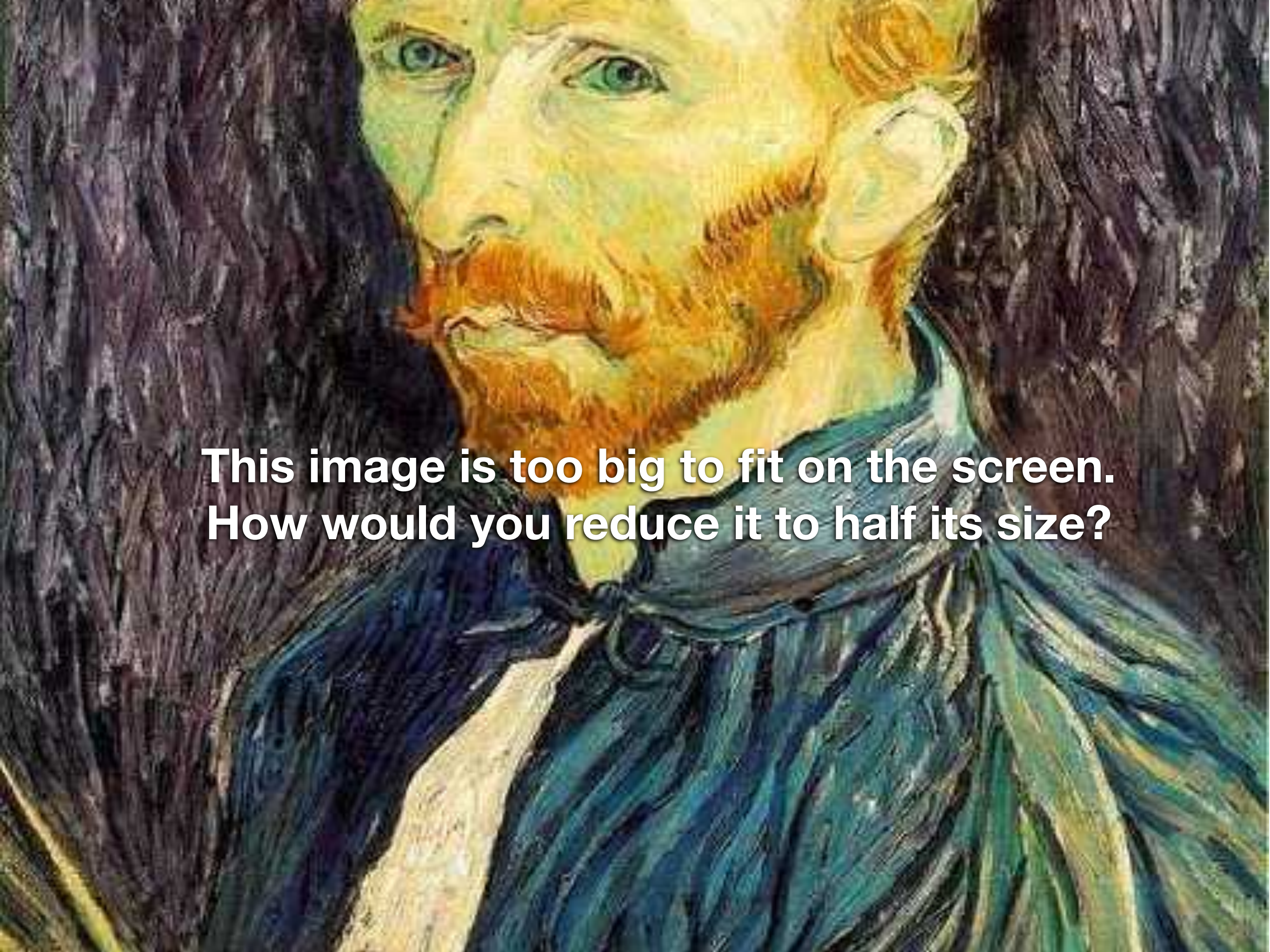




Image Subsampling

Computer Vision

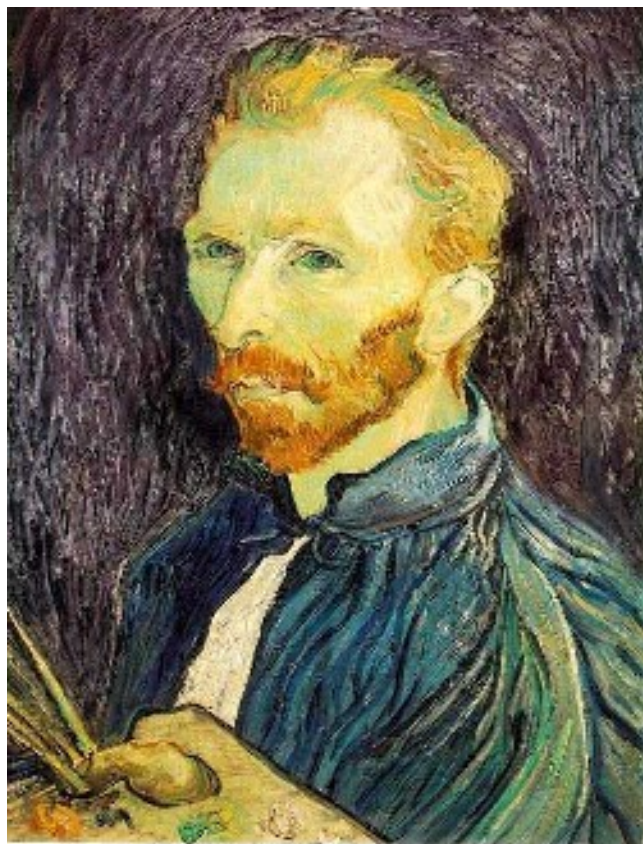
Carnegie Mellon University (Kris Kitani)

A close-up portrait of Vincent van Gogh, showing his face and upper torso. He has a thick, reddish-brown beard and mustache, and his eyes are a pale, yellowish-green. He is wearing a dark blue, textured garment. The background is a dark, swirling, and textured pattern, characteristic of Van Gogh's style. The image is cropped closely, focusing on the subject's head and shoulders.

**This image is too big to fit on the screen.
How would you reduce it to half its size?**

Naive image sub-sampling

‘throw away even rows and columns’



1/2

delete even rows
delete even columns



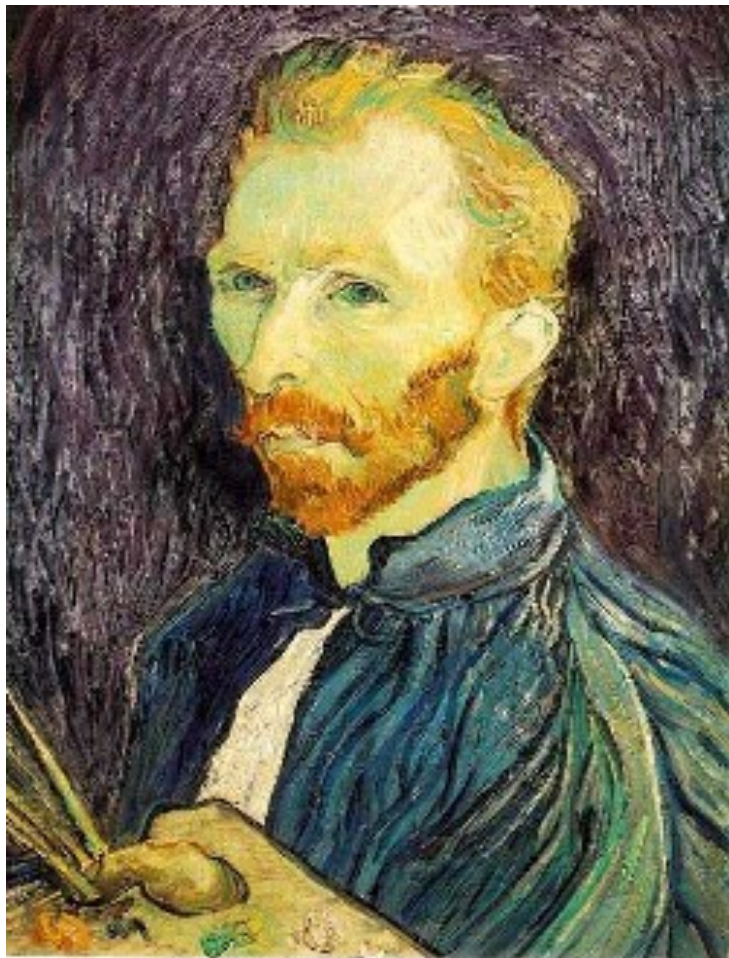
1/4

delete even rows
delete even columns



1/8

What are the problems with this approach?



1/2



1/4 scaled by 2

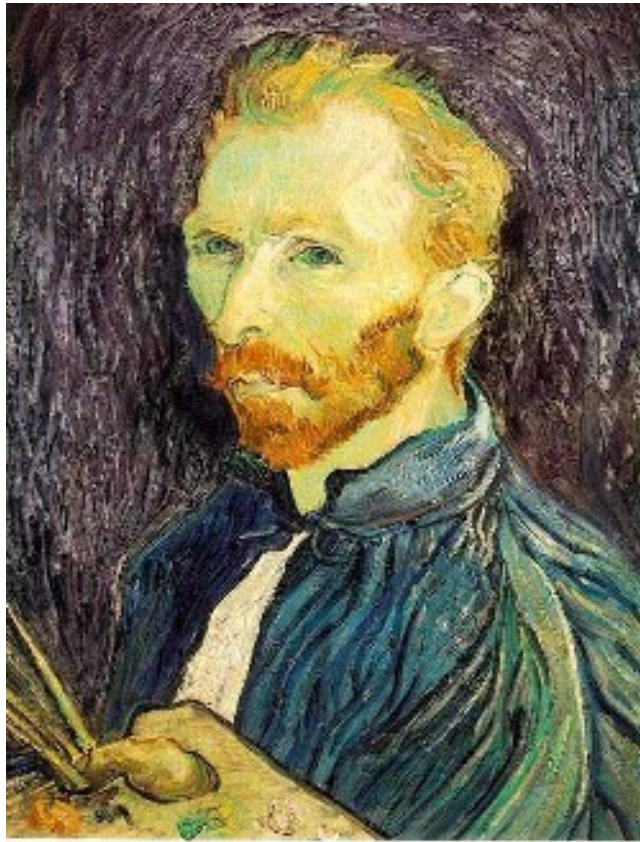


1/8 scaled by 4

Why is the 1/4 image so blocky (pixelated, aliased)?

How can we fix this?

Add Gaussian (lowpass) pre-filtering



1/2

Gaussian filtering
delete even rows
delete even columns



1/4

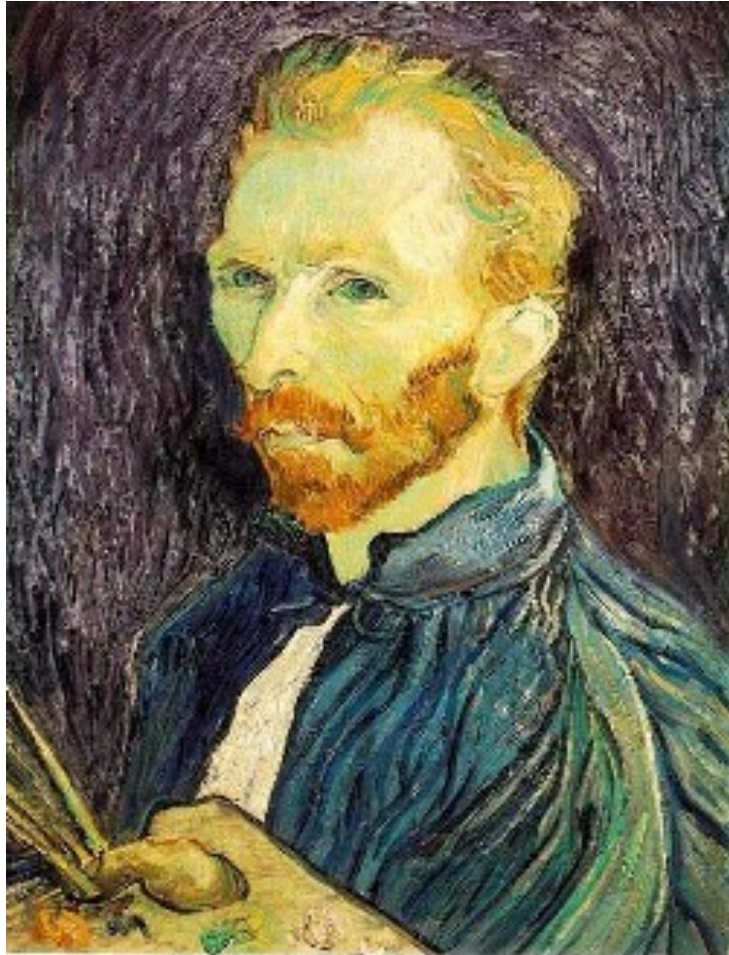
Gaussian filtering
delete even rows
delete even columns



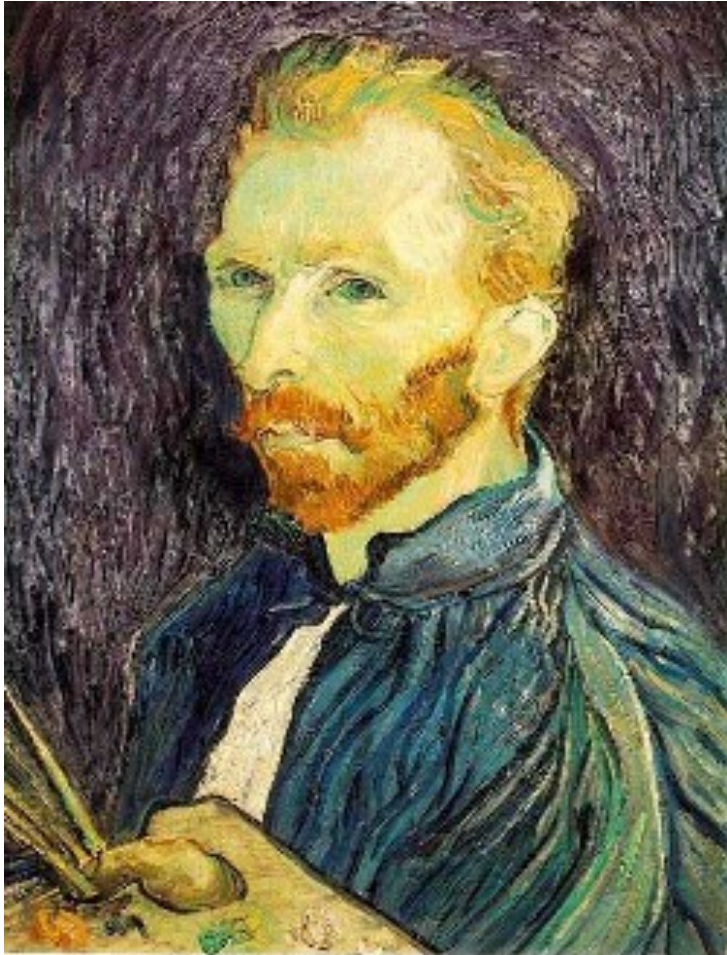
1/8

What will the images look like scale to the same size?

Gaussian pre-filtering



Naive subsampling





This sequence of subsampled images is called the...

Gaussian image pyramid