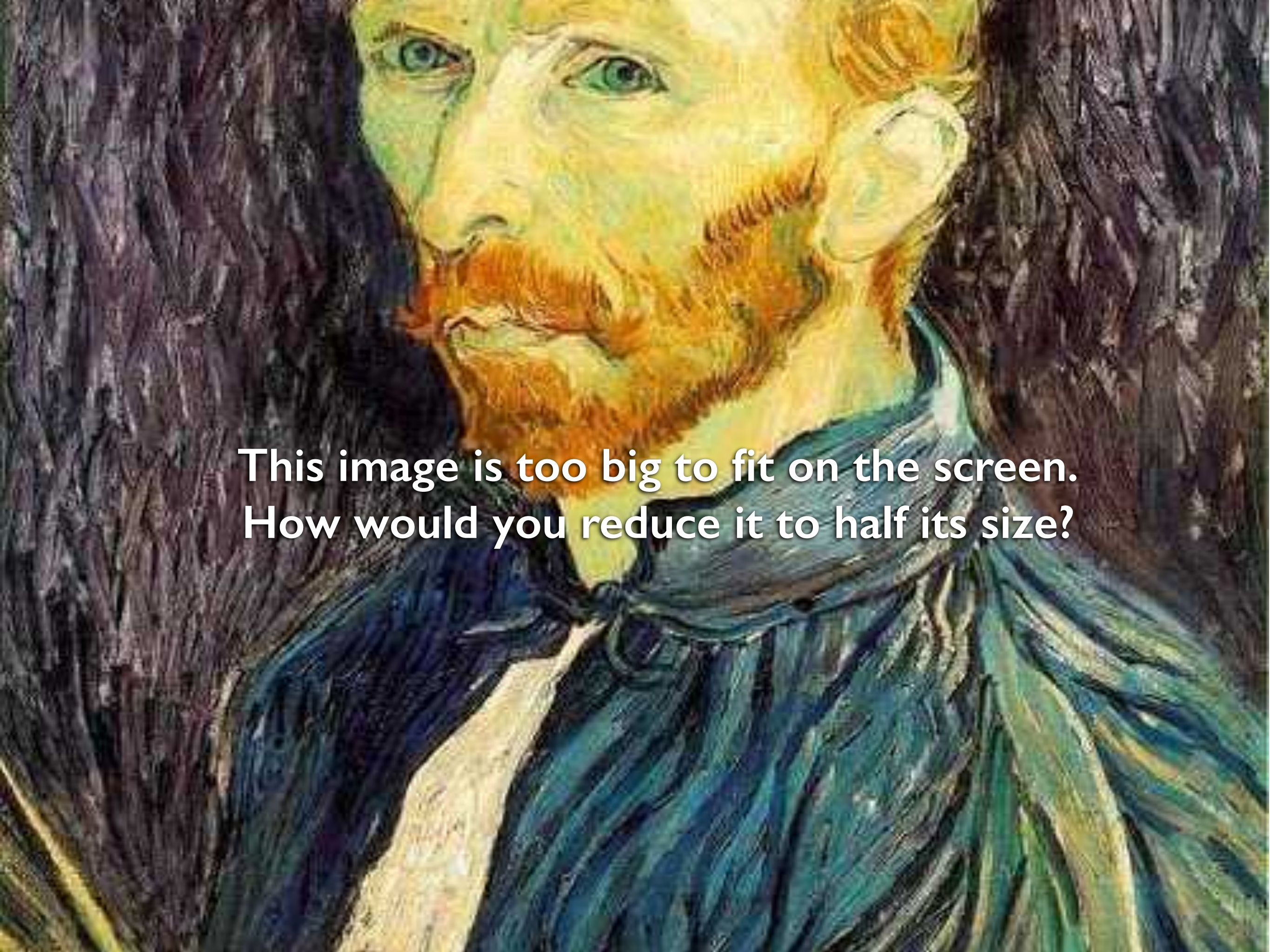




Image Subsampling

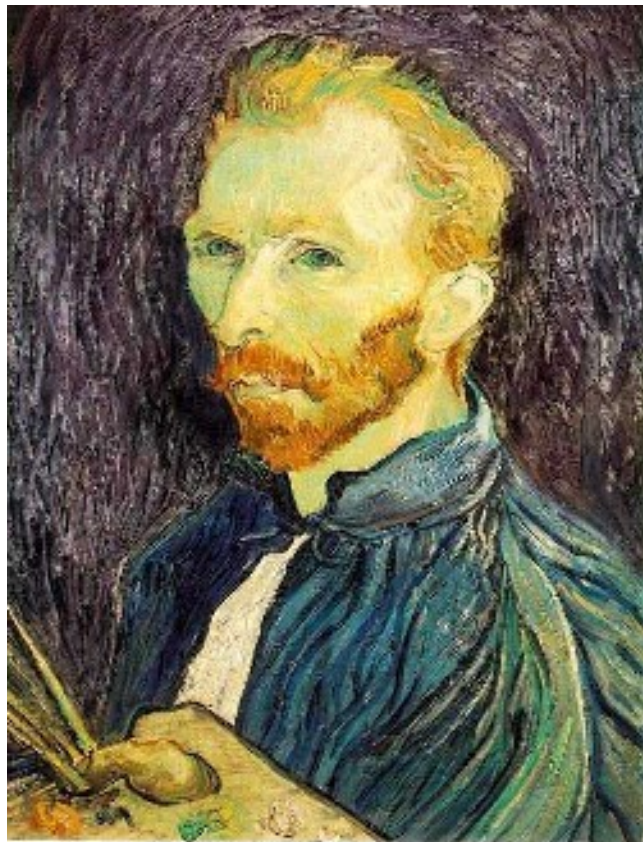
16-385 Computer Vision (Kris Kitani)
Carnegie Mellon University

A close-up detail of a painting by J.M.W. Turner, 'Rain, Steam, and Great Central Railway'. The image focuses on the face of a man with a full, reddish-brown beard and mustache. He has light-colored eyes and is looking slightly to the left. He is wearing a dark blue, textured scarf or shawl. The background is a dark, textured brown, suggesting a rainy or steamy atmosphere. The painting style is visible with thick, expressive brushstrokes.

**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



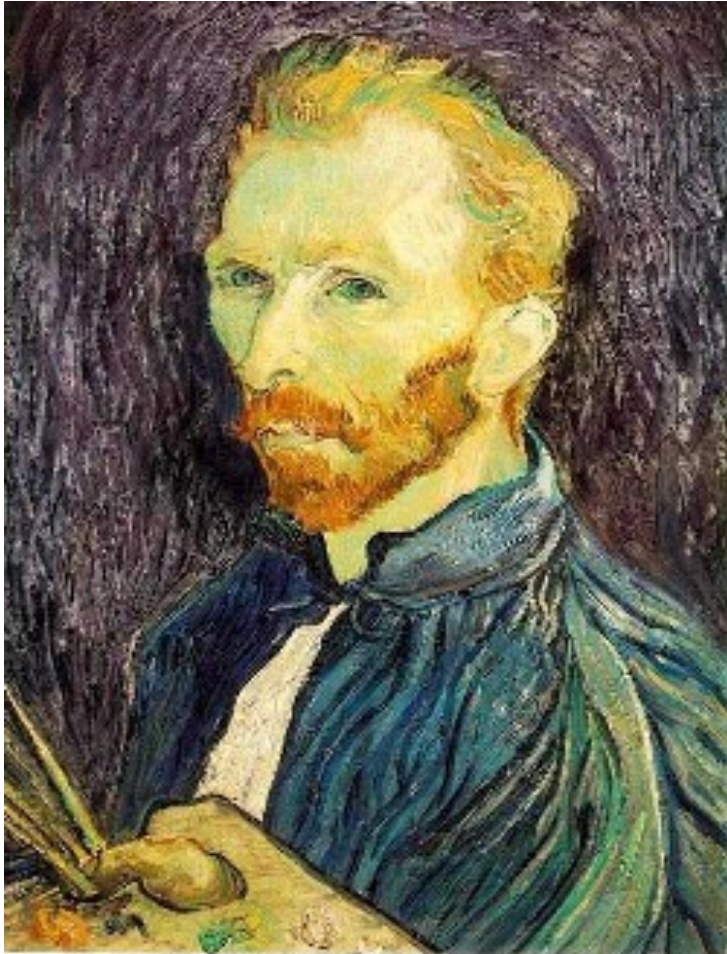
1/4

delete even rows
delete even columns



1/8

What are the problems with this approach?



1/2



1/4 scaled by 2

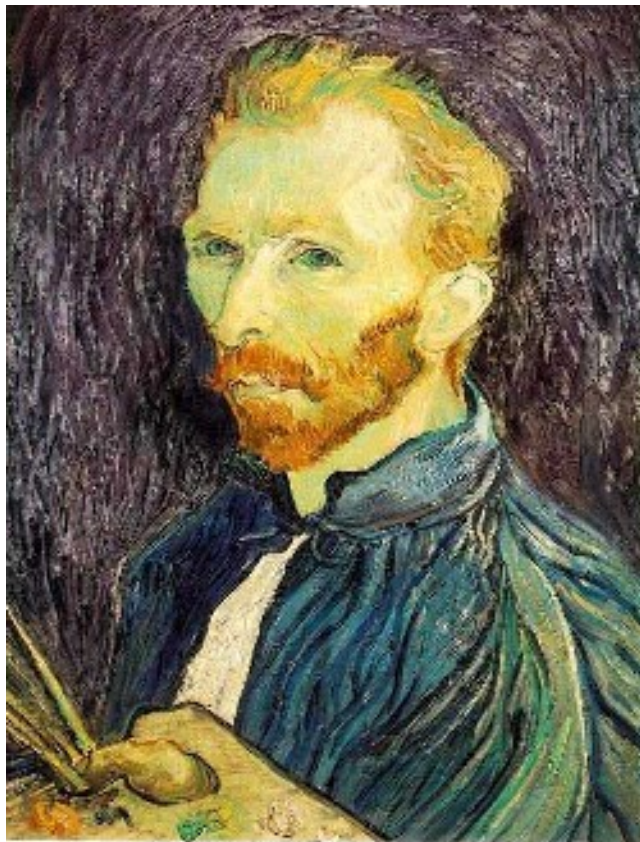


1/4 scaled by 4

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

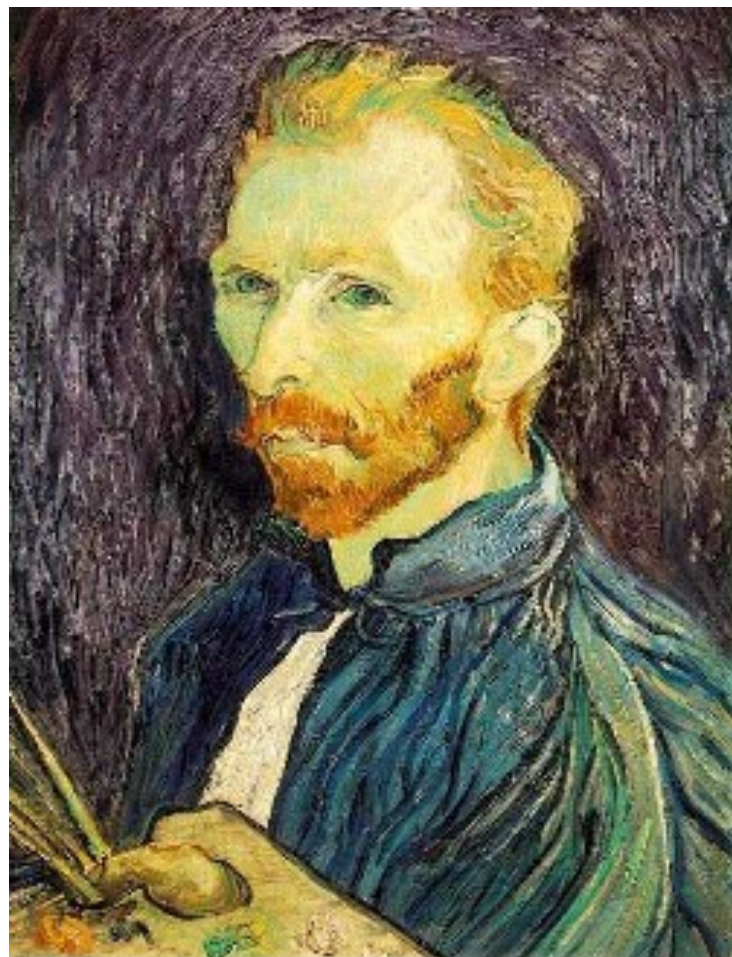
Gaussian filtering
delete even rows
delete even columns



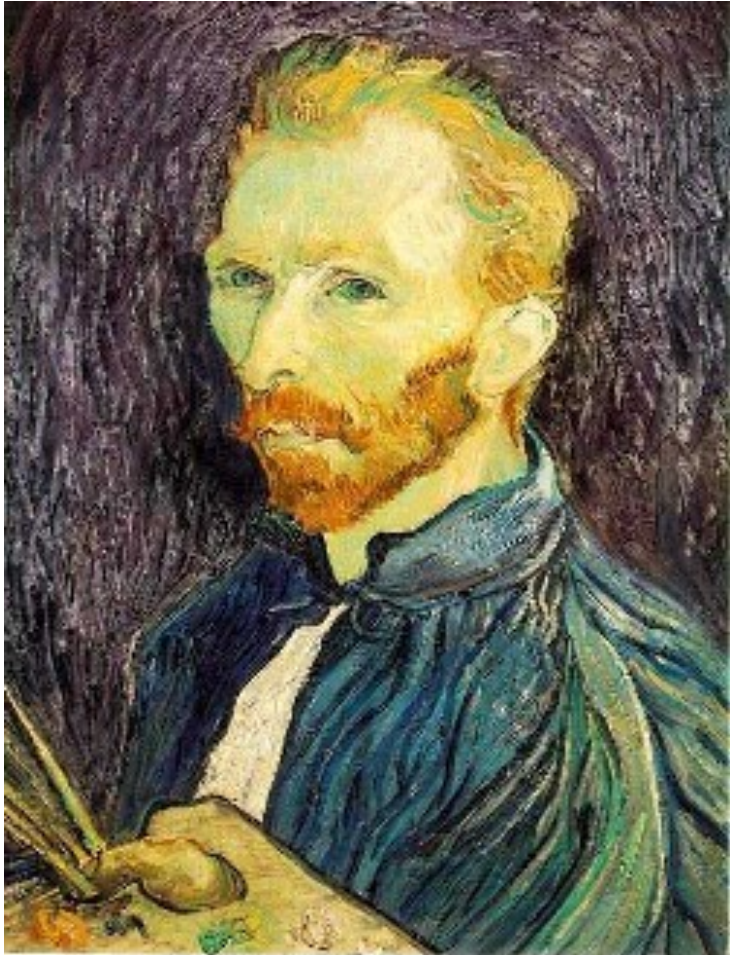
1/8

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