Leveraging Big Data: Photo Completion

René Magritte, “The Unexpected Answer”

CSC320: Introduction to Visual Computing
Michael Guerzhoy

Slides from Alyosha Efros, Derek Hoiem
Google and massive data-driven algorithms

A.I. for the postmodern world:

– all questions have already been answered...many times, in many ways
– Google is dumb, the “intelligence” is in the data
My dog once ate three oranges, but then it died.

Mi perro se comió una vez tres naranjas, pero luego murió.
Chinese Room

• John Searle (1980)
Scene Completion Using Millions of Photographs

James Hays
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What should the missing region contain?
How it works

• Find a similar image from a large dataset
• Blend a region from that image into the hole
Trick: If you have enough images, the dataset will contain very similar images that you can find with simple matching methods.
How many images is enough?
Nearest neighbors from a collection of 20 thousand images
Nearest neighbors from a collection of 2 million images
Image Data on the Internet

• Flickr (now)
  – 6 billion images per month
  – More than 100 petabytes of images/video

• Flickr (as of Sept. 19th, 2010)
  – 5 billion photographs
  – 100+ million geotagged images

• Imageshack (as of 2009)
  – 20 billion

• Facebook (as of 2009)
  – 15 billion

Scene Matching
Scene Descriptor
Scene Descriptor

Scene Gist Descriptor
(Oliva and Torralba 2001)
Scene Descriptor

Scene Gist Descriptor
(Oliva and Torralba 2001)
2 Million Flickr Images
Context Matching
Find the best seam + blend
... 200 scene matches