Image Quilting for Texture Synthesis and Transfer
The Goal

Texture Synthesis
The Goal

Texture Transfer
The Approach (Synthesis)
The Approach (Synthesis)
The Approach (Synthesis)

Similarity = \[ f(B_i) - g(B_j) \]^2

“Get right overlap”

“Get left overlap”
The Approach (Synthesis)
The Approach (Synthesis)

Notice the blocky looking boundaries
The Approach (Synthesis)
e = \[f(B_1) - g(B_2)\]^2
\[ E_{ij} = e_{ij} + \min(E_{i-1, j-1}, E_{i-1, j}, E_{i-1, j+1}) \]

Dynamic programming: \( E_{ij} \) is the min path to that position
\[ E_{12} = e_{12} + \min(E_{01}, E_{02}, E_{03}) = e_{12} + \min(e_{01}, e_{02}, e_{03}) \]
The Approach (Transfer)
The Approach (Transfer)

Correspondence Map
The Approach (Transfer)

\[(1-\alpha) \times (C_i - C_j)^2\]

\[\alpha \times [f(B_i) - g(B_j)]^2\]
The Approach (Transfer)
Image Analogies
The Idea

[Images of objects and a question mark]

Courtesy A. Hertzmann
But how?

Relate these... to these
Approximate Best Match

Need to locate best pixel (p) in A’ given q
Approximate Best Match

Precompute an acceleration data structure for ‘features’ in A, A’
Approximate Best Match
Approximate Best Match
Approximate Best Match
Exploiting Coherence
p = s(q)
Consider this feature...
What about the features?
Shameless copying of results...

Van Gogh

Watercolor
Texture Synthesis

Which one do you think is ‘better’?