Simple Adaptive Mosaic Effects

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IMPA

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Outline

- The problem
- Related work
- Our algorithm
- Results
- Conclusions
- Future work
The problem
The problem
Related work

image tools

Original Image
Adobe Photoshop

Paint Shop Pro

GIMP
Related work

Hausner (SIGGRAPH 2001)

original image

mosaic
Related work

Hausner (SIGGRAPH 2001)

original image

mosaic
Related work

Dobashi et al. (EUROGRAPHICS 2002)

original image

mosaic

stained-glass effect
Related work

Mould (EUROGRAPHICS 2003)

- original image
- segmented image
- region outlines
- final image
Related work

Elber & Wolberg (VISUAL COMPUTER 2003)

original image

final image
Related work

Di Blasi & Gallo (VISUAL COMPUTER 2005)

original image direction lines
final image
Related work

Di Blasi & Gallo (VISUAL COMPUTER 2005)

original image  direction lines  final image
Input is a digital image

1. Adaptive sampling of image finding seed points
2. Centroidal Voronoi diagram of seed points
3. Paint Voronoi regions
4. Paint Voronoi edges
Our algorithm overview

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Sampling the image

Average color in R

\[ C_M = \frac{1}{A_R} \sum_{p \in R} I(p) \]

\[ E_{\text{cor}} = \max_{p \in R} d(I(p), C_M)^2 \]
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Centroidal Voronoi diagrams
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Lloyd relaxation
Centroidal Voronoi diagrams
Centroidal Voronoi diagrams

density function $e^{-10x^2 - 10y^2}$ in $[-1,1]^2$
Why centroidal Voronoi diagrams?
Why centroidal Voronoi diagrams?
Density function is Euclidean norm of gradient of luminance.
Paint Voronoi cells

center color

average color
Paint Voronoi edges

black – stained-glass

background – mosaic
Visual effects
synthetic illumination
Visual effects
glass texture
Results
Painting effect
Mosaic effect
Stained-glass effect
Stained-glass effect
Quilt effect
Painting effect
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Our algorithm

✓ is simple to implement
✓ produces locally adaptive mosaics that look nice
✓ needs little user intervention
✓ does not need special hardware
Future work

- test other sampling strategies
- test other density functions
- reduce blur effect near edges
The End