Programmable Synthesis of Element Textures and Application to Cartography

Hugo Loi

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Embouchure de l'Adour
Texturing people for *Avatar*

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Mia Askew
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Virginie Degorgue
Samuel Doyle
Ryan Duncan
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John William Harnagel
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Zoe Lord
Nigel McKissock
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Collin Maxfield Parrish
Ula Rademeyer
Raine Reen
Anne Ritter
Justine Sagar
Adam Shelton
Grace Stephens
Shar Stewart
Petra Stueben
Masaya Suzuki
David Swift
Nataliya Tsyganok
Kara Vandeveleur
Christopher Welch
Sarah Wilson
Jasmine Wong
Piotr Fox Wysocki
Mark Young
Melissa Almeida
Ravi Bansal
Jami Gigot
Yann Provencher
Guillaume Ruegg
Anna Silvey
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Jami Gigot
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Guillaume Ruegg
Anna Silvey
Celine Velasco
Malcolm Wright
Draw
Draw + Arrange
Draw + Arrange + Stylize
Draw + Arrange + Stylize
Predefined layouts

[Hiller et al 2003]  [Lagae et al 2005]  [Adobe Illustrator 2013]
Examplar-based approaches up to [Emilien et al 2015]
Examplar-based approaches up to [Emilien et al 2015]
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Examplar-based approaches up to [Emilien et al 2015]
Examplar-based approaches

(a) [Ijiri et al 2008] [Hurtut et al 2009] [Ma et al 2011] [Landes et al 2013]

(b)
Examplar-based approaches

Exemplars

Artist 1

Artist 2

[AlMeraj et al 2013]
Examplar-based approaches

[c] [d] [Ijiri et al 2008] [Hurtut et al 2009] [Ma et al 2011] [Landes et al 2013]
Procedural Modeling

Irregular
Combine Partition Mapping Combine
Results - expressiveness
Results - expressiveness
Results - expressiveness
Results - expressiveness
Results - usability after 1h learning

<table>
<thead>
<tr>
<th>Targets</th>
<th>U1</th>
<th>U2</th>
<th>U3</th>
<th>U4</th>
<th>U5</th>
</tr>
</thead>
</table>

15min each
- Hatching divided into mountain faces
- Hatching divided into mountain faces
- Pseudo-perspective orientation
- Hatching divided into mountain faces
- Pseudo-perspective orientation
- Density enhances face separations
- Hatching divided into mountain faces
- Pseudo-perspective orientation
- Density enhances face separations
- Density enhances relative height
- Hatching divided into mountain faces
- Pseudo-perspective orientation
- Density enhances face separations
- Density enhances relative height
- Additional hatching layer for ridges
Input Data

Partition

Density

Orientation

Height
Stationary arrangement

Controlled arrangement

Spat-varying arrangement
Design Iterations
Design Iterations

- Hatching divided into mountain faces
- Pseudo-perspective orientation
- Density enhances face separations
Design Iterations

- Hatching divided into mountain faces
- Pseudo-perspective orientation
- Density enhances face separations
- Additional hatching layer for ridges
Design Iterations

- Hatching divided into mountain faces
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Design Iterations

- Hatching divided into mountain faces
- Pseudo-perspective orientation
- Density enhances face separations
- Additional hatching layer for ridges
- Density enhances relative height
- More complex arrangement
Application to Cartography - Conclusion

- Good design flexibility

- Potential applications for other map themes

- Opportunity for user-tuned maps