USC Viterbi School of Engineering

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The USC Texture Mosaic Images

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This document gives brief description of the three texture mosaic images that are presently available on the USC-SIPI web site (http://sipi.usc.edu).

USC Texture Mosaic #1

Texture mosaic #1 was created by Ken Laws while a graduate student at USC [1]. It is a 512×512 pixel image containing eight textures in square regions of 128×128, 32×32, and 16×16 pixels. Unfortunately we no longer have any information available as to which textures are present in each of the square regions.

USC Texture Mosaic #2

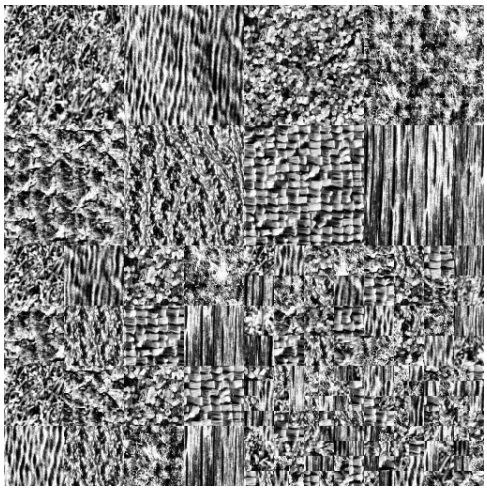
Mosaic #2 (Fig. 1a) was created to provide a test image similar to mosaic #1 but with information about the contents of the image. It is composed of eight different texture samples taken from the Brodatz texture book [2]. The Brodatz book consists of photographs of a variety of textures, both small and large grained. Photographic prints of several of the textures were obtained from the author. These were digitized as 512×512 pixels images with 256 gray levels per pixel, followed by a histogram equalization process.

The mosaic is a 512×512 image with 8-bits (256 gray levels) per pixel. It consists of eight textures which are numbered from one through eight and listed for reference in Table 1. Rectangular regions of size 128×128 pixels were extracted from the 512×512 scanned images for these eight textures and combined into a single mosaic image following the diagram in Fig. 1b. All eight textures are present in the image in squares of size 128×128, 64×64, 32×32, and 16×16. The texture data in the smaller regions was obtained by extracting data from the larger 128×128 regions. This mosaic is slightly different than mosaic #1 in that is has regions of four different sizes rather than only three. Mosaic #1 did not have 64×64 regions.

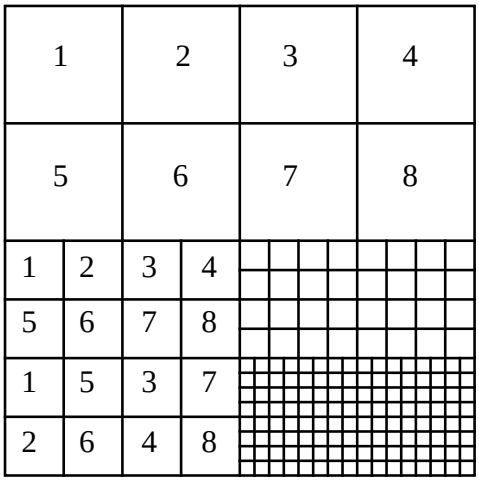
Figure 1c shows the gray levels used to display each of the eight textures.

Reference number	Texture	Brodatz page number	Pixel level in map image
1	Grass	D9	32
2	Water	D38	64
3	Sand	D29	96
4	Wool	D19	128
5	Pigskin	D92	160
6	Leather	D24	192
7	Raffia	D84	224
8	Wood	D68	255

Table 1: Components of the texture mosaic



(a) Texture mosaic image



(b) Numerical texture map

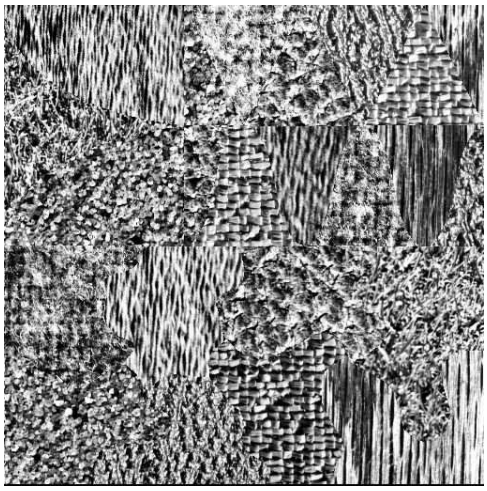
(c) Gray-level texture map

Figure 1: Texture mosaic #2 and reference maps

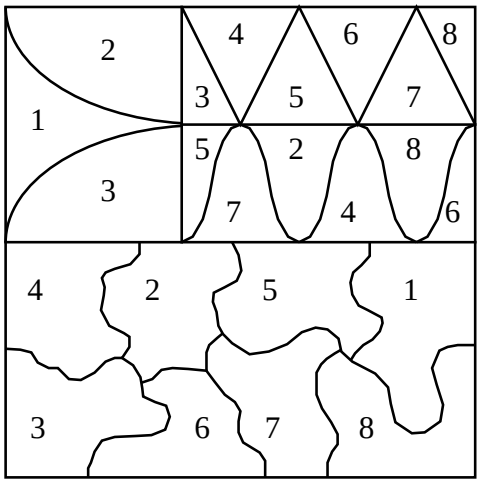
USC Texture Mosaic #3

To test the effect of non-horizontal and non-vertical texture boundaries, a mosaic was developed that has many of the properties not found in mosaic #2. The new mosaic (#3) is shown in Fig. 2a with the maps of the texture regions shown in Figs. 2b and 2c. This mosaic contains the same eight Brodatz textures that were present in the first mosaic (Table 1). The textures are present in the image in approximately equal proportions. The mosaic consists of three basic regions. The upper-left portion contains three textures in an arrangement where two texture are converging along curved paths. The upper-right portion of the new mosaic contains regions with non-vertical and non-horizontal boundaries, both straight and slightly curved. The bottom half of the image is made up of the eight textures in irregularly shaped regions of approximately equal size.

Mosaic #3 was created in a slightly different manner than mosaic #2. As described in Section , the textures used in the mosaic #2 were obtained by extracting 128×128 pixels regions from 512×512 pixels scanned images. For generating mosaic #3, the full 512×512 scanned images were used and data was extracted from various parts of the images as dictated by the region map (Fig. 2b).



(a) Texture mosaic image



(b) Numerical texture map

(c) Gray-level texture map

Figure 2: Texture mosaic #3 and reference maps

References

[1] K. I. Laws, *Textured Image Segmentation*. PhD thesis, University of Southern California, 1980. USCIPI Report 940.

[2] P. Brodatz, *Textures: A Photographic Album for Artists and Designers*. Dover Publications, 1966.