HARLEM-13-GIGAPIXELS.COM

ABOUT

Harlem-13-Gigapixels.com, the largest known stitched panorama, is a collaboration between artist Gerard Maynard and Kolor Company, represented by Alexandre Jenny.

Gerard Maynard is an artist working in Harlem, New York. His work has been exhibited at the Brooklyn Museum, New York; John Connelly Presents, New York; Deitch Projects, New York; and D'Ameilo Terras, New York. His work can be found in the Brooklyn Museum of Art. Gerard Maynard is currently represented by John Connelly Presents, in New York.

Kolor is a business specialized in panorama stitching tools. Their main product, Autopano Pro, is the software that made this panorama possible. It is the result of a long-time collaboration between Kolor, Dr. David Lowe, and Mr. Matthew Brown of University of British Columbia, Vancouver. Kolor's team, Alexandre Jenny and Lionel Laissus, optimized the software package to match the high requirements of this extreme panorama. All improvements are now available to the public in Autopano Pro.

SHOOTING

This image is a composite of 2,045 individual photographs taken on August 13, 2006 over a duration of 2 hours 10 minutes (4:43pm – 6:53pm).

The images were captured with a Nikon D2X and a 300mm Nikkor lens using a modified version of Peace River Studio's PixOrb. The camera captured images from left to right, top to bottom. For each relative image the camera had a 2 degree pan and a 3 degree tilt. Each image is 12 megapixels. The initial data is 21.49 GB of compressed RAW files.

The image was shot from the roof of a building at 7th Avenue and 110th Street in New York City. The large street in the center of the image is 7th Avenue (Adam Clayton Blvd) heading north. At the end of 7th Avenue is Macomb's Dam Bridge, 2.2 miles away. You can also see the George Washington Bridge, 3.5 miles away, and St. John the Divine cathedral.

STITCHING

Stitching was done with our software, Autopano Pro. The full workflow was separated into two passes: first, the detection and optimization of the panorama and second, the rendering of the panorama.

The detection, optimization, and manual placement of some pictures took us one day to perform with the 2,045 pictures. We have improved our color correction engine to be able to support such a large picture set, and it's now working perfectly even on such a large panorama. You can see the result in the animation to the right. This case was particulary surprising because the shooting was done in manual mode and we still had great differences in lighting. But those differences are natural: cloud motion, sun beeing occluded temporarily, etc.

STITCHING (continued)

The rendering was done with a 64bit Linux version of the software. We set up special hardware to do the rendering: dual xeon quad-core processor with 8GB memory and 2 high-speed 150GB hard drives. It took 46 hours to render this 13 Gigapixel panorama.

EXPORTING

The final panorama was produced as a single PSB file of size 279689 x 46901 (48.8 GB). Such a huge picture cannot be displayed easily over the web.

One standard technology for doing this is called Zoomify. The tool provided with this package does not read the PSB file format – only standard formats like TIFF or JPG. These formats have limitations that prevent us from using them (e.g. standard TIFFs cannot be more than 2 GB in size). To solve this issue we developed an internal tool to cut the big picture into smaller parts and then use the Zoomify converter.

HDView is another technology for displaying large panoramas on the web. It is brand new and the tool currently provided with this package cannot read PSB files either. So we also had to design an internal tool to allow direct export of a single PSB to HDView.

RELATED WEBSITES

Gerard Maynard, www.gerardmaynard.org
Autopano Pro, www.autopano.net
John Connelly Presents, www.johnconnellypresents.com

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