Image Stitching: Exploring Practices, Software, and Performance

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Abstract

The merging or stitching of separately captured portions (tiles) of an object into a single unified digital image is becoming increasingly popular in the cultural heritage community. Maps, negatives, tapestries, and paintings that were once too onerous to digitize faithfully because of their physical size are now included in digital collections. These can be digitally sewn together from component images with several post-processing solutions. In some cases large robotic systems are accomplishing these tasks.

When such stitched images are viewed without a known reference image the stitching performance can appear quite remarkable. What and where are the hidden flaws in these stitched objects? Are certain content types more prone to stitching errors than others? Are there analytical tools to detect stitching errors or are visual assessments sufficient? What operational guidelines and software options offer the best stitching solutions?
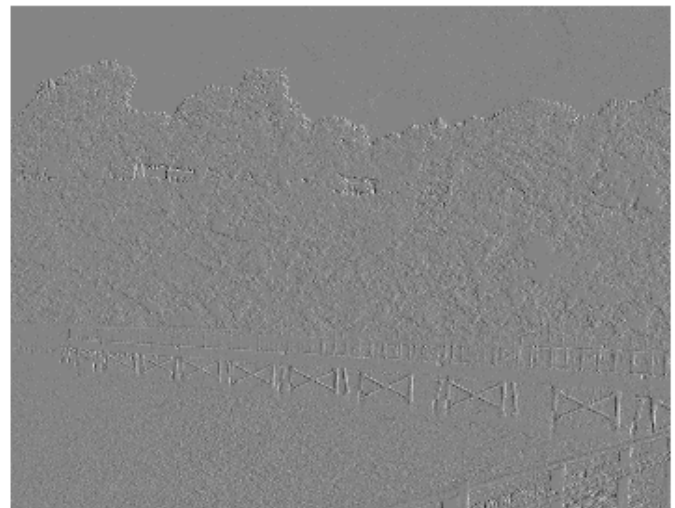
We explore these questions and offer an assessment of best current thinking on the pros and cons of different digital stitching solutions and guidelines on how to make them perform well.
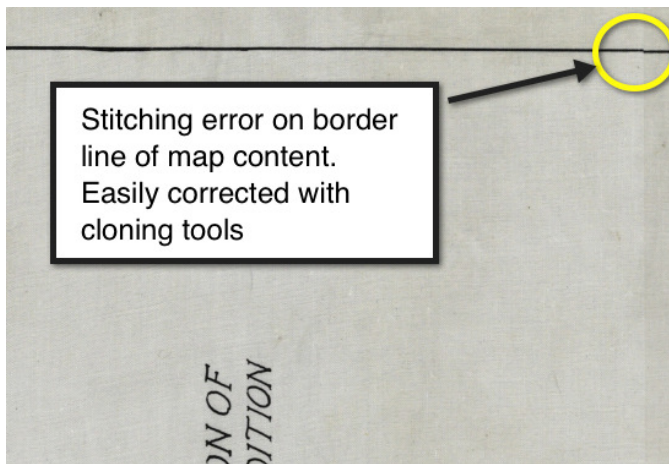
Image after stitching
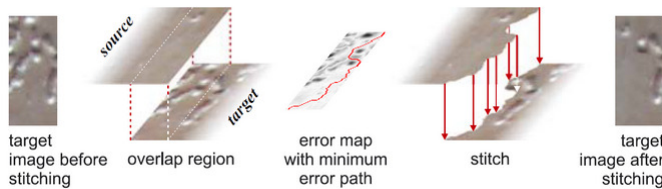
Outline of steps used in current image stitching software (*Somol and Haindl, 2005*)

Stitching error on border line of map content. Easily corrected with cloning tools

Obvious error on a map border

Difference image for the above region shown for the green color-record