Image “Stitching” Motivation

The idea of wanting to have a single printed image that shows a wider field of view or higher level of detail than the one that a particular camera and lens can provide natively is not new (examples go back to near the very start of the photography era itself).

Large subjects could be ones such as a city’s skyline or majestic nature photos. Aside from lenses, camera issues include small “capture” surfaces (whether glass plates, film, or sensors).
Historic Panoramic Images

Consider this city skyline made from five photos in 1913 or this nature photo built from three photos in 1864.

Let’s try making some “joiner” images…

We’ll split into groups to manually combine printouts of these photo sets. The top as a **panorama**, the lower-left as a **panograph**, the lower-right as a **motion study**.
What things might a program do? (I)
They typically need to distort the individual images to adjust for things such as parallax and lens distortions.
- The way in which the images were taken (rotating the camera versus moving it sideways for example) impacts some of these distortion correction choices.
- Keeping straight lines in nature straight in the stitched image is an issue to consider.
- Common lens-related adjustments are pincushion and barrel compensation.

What things might a program do? (II)
They will look for the best way to overlap and blend images. Since “perfect” solutions are highly unlikely, a common approach is exploration of iterative changes that attempt to minimize differences to find a good overlap between neighboring images.
- Rotating and shifting the images is one way.
- Feature detection to look for the same items in neighboring images is another.
Software Tools for Stitching
There are many pieces of software for merging multiple photos into a single image.

We’ll try out Photoshop’s “Photomerge” feature, a free tool for Mac or Windows called AutoStitch, and (for those with Windows) Microsoft’s Image Composite Editor.

Artistic Choices
There are decisions to be made when merging multiple images into a single one.

– Most notably perhaps, is whether you want the result to look like it was taken as a single image, or have the edges and overlaps themselves be a part of the overall look.
– Styles include photomontages, collages, panographs, etc.
Mosaics

Given a collection of photos, there is software that can match photos from the collection to regions of a master photo...

http://www.andreaplanet.com/andreamosaic/

Specialized Hardware

For capturing wide-angle images today we have ultra-wide lenses or even cameras with multiple lenses and sensors.

For higher resolution images, we have digital cameras with high megapixel sensors, or lens/sensor clusters that can produce 100MP+ spherical panoramas.

The idea of specialized cameras also goes back over a hundred years, with cameras that had a lens that would rotate to expose a wider strip of film.
Gigapixel Zoomable Images

Robotic camera mounts (and software tools) allow for the easier creation of merged images that are gigapixels in resolution.

http://gigapan.com/gigapans/15374/

Some devices go a little overboard 😊

36 still-frame cameras
108MP total resolution

$2,400

Remote stitching, company-dependent…

https://www.panono.com/en/home/
More Viable Product? Insta360 Pro 2

7680 x 3840 resolution
3D video
$5,000

Creativity

As with everything we have been looking at, the tools are a start, but it’s our creativity that tends to (hopefully) make the results interesting…

http://ter.ps/Pikachu360
https://ter.ps/MallStylized
https://ter.ps/TestudoTiles

(click on image to get larger version to see individual photos)
Some Resources

- https://www.insta360.com/product/insta360-pro2
- https://www.loc.gov/resource/pan.6a00074