Licensable Technologies

Image Alignment and Registration

Applications:

- Aerial and hand-held
  - Photography
  - Videography

- Cinematography
  - Real-time, stabilized video feedback from moving vehicles
  - Mapping and monitoring
  - Multi-spectral and hyperspectral imagery sequences

Benefits:

- Reduction of hardware costs for capturing video in unstable environments

- Large imagery, 11 Megapixels and up, supported

- Low computation resources required

- Independent of predefined feature sets

- Designed for image translation, also works with image rotation

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![Los Alamos National Laboratory logo — EST.1943]

Frame 1   Frame 2   Frame 3
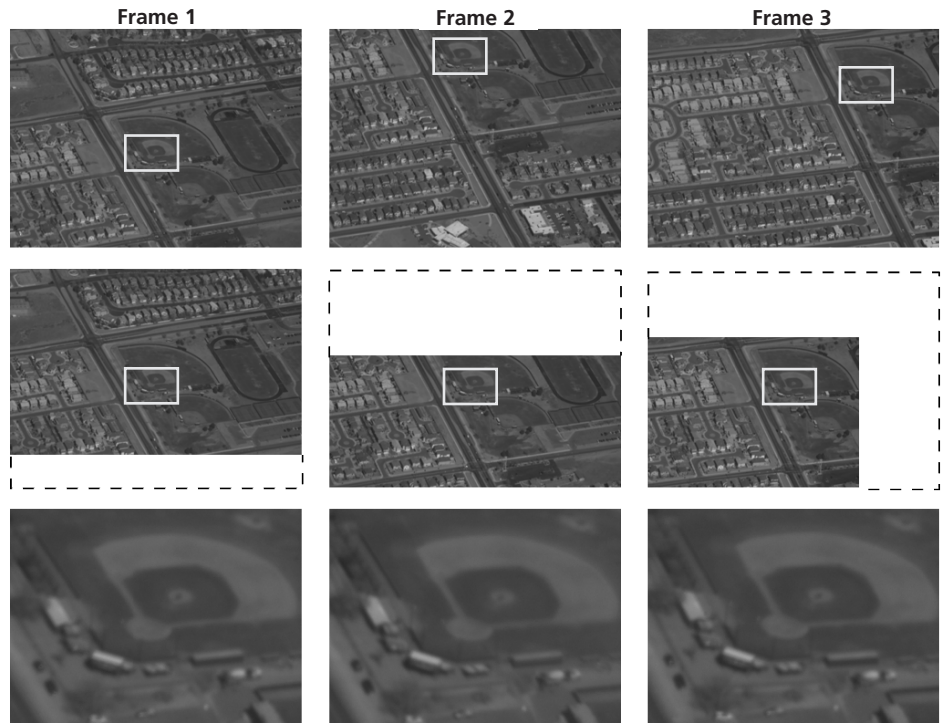
Above, three frames shot successively from an aircraft flying above Albuquerque, N.M., in turbulent weather. The top row shows the raw video imagery with severe camera jitter; the center row, the three frames registered to the same position relative to the baseball field; and the third row, a smooth video stream of the same field in real time.

Summary:

When video is captured from a moving vehicle, such as an aircraft or a car driving down a bumpy road, large amounts of jitter are introduced. Whether the application is displaying in real time a high-pursuit police chase on the 10:00 news, or capturing video, analyzing it, and telling warfighters on the ground what's around the corner, stabilization of jitter created in the video data is essential. The current solution for removing camera jitter requires the use of costly camera gimbals (stabilization devices), which don't always offer a complete solution.

Scientists at Los Alamos National Laboratory (LANL) have developed an innovative software solution for image alignment to correct camera jitter. Using this software tool, video data can be captured with a camera mounted on a low-end gimbal (~$20,000 or less) allowing the jitter to be removed on the fly in real time as the image is processed and displayed to the viewer. The software uses a unique algorithm to identify common features in frames for frame-to-frame image registration. This algorithm can correct large frame-to-frame image translations, correcting pixel translations by as much as 75% of an image diagonal. The algorithm works for large and small images, demonstrated in practice with images as large as 11 Megapixels.

Intellectual Property Status: Patent pending, international copyright

Licensing Status: Los Alamos National Laboratory is seeking commercial partners to further develop this technology and introduce it into new markets.

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