Robust, Efficient and Streamable Video Stabilization

[View U.S. Patent No. 8,872,928 in PDF format.](#)

WARF: P100230US01

Inventors: Michael Gleicher, Feng Liu, Hailin Jin, Jue Wang, Aseem Agarwala

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a video stabilization technique that is robust and efficient yet provides high-quality results for a range of videos.

Overview

One of the most obvious differences between professional and amateur level video is the quality of camera motion. Hand-held amateur video typically is shaky and undirected, while professionals use careful planning and equipment to achieve directed motion.

Video stabilization is a widely used tool for improving casual video. Existing 2-D techniques are robust and fast but provide limited stabilization. On the other hand, existing 3-D techniques can provide high-quality motion but are so computationally intensive they essentially are limited to videos only a minute or so long.

The Invention

UW−Madison researchers have developed a robust and efficient approach to video stabilization that achieves high-quality camera motion for a wide range of videos. The key to this approach is that they enforce subspace constraints on feature trajectories while smoothing them. The method assembles tracked features in the video into a trajectory matrix, factors it into two low-rank matrices and performs filtering or curve fitting in a low-dimensional linear space.

Applications

- Stabilizing both amateur and professional video

Key Benefits

- Combines the advantages of 2-D and 3-D video stabilization
- Achieves high-quality video stabilization
- Approach is efficient, robust and streamable.
- Practical enough for consumer applications
- Simpler than convention 3-D approaches
- Provides smooth camera motions in cases where conventional approaches often fail, such as videos that lack parallax
- May be performed in real time or near real time
- May use linear approximations to bilinear optimizations for efficiency
- Suitable for a wide range of videos

Additional Information

For More Information About the Inventors

- [Michael Gleicher](#)

Related Technologies
- [WARF reference number P100231US01 describes an efficient video retargeting approach that avoids jitter.](#)

Publications
- Liu F., Gleicher M., Wang J., Jin H. and Agarwala A. 2011. Subspace Video Stabilization. ACM Trans. Graph. 30, 4:1-4:10.
- [Watch the demo video.](#)

Tech Fields
- [Information Technology : Image processing](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846