SYSTEMS AND METHODS FOR SCENE RECONSTRUCTION USING A HIGH-SPEED IMAGING DEVICE

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The Invention

UW-Madison researchers have created a method capable of estimating extreme scene motion under challenging conditions, such as low light or high dynamic range, from a sequence of high-speed image frames. These can be captured by a single-photon camera, or other types of hardware such as jots. It iteratively improves motion estimation by grouping and aggregating frames after-the-fact, in a stratified manner. As shown in Fig. 1 below, an initial motion estimate (blue line) is obtained using locally averaged groups of frames (shaded regions). This blur causes the registration algorithm to produce noisy motion estimates (black error bars) from which the estimated motion trajectory is updated. With this new trajectory, the apparent motion is smaller (shaded area), leading to higher-quality virtual exposures. In addition, sampling new virtual exposures can be done as needed, with new frames centered around the midpoints of previous frames (far right graph). These lead to improved motion estimates. The estimated motion trajectory converges to the true motion over several iterations.

Additional Information

For More Information About the Inventors
- Mohit Gupta

Tech Fields
- Information Technology : Image processing

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867