CONTRIBUTION: EXPOSURE FUSION VIDEO DEGHOSTING

We present a novel method that deals with the elimination of ghosting artifacts during the creation of Exposure Fusion video by using several carefully selected filters and performing a local analysis.

→ Input images (analyzing two frames)
→ Ghosting Coefficients
→ Resulting Deghosted image with amplified detail.

DEGHOSTING METHOD

Exposure Fusion relies on three numerical parameters assigned to each pixel in the inbound images: Well-Exposedness, Detail and Saturation. We propose a fourth parameter to aid video creation - Ghosting.

The original images’ color variations were found too steep due to the implicit exposure variation to generate reliable results. Thus, the process outlined below is applied to the result of a regular Low-Pass, followed by a High-Pass Laplacian filter applied to each image.

To find the Ghosting parameter of pixel \((i, j)\), \(G(i, j)\) we analyze the regions \(A_{ij}\) and \(B_{ij}\) as given by \((i - l : i + l, i - l : i + l)\) in each image.

The pixel areas are evaluated according to the following formula:

\[ G(i, j) = 1 - \|A_{ij} - B_{ij}\| \]

This method is then repeated with additional Low-Pass filter steps. The resulting obtained Ghosting coefficients are multiplied to obtain the final pixel Ghosting parameter value. This process attenuates the contribution of capture noise and irrelevant weaker high-frequencies, which disappear after consecutive Low-Pass applications, resulting in less erroneous detections of non-movement high-frequency variations and a strengthened Ghosting parameter for pixels that involve true object movement.

REFERENCES


METHODS

In order to obtain the video frames used in this work, a Nokia N900 running Maemo 5 and the FCam API was used. We proceed to perform a multiresolution alignment based on image pyramids. This step is necessary, as background pixel correspondence is crucial for this work. Both are explained in detail in our previous work [Castro et al.].