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Vibration Imaging Method for Vibrating Objects with Translation

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Abstract : We propose a vibration imaging method for high frame rate (HFR)-video-based localization of vibrating objects with large translations. When the ratio of the translation speed of a target to its vibration frequency is large, obtaining its frequency response in image intensities becomes difficult because one or no waves are observable at the same pixel. Our method can precisely localize moving objects with vibration by virtually translating multiple image sequences for pixel-level short-time Fourier transform to observe multiple waves at the same pixel. The effectiveness of the proposed method is demonstrated by analyzing several HFR videos of flying insects in real scenarios.

Keywords : HFR video analysis, pixel-level vibration source localization, short-time Fourier transform, virtual translation
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