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Real Time Video Based Smoke Detection Using Double Optical Flow Estimation

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Abstract : In this paper, we present a video based smoke detection algorithm based on TVL1 optical flow estimation. The main part of the algorithm is an accumulating system for motion angles and upward motion speed of the flow field. We optimized the usage of TVL1 flow estimation for the detection of smoke with very low smoke density. Therefore, we use adapted flow parameters and estimate the flow field on difference images. We show in theory and in evaluation that this improves the performance of smoke detection significantly. We evaluate the smoke algorithm using videos with different smoke densities and different backgrounds. We show that smoke detection is very reliable in varying scenarios. Further we verify that our algorithm is very robust towards crowded scenes disturbance videos.

Keywords : low density, optical flow, upward smoke motion, video based smoke detection
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