一种改进的 ViBe 算法结合多特征融合的阴影移除方法

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摘　要:由于阴影会直接影响监控系统对运动车辆的识别,因此如何有效移除阴影已成为重要的研究内容之一.常用的运动检测 ViBe 算法存在"鬼影"问题,从而干扰后续帧的检测效果.基于色相的阴影检测算法易受噪声干扰,且不适用于强光照变化的场景.基于纹理的阴影检测算法不依赖于颜色特征,对强光照变化的场景具有较好的健壮性.鉴于上述算法的优劣,提出一种改进的 ViBe 算法结合多特征融合的阴影移除方法,首先在背景模型初始化中引入高斯分布概率密度函数,并结合原 ViBe 算法进行模型更新,然后再结合色相和纹理特征进行特征融合,检测出阴影并最终移除阴影.实验结果表明,该方法能有效地检测出车辆且抑制"鬼影",并能在强光照等不同场景下有效地移除阴影,准确地提取运动车辆.

关键词:阴影检测;阴影移除;改进的 ViBe 算法;色相特征;纹理特征

Shadow Elimination Based on Improved Vibe and Multiple Features Fusion

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Abstract:Shadow removal is one of the most important parts of moving object detection in the field of intelligent video surveillance since the shadow definitely affects the recognition result. There is a flaw when ViBe algorithm is used to detect moving vehicles, that is, the ghost of moving vehicles would exist over a period in vehicles detection if moving vehicles exist in the first frame and interfere the following detection effect. Chromaticity-based approach are susceptible to noise, furthermore it is sensitive to illumination changes. Texture-based approach is highly distinctive, do not depend on colors and robust to illumination changes. In terms of the disadvantage of above approaches, a new improved ViBe algorithm combined with multiple features fusion, fusing chromaticity and texture is proposed in this paper. The initialization model would be initialized by Gaussian distribution probability function and updated according to original ViBe update algorithm in the proposed approach, next fusing the chromaticity feature and texture feature to remove the shadow. Experimental results show the proposed approach can detect the moving vehicles as well as remove the ghost effectively, and it is efficient and robust in shadow removing under different scenes.

Key words:Shadow detection;Shadow elimination;Improvec ViBe algorithm;Chromaticity feature;Texture feature

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