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低信噪比下融合随机共振的运动目标检测算法

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摘要：

　　为提高智能视频监控系统中运动目标检测算法在低信噪比条件下的鲁棒性，结合混合高斯背景建模算法和随机共振原理实现一种低信噪比下的运动目标检测算法。算法根据混合高斯背景模型对当前帧生成目标概率灰度图，在本文定义的性能评价函数下，通过向该概率灰度图添加噪声使得评价函数取最优化从而达到随机共振，对该随机共振灰度图进行阈值分割得到输出的检测目标。针对昏暗、大雾和红外视频分别进行了实验，证实了本文算法的有效性同时也显示本文算法相对于普通背景差算法性能获得了明显提升。

关键词：　目标检测　混合高斯　目标概率灰度图　随机共振

An algorithm improving objects detection for low-quality video using stochastic resonance

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Abstract:

　Video object extraction is a key technology in intelligence surveillance. An object detection algorithm for low-quality video based on Gaussian Mix Model and stochastic resonance was proposed. Firstly, the algorithm generated the object probability gray image from the current frame with the Gaussian Mix Model by the mapping function defined. Then, stochastic resonance was applied to the object probability gray image by adding noise until the defined evaluation function achieved the minimum value. After stochastic resonance, an effectively enhanced object probability gray image could be obtained. Hence the binary image including the interested objects is retrieved by segmentation of the enhanced object probability gray image. The experimental results show that the proposed algorithm combining the Gaussian Mix Model and the stochastic resonance achieved satisfactory subjective and objective performance under the worse environment with dark, foggy and infrared imaging while the classic background subtraction method almost could not detect the interested objects.

Key words: object detection　Gaussian mixture model　object probability gray image　stochastic resonance

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