A Hierarchical approach for rain removing in single color image

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ABSTRACT

Effects of the rain are complex. The Rain removal is a much useful method in applications such as security and surveillance, video editing, vision based navigation, and video indexing or retrieval. Rain generates sharp intensity variation in images and videos, which put down the performance of outdoor vision systems. These intensity variations depend on different parameters, such as the camera properties, the parameter of rain, and the bright and sharp of the scene. Removal of rain stripes in video is a hard task due to the random spatial distribution and fast motion of rain. Photo-metric, chromatic, and probabilistic characteristics of the rain have been exploited to detect the rainy effect to remove it. system is introduce the Rain Pixel Algorithm with better performance for rainy scenes with large motion than exiting algorithm.

Keyword: *Gaussian Noise, Gaussian Filter, Motion segmentation, Rain Detection, Rain removal, Quality improvement*.

Introduction:

We propose an efficient algorithm to remove rain from a single color image. Our algorithm takes advantage of two popular methods employed in image processing, namely, image decomposition and dictionary learning. At first, a combination of rain/snow detection and a guided filter is used to decompose the input image into a complementary pair: (1) the low-frequency part that is free of rain or snow almost completely and (2) the high-frequency part that contains not only the rain/snow component but also some or even many details of the image. Then, we focus on the extraction of image's details from the high-frequency part. To this end, we design a 3-layer hierarchical scheme.

In the first layer, an over-complete dictionary is trained and three classifications are carried out to classify the high-frequency part into rain/snow and non rain/ snow components in which some common characteristics of rain/snow have been utilized. In the second layer, another combination of rain/snow detection and guided filtering is performed on the rain/snow component obtained in the first layer. In the third layer, the sensitivity of variance across color channels (SVCC) is computed to enhance the visual quality of rain/snow removed image.

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LITERATURE REVIEW:

Rain removal in single color image is complex task because no temporal information among successive images can be obtained. In this framework image decomposed into a low frequency part and high frequency part. By using dictionary learning and sparse coding image has been decomposed into rain component and non rain component. Visual quality also improved [2]. Spatial coherency and temporal coherency maps are combined to obtain the spatiotemporal map identifying salient regions. This method is used to segment salient objects in videos

[3]. For the background suppression based moving object detection Gaussian Mixture Model (GMM) is used. This method is targeted towards improving GMM .The task is relatively complex due to a number of prevalent challenges. The main challenge is that the background is not static but relatively static. The background can contain unnecessary motions such as waving tree branches, periodically moving objects such as rotating lyres and fans, and also background noise. Also, mentionable challenges are slow foreground, in-adequate background, etc. The moving object detection can be broadly classified into change detection-based approaches and modelling-based approaches [4].

CONCLUSIONS

This project has attempted to solve the rain removing problem from a single color image by utilizing the common characteristics of rain. We acquired the low and high frequency parts by implementing a rain/snow detection and applying a guided filter. For the high frequency part, a dictionary learning and three classifications of dictionary atoms are implemented to decompose it into non dynamic components and dy0namic (rain or snow) components, where some common characteristics of rain/snow de ned earlier in our work are utilized. Moreover, we have designed two additional layers of extracting image details from the high frequency part.

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