Abstract

In this dissertation, the problem of rain streaks removal from single images is addressed. Extensive research is done on the single image de-raining methods as well as the video de-raining methods. A brief summary of all the de-raining methods studied is provided along with the categorization of the single image de-raining methods for better understanding. A single image de-raining framework is also proposed which is not build on a deep convolutional neural network with the aim to propose a model which can be executed on all systems and with little time and computation. Multiple approaches were tested for rain streak detection, false positive negation and rain streak removal processes. The best approach was selected for the comparison of de-raining capabilities with state-of-the-art methods. The proposed method uses row mean in a small image frame, which is a subset of the original rainy image, to identify the pixels with intensity higher than the average intensity of the row pixels and marks them as the rain streak pixels. A transparency channel of the input rainy image is used to create a background mask aiming to improve the de-raining quality of the output images. The transparency channel defines the transparency or the opaqueness of the details in any image. The objects which are in focus, as well as the objects that are in the background, can be separated using the transparency channel. Lastly, an average pooling function is used to change the rain streak pixel value in a way that matches the neighbouring pixels or background details. Finally, it was found that the proposed model has some flaws since it produces blurry and smooth edges de-rained images, which is due to the fact that the rain streak pixels are replaced by the average value of the neighbouring pixels. Moreover, since a background mask is used to negate false positives, therefore, the de-rained image is distorted around the edges of the objects in focus.