Video Deraining and Desnowing

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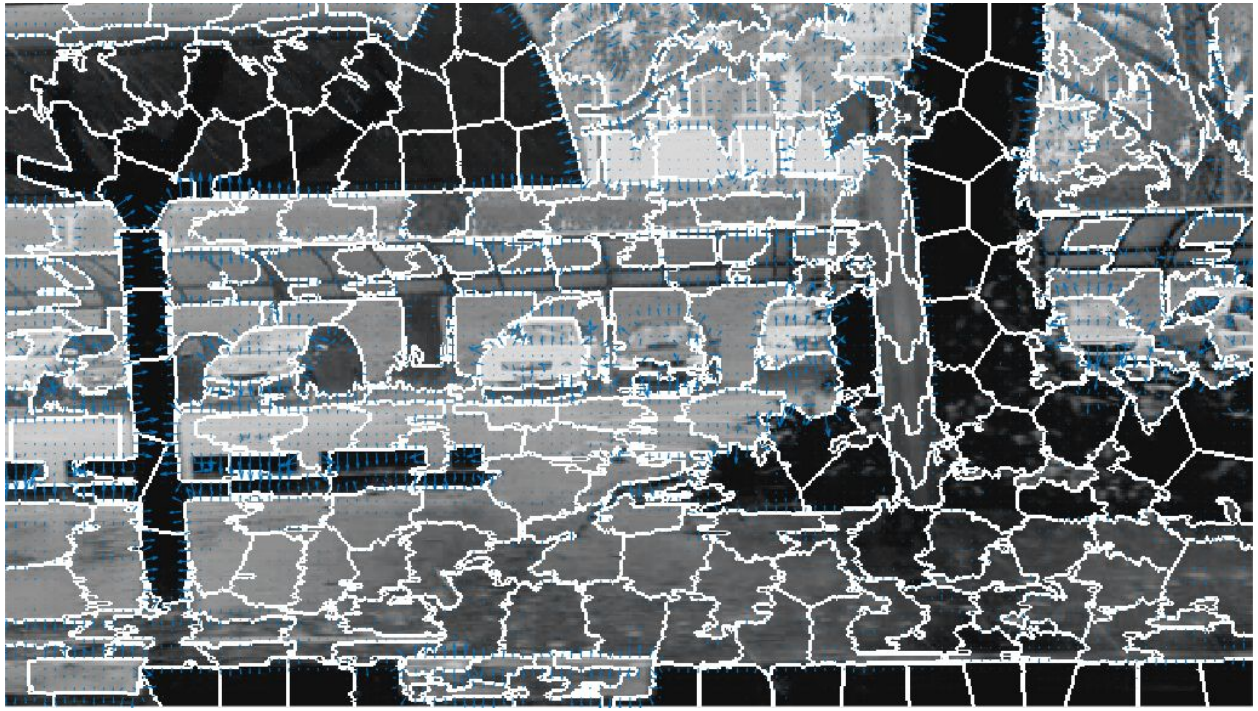
Objective

Video captured for surveillance or processing are difficult to work with, when rain streaks and haze are present in the scenes. Hence rain streak removal plays an important part before using any further video processing algorithm. In this report we have studied and implemented two papers and mentioned their limitations and proposed improvements in these methods.

Improvement Proposed

When fast moving objects are in frame, the super-pixels in consecutive frames do not match resulting in poor rain removal.

- Vary the buffer length dynamically based on the motion of objects.
- Motion estimation can be done using optical flow by Lucas-Kanade method and the buffer length can be kept variable
- Small buffer for fast moving objects and larger buffer for slow movements.



Results

Datasets	PSNR(static)	SSIM(static)	PSNR(Dynamic)	SSIM(Dynamic)
T1	0.2144	0.3240	0.2461	0.2703
T2	0.2813	0.3018	0.3151	0.2453
T3	0.2377	0.3603	0.2668	0.2979
T4	0.1814	0.5719	0.2108	0.5103
T5	0.1333	0.6691	0.1672	0.5840
T6	0.1169	0.6977	0.1357	0.6447

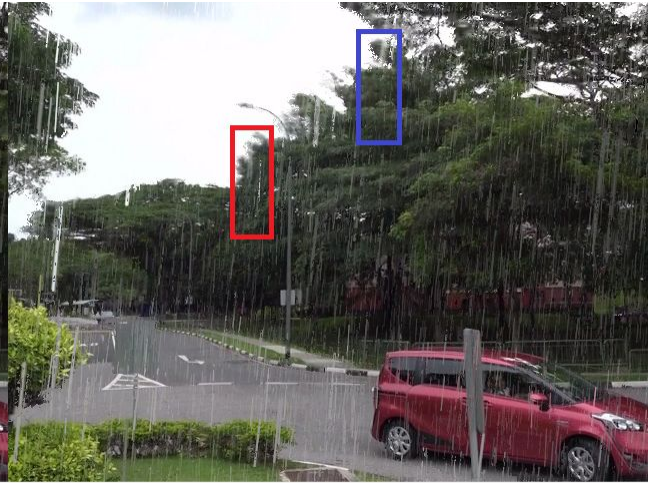
Input Image

SPACNN Result

Proposed Method

Input Image

SPACNN Result



Proposed Method

Conclusion

Hence, we can conclude that the buffer size can be dynamically varied to effectively remove rain occlusion as well as preserve details. We can further improve the speed of the model by estimating Optical Flow periodically and tune the threshold values to determine the buffer sizes and improve performance.

Thank you!