# Dictionary Based Filtering

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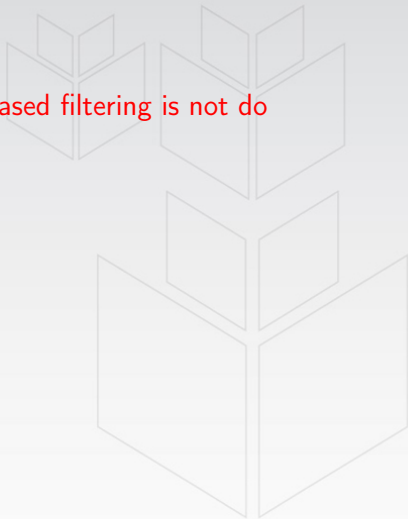
Group-8

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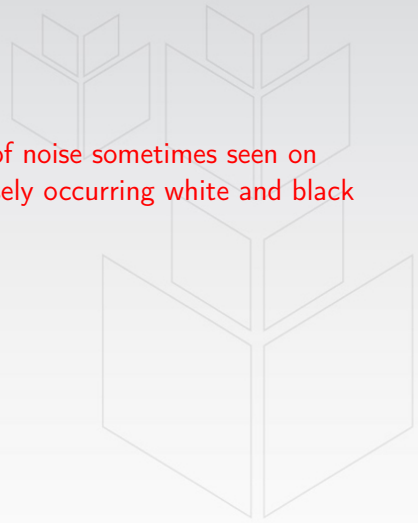1. Basically the idea of Dictionary based filtering is not do classical convolution every time.
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3. If no image is present in the dictionary below a threshold value, we will apply the the convolution and add that block to dictionary.

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4. Low pass filter is used to remove salt and paper noise.
5. High pass filter is used to sharpen the image and extract details from image.
6. We use OpenCV libraries and Python libraries to implement the low pass filter and to create blocks of image.

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2. An effective noise reduction method for this type of noise is a median filter.

$$\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & 128 & 24 & 172 & 26 & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix} \longrightarrow \begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & 24 & 31 & 31 & 26 & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$$

Original pixel value  Median value

Figure: Median Filter

First of all we have to take n x k training image.
Create m x m blocks.
Create dictionary using blocks.
Dictionary:
    **Key** - Noisy image
    **value** - filtered image
Search algorithm (Forbenius Norm)
**if** *Nearest Possible Match* **then**
| Noisy Patch Replaced with this Image
**else**
| Add to Dictionary
**end**
return **Final Filtered Image**

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(a) Original



(b) Low pass Filtered

There is trade-off between accuracy of result and time taken to create dictionary.

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Thank you

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