Summary of learning Dsp using python

1. summary

The formula of discrete-time Fourier transformation is shown below:
$X(exp(jw))=\sum_{n=-\infty}^{n=+\infty} x[n]*exp(-jwn)$
We can use Scipy and numpy to achieve this goal and utilize it by python.

2. Learning about Dsp

Dsp uses fft dtft and other transform methods to transform a time-domain data to frequency-domain data. From frequency-domain we can discover many things that could not be revealed in time-domain such as which frequency is the largest part of this signal and if there is some-kind of noise and which type of noise is this signal tend to be. By getting these data we can process signal more efficiently.

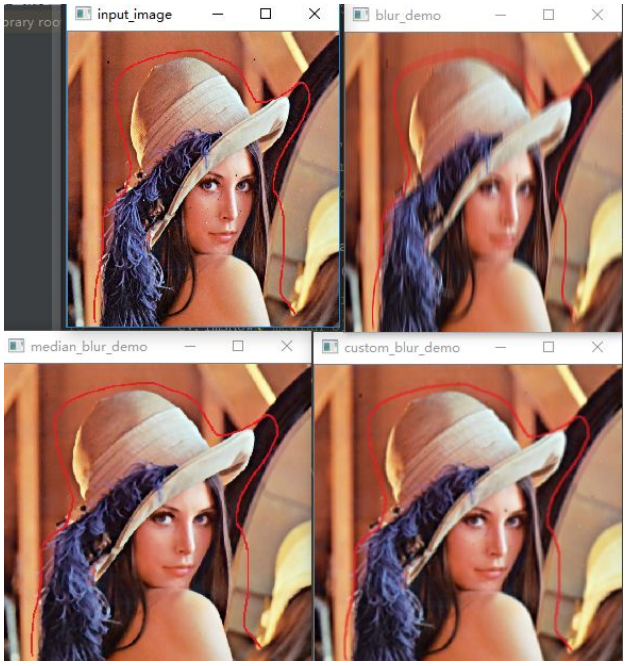
3. Applications

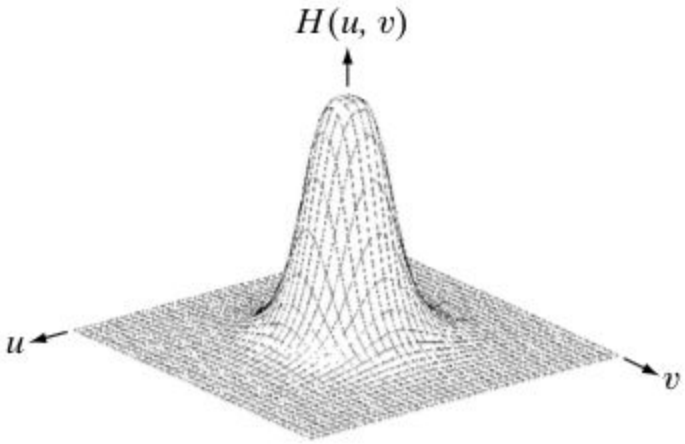
Dsp is used in many majors and it is mainly used to get frequency-domain plot and seperate things apart from a whole bunch of resources. For this mini project, I will display how dsp is used in image processing.

4. Method used

Average-blur, median-blur and custom blur. All of these three methods I used is to remove the sharp noise by blurring them with the pixel next to them and this method is a spatial-domain processing. We could also build a wave-filter that only allows low frequency wave to pass through. It has the same effect as blurring ,which filters high frequency noises.

5. Demos


input_image
blur_demo
median_blur_demo
custom_blur_demo


H(u, v)
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