

Gaussian Filter

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In [ ]: import numpy as np
import cv2
from matplotlib import pyplot as plt

In [ ]: def pad(img,shp,l):
    p=np.zeros((shp[0]+2*l,shp[1]+2*l))
    p[l:-l,l:-l]=np.copy(img)
    for j in range(l):
        p[l:-l,j]=p[l:-l,l]
        p[l:-l,-j-1]=p[l:-l,-l-1]

    for i in range(l):
        p[i]=p[l]
        p[-i-1]=p[-l-1]

    return p

In [ ]: def gauss(Z,var):
    N=int(Z/2)
    fil=np.zeros((Z,Z))
    for x in range(1,N+1):    #for non zero
        for y in range(x,N+1):
            ex=np.exp(-float(x*x+y*y)/(2*var))
            print(ex)
            fil[N-x,N-y]=ex
            fil[N+x,N-y]=ex
            fil[N-x,N+y]=ex
            fil[N+x,N+y]=ex
            if x!=y:
                fil[N-y,N-x]=ex
                fil[N+y,N-x]=ex
                fil[N-y,N+x]=ex
                fil[N+y,N+x]=ex
    for x in range(1,N+1):    #for zero elements
        ex=np.exp(-float(x*x)/(2*var))
        fil[N-x,N]=ex
        fil[N+x,N]=ex
        fil[N,N-x]=ex
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        fil[N,N+x]=ex
    fil[N,N]=1
    print(fil)
    c=float(1)/float(fil[Z-1,Z-1])
    print(c)
    fil=np.round(fil*c).astype(int)
    return fil

In [ ]: N=int(input("Enter size of Gaussian Filter (odd number only): "))
var=int(input("Enter the variance of Gaussian Filter: "))
fil=gauss(N,var)
print(fil)
coeff=np.sum(fil)
print(coeff)
img=cv2.imread('cat.jpeg',0)
shp=img.shape
shpm=(N,N)
mask=fil
p=pad(img,shp,shpm[1])

out=np.zeros((shp))

for i in range(shp[0]):
    for j in range(shp[1]):
        temp=np.multiply(p[i:i+shpm[0],j:j+shpm[1]],mask)
        temp2=temp.sum()
        out[i,j]=np.floor(temp2)

out=out/coeff

out=np.array(out, dtype = np.uint8)

cv2.imshow('image', img)
cv2.imshow('masked', out)
cv2.waitKey(0)
cv2.destroyAllWindows()

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In []: