atividade-2

November 10, 2017

1 Atividade 2 (0,5 ponto)

1.1 Descrição

- Analise diferentes filtros de imagem para uma imagem do seu problema.
- Aplique os filtros de média, mediana, gaussiano e bilateral, utilizando 3 tamanhos de janela.
- Para os filtros gaussiano e bilateral, teste diferentes variações nos parâmetros internos do filtro (no mínimo 3).
- Ao final, identifique que tipo de filtro foi melhor para o seu problema e justifique.

Para essa atividade, você pode usar as funções prontas da biblioteca do opencv. Mas fique a vontade para implementar da forma que quiser.

Encare essa atividade como uma etapa inicial de pré-processamento para o seu projeto da disciplina.

1.1.1 Importando e configurando ambiente

```
In [4]: import cv2
        import numpy as np

        import pylab as plt
        %matplotlib inline
```

1.1.2 Imagem Original

```
In [5]: image = cv2.imread('../../db_images/jpeg/captcha.jpeg')
        plt.title("BGR")
        plt.xticks([]), plt.yticks([])
        plt.imshow(image)

        plt.tight_layout()
```

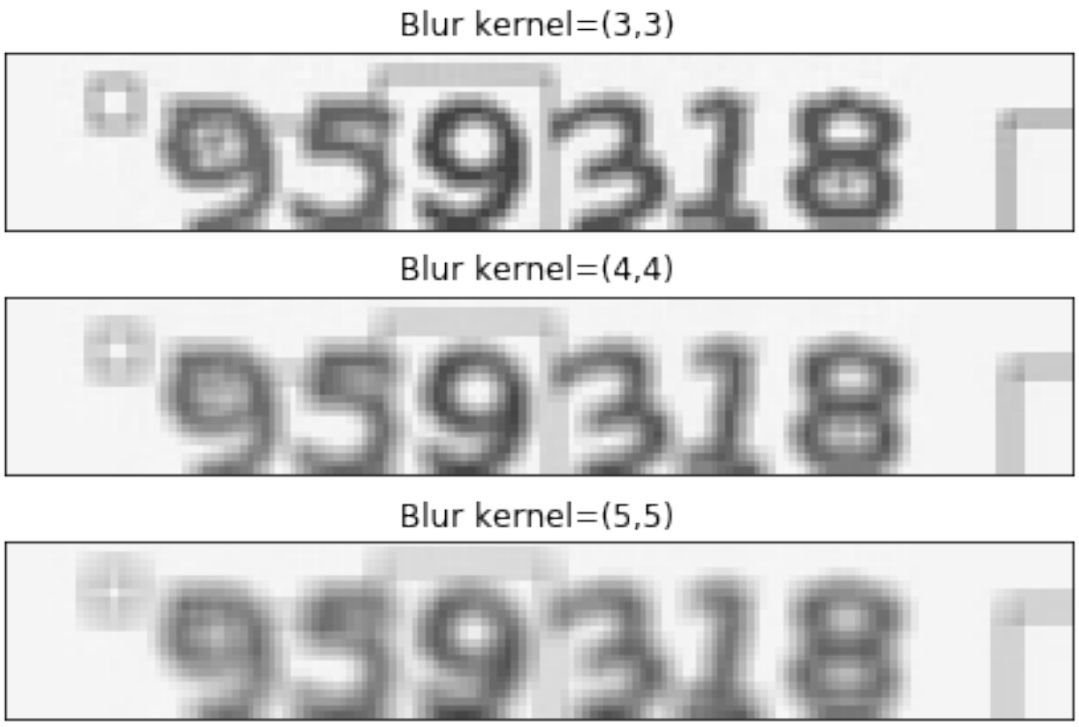
In [6]: d = {}

1.1.3 Usando filtro Blur

In [7]: d['blur'] = []

In [8]: plt.figure()

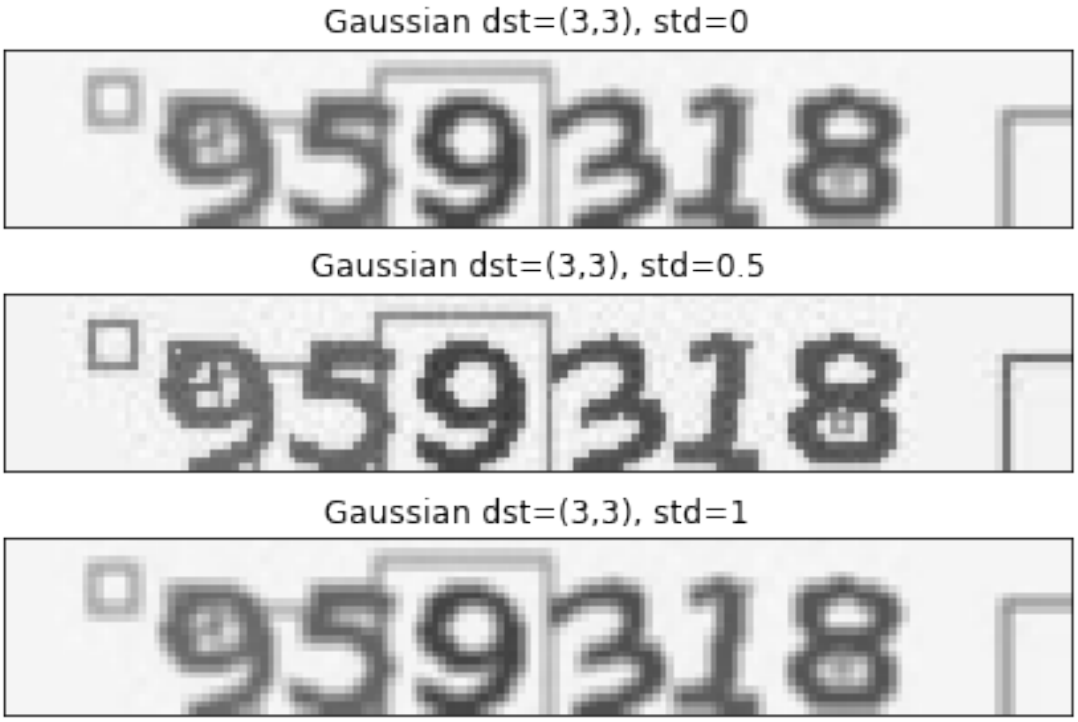
```
blur = cv2.blur(image, (3,3))
plt.subplot(311)
plt.title('Blur kernel=(3,3)')
plt.xticks([]), plt.yticks([])
plt.imshow(blur)
d['blur'].append(blur)

blur = cv2.blur(image, (4,4))
plt.subplot(312)
plt.title('Blur kernel=(4,4)')
plt.xticks([]), plt.yticks([])
plt.imshow(blur)
d['blur'].append(blur)

blur = cv2.blur(image, (5,5))
plt.subplot(313)
plt.title('Blur kernel=(5,5)')
plt.xticks([]), plt.yticks([])
plt.imshow(blur)
d['blur'].append(blur)

plt.tight_layout()
```



1.1.4 Usando filtro GassianBlur

```
In [9]: d['gaussian_blur'] = []

In [10]: plt.figure()

         gaussian = cv2.GaussianBlur(image,(3,3), 0)
         plt.subplot(311)
         plt.title('Gaussian dst=(3,3), std=0')
         plt.xticks([]), plt.yticks([])
         plt.imshow(gaussian)
         d['gaussian_blur'].append(gaussian)

         gaussian = cv2.GaussianBlur(image,(3,3), 0.5)
         plt.subplot(312)
         plt.title('Gaussian dst=(3,3), std=0.5')
         plt.xticks([]), plt.yticks([])
         plt.imshow(gaussian)
         d['gaussian_blur'].append(gaussian)

         gaussian = cv2.GaussianBlur(image,(3,3), 1)
         plt.subplot(313)
         plt.title('Gaussian dst=(3,3), std=1')
```

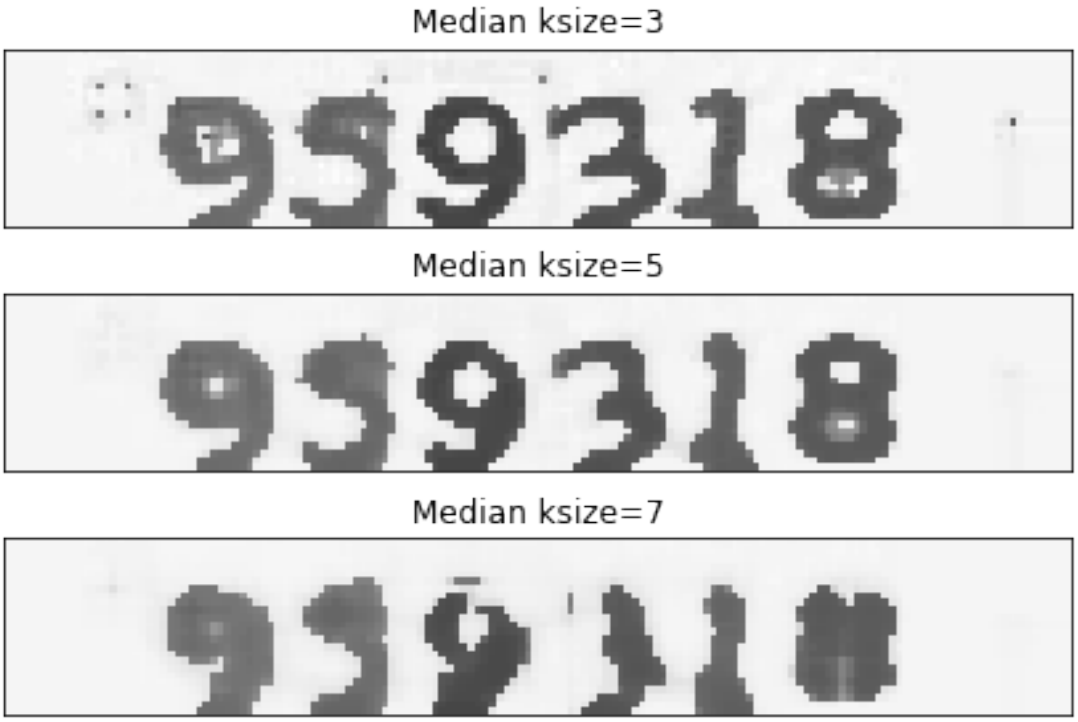
```
plt.xticks([]), plt.yticks([])
plt.imshow(gaussian)
d['gaussian_blur'].append(gaussian)

plt.tight_layout()
```



1.1.5 Usando filtro median

```
In [11]: d['media'] = []

In [12]: plt.figure()

         median = cv2.medianBlur(image, 3)
         plt.subplot(311)
         plt.title('Median ksize=3')
         plt.xticks([]), plt.yticks([])
         plt.imshow(median)
         d['media'].append(median)

         median = cv2.medianBlur(image, 5)
         plt.subplot(312)
         plt.title('Median ksize=5')
         plt.xticks([]), plt.yticks([])
```

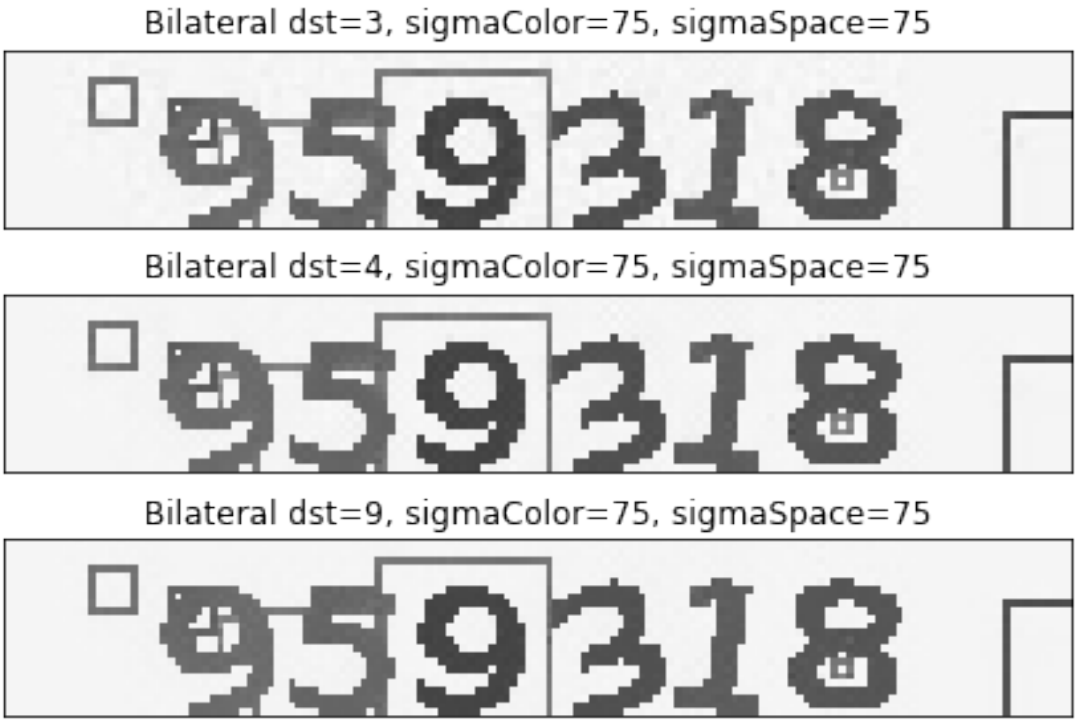
```
plt.imshow(median)
d['media'].append(median)

median = cv2.medianBlur(image, 7)
plt.subplot(313)
plt.title('Median ksize=7')
plt.xticks([]), plt.yticks([])
plt.imshow(median)
d['media'].append(median)

plt.tight_layout()
```



1.1.6 Usando filtro bilateral

```
In [13]: d['bilateral_filter'] = []

In [14]: plt.figure()

         bilateral = cv2.bilateralFilter(image, 3, 75, 75)
         plt.subplot(311)
         plt.title('Bilateral dst=3, sigmaColor=75, sigmaSpace=75')
         plt.xticks([]), plt.yticks([])
         plt.imshow(bilateral)
```

```
d['bilateral_filter'].append(bilateral)

bilateral = cv2.bilateralFilter(image, 4, 75, 75)
plt.subplot(312)
plt.title('Bilateral dst=4, sigmaColor=75, sigmaSpace=75')
plt.xticks([]), plt.yticks([])
plt.imshow(bilateral)
d['bilateral_filter'].append(bilateral)

bilateral = cv2.bilateralFilter(image, 9, 75, 75)
plt.subplot(313)
plt.title('Bilateral dst=9, sigmaColor=75, sigmaSpace=75')
plt.xticks([]), plt.yticks([])
plt.imshow(bilateral)
d['bilateral_filter'].append(bilateral)

plt.tight_layout()
```

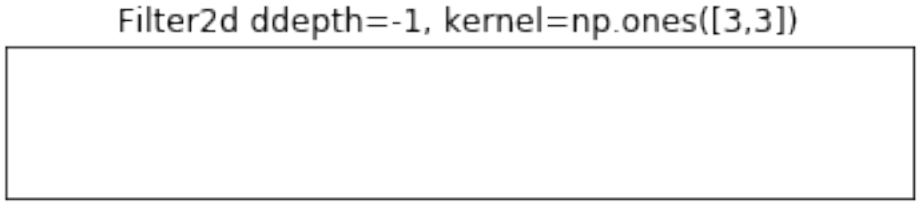


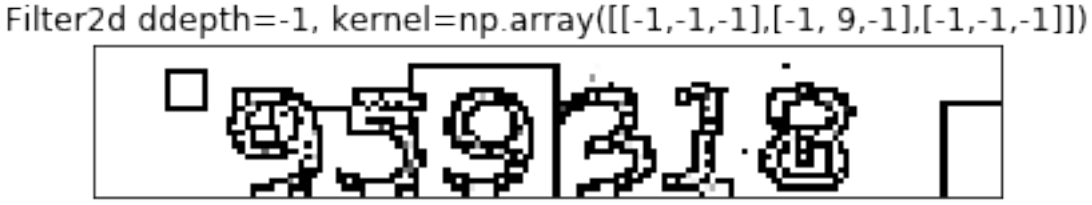
1.1.7 Usando filtro filter2d

In [15]: `d['filter2d'] = []`

In [16]: `plt.figure()`

```
kernel = np.ones([3,3])
filter2d = cv2.filter2D(image, -1, kernel)
plt.subplot(311)
plt.title('Filter2d ddepth=-1, kernel=np.ones([3,3])')
plt.xticks([]), plt.yticks([])
plt.imshow(filter2d)
d['filter2d'].append(filter2d)

kernel = np.array([[-1,-1,-1],[-1, 9,-1],[-1,-1,-1]])*10
filter2d = cv2.filter2D(image, -1, kernel)
plt.subplot(312)
plt.title('Filter2d ddepth=-1, kernel=np.array([[-1,-1,-1],[-1, 9,-1],[-1,-1,-1]])')
plt.xticks([]), plt.yticks([])
plt.imshow(filter2d)
d['filter2d'].append(filter2d)

kernel = np.array([[1,1,1],[1, -8,1],[1,1,1]])
filter2d = cv2.filter2D(image, -1, kernel)
plt.subplot(313)
plt.title('Filter2d ddepth=-1, kernel=np.array([[1,1,1],[1, -9,1],[1,1,1]])')
plt.xticks([]), plt.yticks([])
plt.imshow(filter2d)
d['filter2d'].append(filter2d)

plt.tight_layout()
```





In [17]:
```
img = cv2.bitwise_or(image, d['media'][1], d['filter2d'][2])
plt.xticks([]), plt.yticks([])
plt.imshow(img)

plt.tight_layout()
```

In [18]:
```
img = cv2.GaussianBlur(img,(3,3), 0)
plt.xticks([]), plt.yticks([])
plt.imshow(gaussian)

plt.tight_layout()
```

In [19]:
```
median = cv2.medianBlur(cv2.add(cv2.bitwise_not(img),cv2.bitwise_not(img)), 3)
plt.xticks([]), plt.yticks([])
plt.imshow(median)

plt.tight_layout()
```

In [20]:
```
gaussian = cv2.GaussianBlur(median,(5,5), 0.1)
plt.xticks([]), plt.yticks([])
plt.imshow(gaussian)

plt.tight_layout()
```

In [21]:
```
gaussian = cv2.GaussianBlur(gaussian,(5,5), 0.1)
plt.xticks([]), plt.yticks([])
plt.imshow(gaussian)

plt.tight_layout()
```

In [22]:
```
lower = np.array([50,50,50])
upper = np.array([205,255,255])

mask = cv2.inRange(gaussian, lower, upper)

plt.xticks([]), plt.yticks([])
plt.imshow(cv2.bitwise_not(mask))
plt.tight_layout()
```

In [23]:
```
img = cv2.bitwise_and(gaussian, gaussian, mask=cv2.bitwise_not(mask))
plt.xticks([]), plt.yticks([])
plt.imshow(img)

plt.tight_layout()
```

In [24]:
```
lower = np.array([200,200,200])
upper = np.array([255,255,255])

mask = cv2.inRange(img, lower, upper)

plt.xticks([]), plt.yticks([])
plt.imshow(mask)
plt.tight_layout()
```

In [25]:
```
img = cv2.bitwise_and(gaussian, gaussian, mask=mask)
plt.xticks([]), plt.yticks([])
plt.imshow(img)

plt.tight_layout()
```

O melhor filtro para o meu problema foi o `medianBlur`, pois já remove os ruídos da imagem de fundo e com isso filtro com uma máscara.