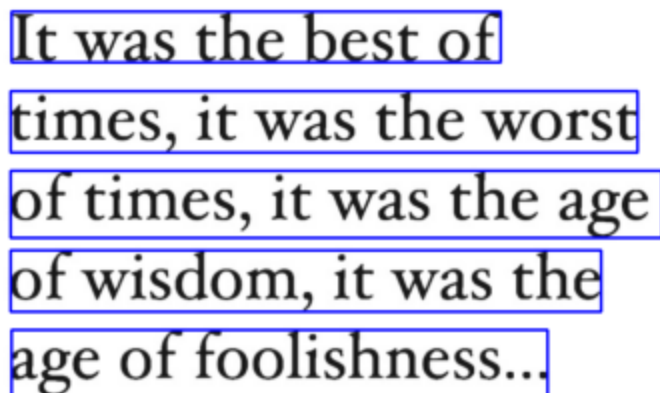


```
In [1]: import cv2 as cv
import numpy as np
import matplotlib.pyplot as plt
```

1.Using Closing

```
In [2]: img = cv.imread("txtimg.png")
img1 = cv.cvtColor(img,cv.COLOR_BGR2RGB)
#converting to grayscale
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
#applying gaussian blur
blur = cv.GaussianBlur(gray,(3,3),0)
#thresholding to convert into binary
thresholded = cv.adaptiveThreshold(blur,255,cv.ADAPTIVE_THRESH_GAUSSIAN_C,cv.THRESH_BINA
#dilate image to connect text contours
kernel = cv.getStructuringElement(cv.MORPH_RECT,(35,21))
dilated = cv.morphologyEx(thresholded,cv.MORPH_CLOSE,kernel)
#get external contours
contours = cv.findContours(dilated,cv.RETR_EXTERNAL,cv.CHAIN_APPROX_SIMPLE)
contours = contours[0] if len(contours)==2 else contours[1]
#draw contours
result = img1.copy()
for points in contours:
    pad = 10
    x,y,w,h = cv.boundingRect(points)
    cv.rectangle(result,(x,y),(x+w,y+h),(0,0,255),2)
plt.imshow(result)
plt.axis('off')
```

```
Out[2]: (-0.5, 699.5, 439.5, -0.5)
```



It was the best of
times, it was the worst
of times, it was the age
of wisdom, it was the
age of foolishness...

```
In [3]: img = cv.imread("txtimg1.png")
img1 = cv.cvtColor(img,cv.COLOR_BGR2RGB)
#converting to grayscale
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
#applying gaussian blur
blur = cv.GaussianBlur(gray,(3,3),0)
#thresholding to convert into binary
thresholded = cv.adaptiveThreshold(blur,255,cv.ADAPTIVE_THRESH_GAUSSIAN_C,cv.THRESH_BINA
#dilate image to connect text contours
kernel = cv.getStructuringElement(cv.MORPH_RECT,(6,5))
dilated = cv.morphologyEx(thresholded,cv.MORPH_CLOSE,kernel)
#get external contours
contours = cv.findContours(dilated,cv.RETR_EXTERNAL,cv.CHAIN_APPROX_SIMPLE)
contours = contours[0] if len(contours)==2 else contours[1]
#draw contours
```

```

result = img1.copy()
for points in contours:
    pad = 10
    x,y,w,h = cv.boundingRect(points)
    cv.rectangle(result, (x,y), (x+w,y+h), (0,0,255), 2)
plt.imshow(result)
plt.axis('off')

```

Out[3]: (-0.5, 297.5, 168.5, -0.5)

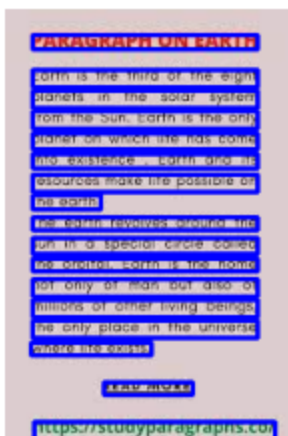


```

In [4]: img = cv.imread("txtimg2.png")
img1 = cv.cvtColor(img,cv.COLOR_BGR2RGB)
#converting to grayscale
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
#applying gaussian blur
blur = cv.GaussianBlur(gray, (3,3),0)
#thresholding to convert into binary
thresholded = cv.adaptiveThreshold(blur,255,cv.ADAPTIVE_THRESH_GAUSSIAN_C,cv.THRESH_BINA
#dilate image to connect text contours
kernel = cv.getStructuringElement(cv.MORPH_RECT, (15,2))
dilated = cv.morphologyEx(thresholded,cv.MORPH_CLOSE,kernel)
#get external contours
contours = cv.findContours(dilated,cv.RETR_EXTERNAL,cv.CHAIN_APPROX_SIMPLE)
contours = contours[0] if len(contours)==2 else contours[1]
#draw contours
result = img1.copy()
for points in contours:
    pad = 10
    x,y,w,h = cv.boundingRect(points)
    cv.rectangle(result, (x,y), (x+w,y+h), (0,0,255), 2)
plt.imshow(result)
plt.axis('off')

```

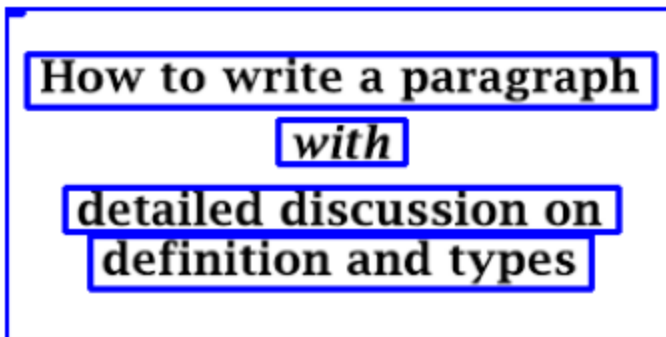
Out[4]: (-0.5, 182.5, 274.5, -0.5)



2. Using Dilation

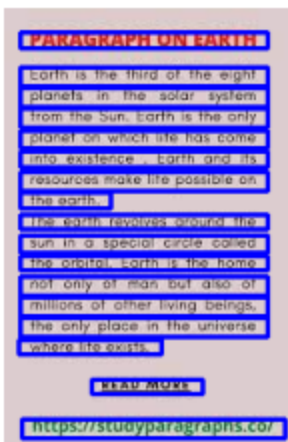
```
In [5]: img = cv.imread("txtimg3.jpeg")
img1 = cv.cvtColor(img,cv.COLOR_BGR2RGB)
#converting to grayscale
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
#applying gaussian blur
blur = cv.GaussianBlur(gray, (3,3),0)
#thresholding to convert into binary
thresholded = cv.adaptiveThreshold(blur,255,cv.ADAPTIVE_THRESH_GAUSSIAN_C,cv.THRESH_BINA
#dilate image to connect text contours
kernel = cv.getStructuringElement(cv.MORPH_RECT, (15,5))
# dilated = cv.morphologyEx(thresholded,cv.MORPH_CLOSE,kernel)
dilated = cv.dilate(thresholded,kernel,iterations=1)
#get external contours
contours = cv.findContours(dilated,cv.RETR_EXTERNAL,cv.CHAIN_APPROX_SIMPLE)
contours = contours[0] if len(contours)==2 else contours[1]
#draw contours
result = img1.copy()
for points in contours:
    pad = 10
    x,y,w,h = cv.boundingRect(points)
    cv.rectangle(result, (x,y), (x+w,y+h), (0,0,255),2)
plt.imshow(result)
plt.axis('off')
```

Out[5]: (-0.5, 316.5, 158.5, -0.5)



```
In [6]: img = cv.imread("txtimg2.png")
img1 = cv.cvtColor(img,cv.COLOR_BGR2RGB)
#converting to grayscale
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
#applying gaussian blur
blur = cv.GaussianBlur(gray, (3,3),0)
#thresholding to convert into binary
thresholded = cv.adaptiveThreshold(blur,255,cv.ADAPTIVE_THRESH_GAUSSIAN_C,cv.THRESH_BINA
#dilate image to connect text contours
kernel = cv.getStructuringElement(cv.MORPH_RECT, (15,2))
# dilated = cv.morphologyEx(thresholded,cv.MORPH_CLOSE,kernel)
dilated = cv.dilate(thresholded,kernel,iterations=1)
#get external contours
contours = cv.findContours(dilated,cv.RETR_EXTERNAL,cv.CHAIN_APPROX_SIMPLE)
contours = contours[0] if len(contours)==2 else contours[1]
#draw contours
result = img1.copy()
for points in contours:
    pad = 10
    x,y,w,h = cv.boundingRect(points)
    cv.rectangle(result, (x,y), (x+w,y+h), (0,0,255),2)
plt.imshow(result)
plt.axis('off')
```

Out[6]: (-0.5, 182.5, 274.5, -0.5)



```
In [7]: img = cv.imread("txtimg.png")
img1 = cv.cvtColor(img,cv.COLOR_BGR2RGB)
#converting to grayscale
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
#applying gaussian blur
blur = cv.GaussianBlur(gray,(3,3),0)
#thresholding to convert into binary
thresholded = cv.adaptiveThreshold(blur,255,cv.ADAPTIVE_THRESH_GAUSSIAN_C,cv.THRESH_BINA
#dilate image to connect text contours
kernel = cv.getStructuringElement(cv.MORPH_RECT,(35,10))
# dilated = cv.morphologyEx(thresholded,cv.MORPH_CLOSE,kernel)
dilated = cv.dilate(thresholded,kernel)
#get external contours
contours = cv.findContours(dilated,cv.RETR_EXTERNAL,cv.CHAIN_APPROX_SIMPLE)
contours = contours[0] if len(contours)==2 else contours[1]
#draw contours
result = img1.copy()
for points in contours:
    pad = 10
    x,y,w,h = cv.boundingRect(points)
    cv.rectangle(result,(x,y),(x+w,y+h),(0,0,255),2)
plt.imshow(result)
plt.axis('off')
```

Out[7]: (-0.5, 699.5, 439.5, -0.5)

It was the best of
times, it was the worst
of times, it was the age
of wisdom, it was the
age of foolishness...

```
In [8]: img = cv.imread("txtimg1.png")
img1 = cv.cvtColor(img,cv.COLOR_BGR2RGB)
#converting to grayscale
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
#applying gaussian blur
blur = cv.GaussianBlur(gray,(3,3),0)
#thresholding to convert into binary
thresholded = cv.adaptiveThreshold(blur,255,cv.ADAPTIVE_THRESH_GAUSSIAN_C,cv.THRESH_BINA
```

```

#dilate image to connect text contours
kernel = cv.getStructuringElement(cv.MORPH_RECT, (5,5))
# dilated = cv.morphologyEx(thresholded,cv.MORPH_CLOSE,kernel)
dilated = cv.dilate(thresholded,kernel)
#get external contours
contours = cv.findContours(dilated,cv.RETR_EXTERNAL,cv.CHAIN_APPROX_SIMPLE)
contours = contours[0] if len(contours)==2 else contours[1]
#draw contours
result = img1.copy()
for points in contours:
    pad = 10
    x,y,w,h = cv.boundingRect(points)
    cv.rectangle(result, (x,y), (x+w,y+h), (0,0,255), 2)
plt.imshow(result)
plt.axis('off')

```

Out[8]: (-0.5, 297.5, 168.5, -0.5)

