تمرین بینایی ماشین

✅تمرین اول

در پایتون و یا متلب برنامه ایی را بنویسید که کرنر را پیدا کند؟

```
Python 3.11 (64-bit)
Python 3.11.0 (main, Oct 24 2022, 18:26:48) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import cv2
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ModuleNotFoundError: No module named 'cv2'
>>> import numpy as np
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ModuleNotFoundError: No module named 'numpy'
>>>
>>> img = cv2.imread('image.jpg')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
>>> gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> dst = cv2.cornerHarris(gray, blockSize=2, ksize=3, k=0.04)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
>>> img[dst > 0.01 * dst.max()] = [0, 0, 255]
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'img' is not defined
>>> cv2.imshow('Image', img)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> cv2.waitKey(0)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> cv2.destroyAllWindows()
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
```

```python
import cv2
import numpy as np

# خواندن تصویر
img = cv2.imread('image.jpg')

# تبدیل تصویر به فضای رنگی خاکستری
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

# پیدا کردن کرنرهای تصویر با استفاده از الگوریتم Harris Corner Detector
dst = cv2.cornerHarris(gray, blockSize=2, ksize=3, k=0.04)

# نمایش تصویر با کرنرها
img[dst > 0.01 * dst.max()] = [0, 0, 255]
cv2.imshow('Image', img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

✅تمرین دوم

الگوریتم روش هریس را پیدا کرده و آنرا در ۳ تصویر دارای گوشه اجرا کنید

```
Python 3.11 (64-bit)
Python 3.11.0 (main, Oct 24 2022, 18:26:48) [MSC v.1933 64 bit (AMD64)] on win32
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>>> import cv2
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ModuleNotFoundError: No module named 'cv2'
>>> import numpy as np
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ModuleNotFoundError: No module named 'numpy'
>>> img1 = cv2.imread('image1.jpg')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> img2 = cv2.imread('image2.jpg')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> img3 = cv2.imread('image3.jpg')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
>>> gray1 = cv2.cvtColor(img1, cv2.COLOR_BGR2GRAY)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> gray2 = cv2.cvtColor(img2, cv2.COLOR_BGR2GRAY)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> gray3 = cv2.cvtColor(img3, cv2.COLOR_BGR2GRAY)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
>>> dst1 = cv2.cornerHarris(gray1, blockSize=2, ksize=3, k=0.04)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> dst2 = cv2.cornerHarris(gray2, blockSize=2, ksize=3, k=0.04)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> dst3 = cv2.cornerHarris(gray3, blockSize=2, ksize=3, k=0.04)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
>>> img1[dst1 > 0.01 * dst1.max()] = [0, 0, 255]
```

```
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
>>> dst1 = cv2.cornerHarris(gray1, blockSize=2, ksize=3, k=0.04)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> dst2 = cv2.cornerHarris(gray2, blockSize=2, ksize=3, k=0.04)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> dst3 = cv2.cornerHarris(gray3, blockSize=2, ksize=3, k=0.04)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
>>> img1[dst1 > 0.01 * dst1.max()] = [0, 0, 255]
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'img1' is not defined
>>> img2[dst2 > 0.01 * dst2.max()] = [0, 0, 255]
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'img2' is not defined
>>> img3[dst3 > 0.01 * dst3.max()] = [0, 0, 255]
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'img3' is not defined
>>>
>>> cv2.imshow('Image 1', img1)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> cv2.imshow('Image 2', img2)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> cv2.imshow('Image 3', img3)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> cv2.waitKey(0)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>> cv2.destroyAllWindows()
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'cv2' is not defined
>>>
```

```python
import cv2
import numpy as np

# خواندن تصاویر
img1 = cv2.imread('image1.jpg')
img2 = cv2.imread('image2.jpg')
img3 = cv2.imread('image3.jpg')

# تبدیل تصاویر به فضای رنگی خاکستری
gray1 = cv2.cvtColor(img1, cv2.COLOR_BGR2GRAY)
gray2 = cv2.cvtColor(img2, cv2.COLOR_BGR2GRAY)
gray3 = cv2.cvtColor(img3, cv2.COLOR_BGR2GRAY)

# Harris Corner Detector پیدا کردن کرنرهای تصاویر با استفاده از الگوریتم
dst1 = cv2.cornerHarris(gray1, blockSize=2, ksize=3, k=0.04)
dst2 = cv2.cornerHarris(gray2, blockSize=2, ksize=3, k=0.04)
dst3 = cv2.cornerHarris(gray3, blockSize=2, ksize=3, k=0.04)

# نمایش تصاویر با کرنرها
img1[dst1 > 0.01 * dst1.max()] = [0, 0, 255]
img2[dst2 > 0.01 * dst2.max()] = [0, 0, 255]
img3[dst3 > 0.01 * dst3.max()] = [0, 0, 255]

# نمایش تصاویر
cv2.imshow('Image 1', img1)
cv2.imshow('Image 2', img2)
cv2.imshow('Image 3', img3)
cv2.waitKey(0)
cv2.destroyAllWindows()
```