
Drawing

학습목표

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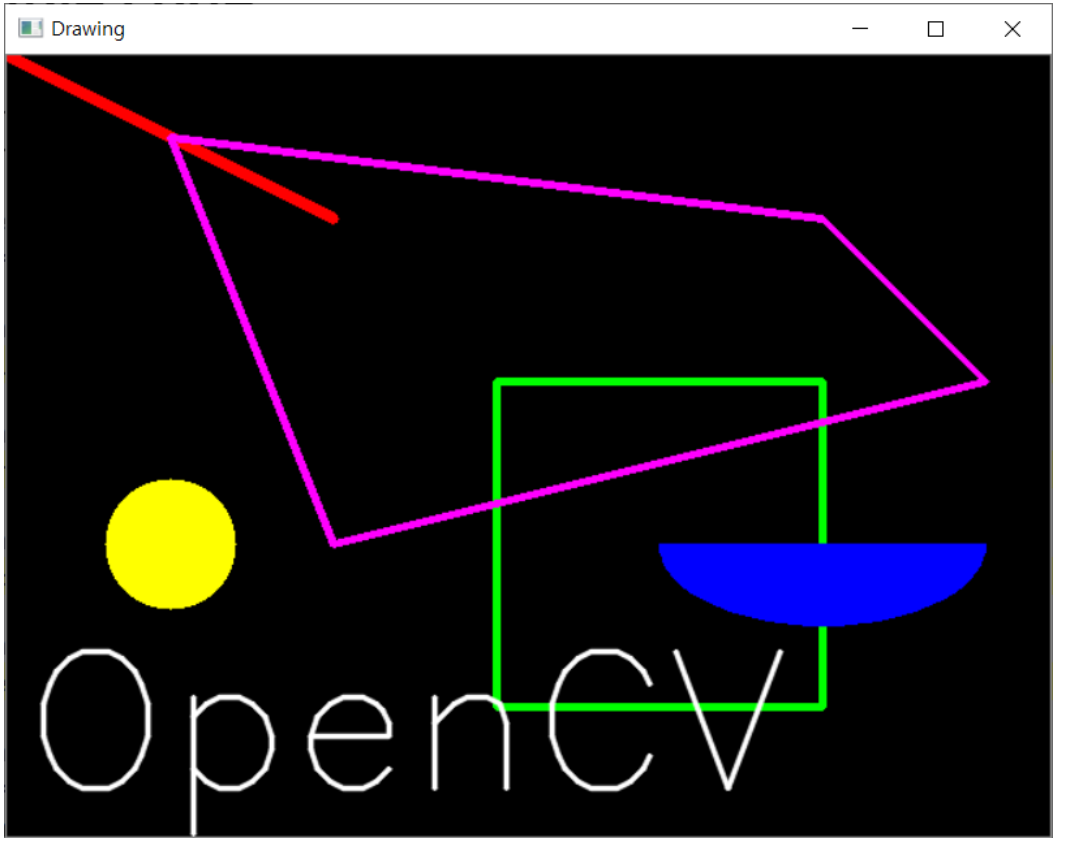
1. 이미지에 다양한 모양의 도형을 그리는 방법을 이해한다.
2. 이미지에 글자를 출력하는 방법을 이해한다.

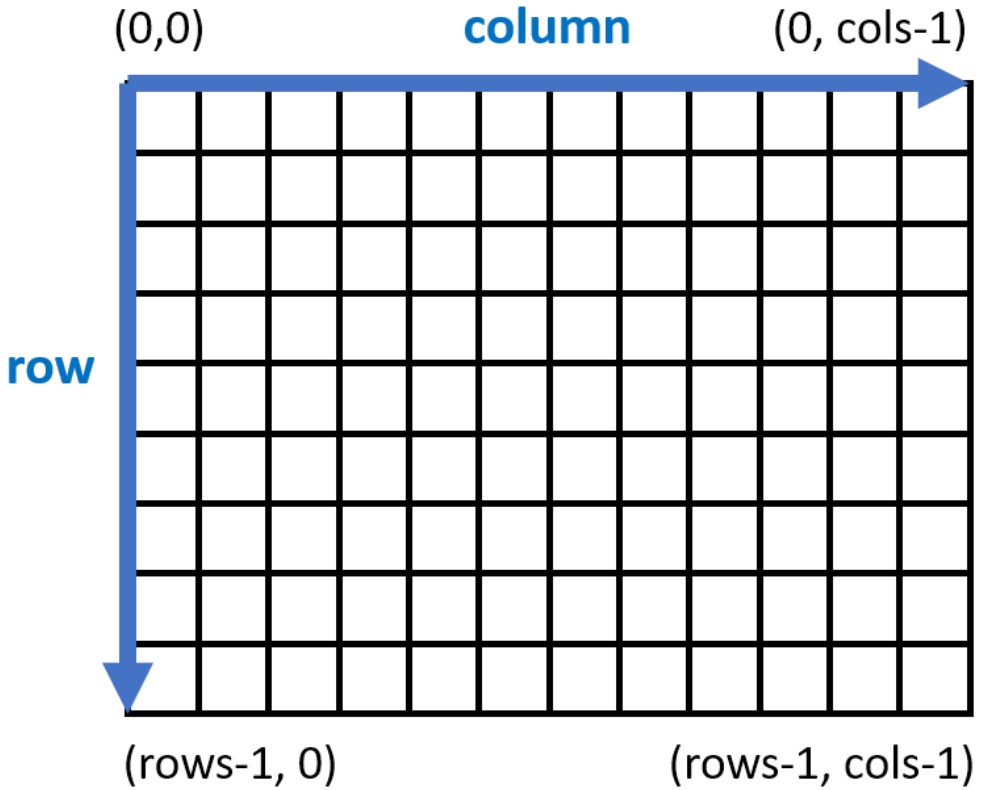
- 왜? 인식결과 등을 이미지 위에 표시하기 위해서!

학습목표



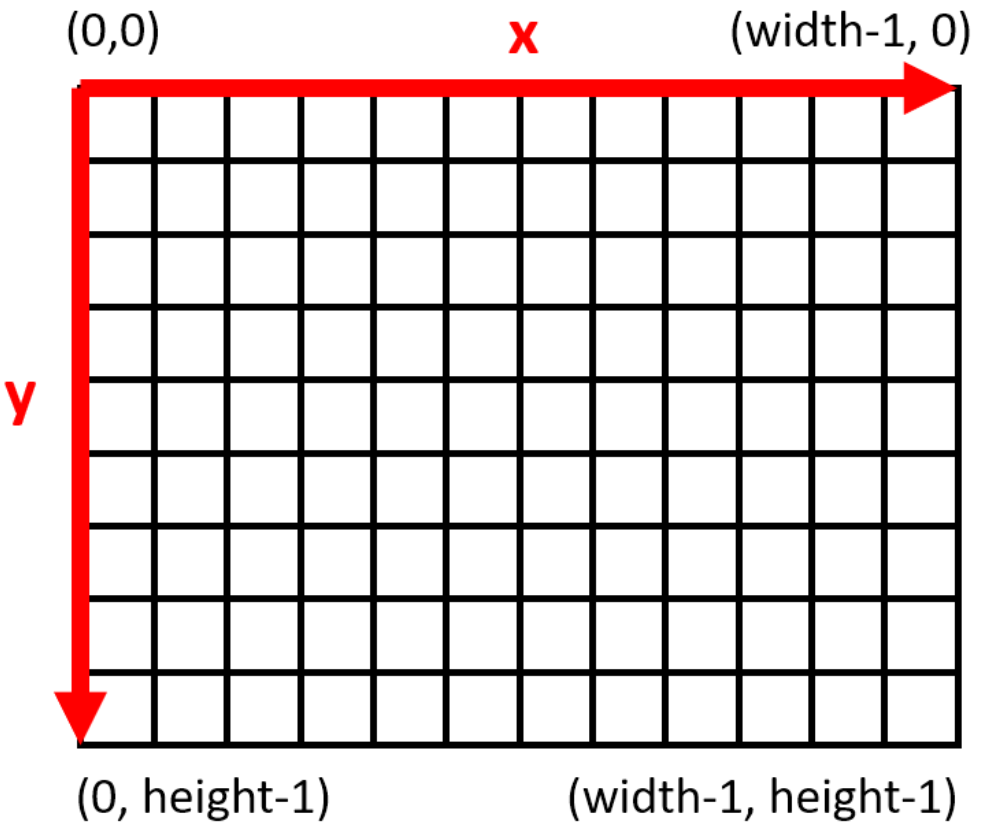
Drawing

Array Index



Pixel 값에 access할 때는 Array Index를 이용한다!

Image Coordinates



도형을 그릴때는 Image Coordinates를 이용한다! 왜?

`cv.line()`[1]

```
img = cv.line(img, pt1, pt2, color[, thickness[, lineType[,
shift]]])
```

- 두 점을 잇는 직선을 그린다.
  - `img`: image
  - `pt1`: first point of the line segment
  - `pt2`: second point of the line segment
  - `color`: line color
  - `thickness`: line thickness
  - `lineType`[2]: line type
  - `shift`: number of fractional bits in the point coords

1. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#ga7078a9fae8c7e7d13d24dac2520ae4a2
2. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#gaf076ef45de481ac96e0ab3dc2c29a777

`cv.rectangle()`[1]

```
img = cv.rectangle(img, pt1, pt2, color[, thickness[, lineType[, shift]]])
img = cv.rectangle(img, rec, color[, thickness[, lineType[, shift]]])
```

- 두 점을 대각선의 끝점으로 하는 사각형을 그린다.
  - `img`: image
  - `pt1`: first point of the line segment
  - `pt2`: second point of the line segment
  - `color`: line color
  - `thickness`: line thickness
  - `lineType`[2]: line type
  - `shift`: number of fractional bits in the point coords

1. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#ga07d2f74cadcf8e305e810ce8eed13bc9
2. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#gaf076ef45de481ac96e0ab3dc2c29a777

`cv.circle()`[1]

```
img = cv.circle(img, center, radius, color[, thickness[, lineType[, shift]]])
```

- 원을 그린다.
  - `img`: image
  - `center`: center of the circle
  - `radius`: radius of the circle
  - `color`: line color
  - `thickness`: line thickness
  - `lineType`[2]: line type
  - `shift`: number of fractional bits in the point coords

1. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#ga28b2267d35786f5f890ca167236cbc69
2. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#gaf076ef45de481ac96e0ab3dc2c29a777

`cv.ellipse()`[1]

```
img = cv.ellipse(img, center, axes, angle, startAngle, endAngle,
color[, thickness[, lineType[, shift]]])
img = cv.ellipse(img, box, color[, thickness[, lineType]])
```

- 타원을 그린다.
  - `img`: image
  - `center`: center of the ellipse
  - `axes`: half of the size of the main axes
  - `angle`: rotation angle in degrees
  - `startAngle`: starting angle of the slliptic arc in degrees
  - `endAngle`: ending angle of the slliptic arc in degrees
  - `color`: line color
  - `thickness`: line thickness
  - `lineType`[2]: line type
  - `shift`: number of fractional bits in the point coords

1. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#gaf10604b069374903dbd0f0488cb43670
2. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#gaf076ef45de481ac96e0ab3dc2c29a777

`cv.polylines()`[1]

```
img = cv.polylines(img, pts, isClosed, color[, thickness[,
lineType[, shift]]])
```

- 점들을 잇는 다각형을 그린다.
  - `img`: image
  - `pts`: array of points
  - `isClosed`: whether the polylines are closed or not
  - `color`: line color
  - `thickness`: line thickness
  - `lineType`[2]: line type
  - `shift`: number of fractional bits in the point coords

1. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#ga1ea127ffbbb7e0bfc4fd6fd2eb64263c
2. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#gaf076ef45de481ac96e0ab3dc2c29a777

`cv.putText()`[1]

```
img = cv.putText(img, text, org, fontFace, fontScale, color[,
thickness[, lineType[, bottomLeftOrigin]]])
```

- 글자를 그린다.
  - `img`: image
  - `text`: text string to be drawn
  - `org`: bottom-left corner of the text string in the image
  - `fontFace`[2]: Font type
  - `fontScale`: font scale factor that is multiplied by the font-specific base size
  - `color`: line color
  - `thickness`: line thickness
  - `lineType`[3]: line type
  - `bottomLeftOrigin`: when true, the image data origin is at the bottom-left corner. Otherwise, it is at the top-right corner

1. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#ga5126f47f883d730f633d74f07456c576
2. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#ga0f9314ea6e35f99bb23f29567fc16e11
3. https://docs.opencv.org/4.4.0/d6/d6e/group__imgproc__draw.html#gaf076ef45de481ac96e0ab3dc2c29a777

Drawing Example

```
import numpy as np
import cv2

# Create a color image (black)
img = np.zeros((480, 640, 3), np.uint8)

# Draw a line
cv2.line(img, (0, 0), (200, 100), (0, 0, 255), 5)

# Draw a rectangle
cv2.rectangle(img, (300, 200), (500, 400), (0, 255, 0), 3)

# Draw a circle
cv2.circle(img, (100, 300), 40, (0, 255, 255), -1)

# Draw an ellipse
cv2.ellipse(img, (500, 300), (100, 50), 0, 0, 180, 255, -1)

# Draw a polygon
pts = np.array([[100, 50], [200, 300], [600, 200], [500, 100]],
np.int32)
pts = pts.reshape((-1,1,2))
```

Push Code to GitHub

References

References

- OpenCV Python Tutorials
  - GUI Features in OpenCV
    - Drawing Functions in OpenCV