라즈베리파이 카메라 앱

- **rpicam-hello**: A "hello world"-equivalent for cameras, which starts a camera preview stream and displays it on the screen.
- **rpicam-jpeg**: Runs a preview window, then captures high-resolution still images.
- **rpicam-still**: Emulates many of the features of the original raspistill application.
- **rpicam-vid**: Captures video.
- **rpicam-raw**: Captures raw (unprocessed Bayer) frames directly from the sensor.
- **rpicam-detect**: Not built by default, but users can build it if they have TensorFlow Lite installed on their Raspberry Pi. Captures JPEG images when certain objects are detected.

https://www.raspberrypi.com/documentation/computers/camera_software.html#rpicam-apps

OpenCV 설치

- opencv 설치

```
sudo apt update
sudo apt install libopencv-dev
```

- opencv 버전 확인

```
pkg-config --modversion opencv#

#컴파일시 이용
pkg-config --cflags --libs opencv#
```

- 컴파일

```
g++  소스파일명 -o 실행파일명  $(pkg-config --cflags --libs opencv4)
```

OpenCV 설치

- 소스 설치

- https://qengineering.eu/install-opencv-on-raspberry-64-os.html
- https://github.com/raspberry-pi-maker/RaspberryPi-For-Makers/blob/master/tips/chap-07/BookWorm-opencv.md

- https://docs.opencv.org/4.#.0/에서 다음 API 함수와 class 의 매뉴얼을 찾아보고 영상을 출력하는 프로그램을 작성해봅시다

```
imread()
imshow()
putText()
rectangle()
namedWindow()
waitKey()

class Mat
```