

Prevention and detection of violence with CCTV

# **AI** Realtime Violence Detection with Raspberry-pi **outline**



Team : ProjectRVD  
( itwill bigdata 21 )

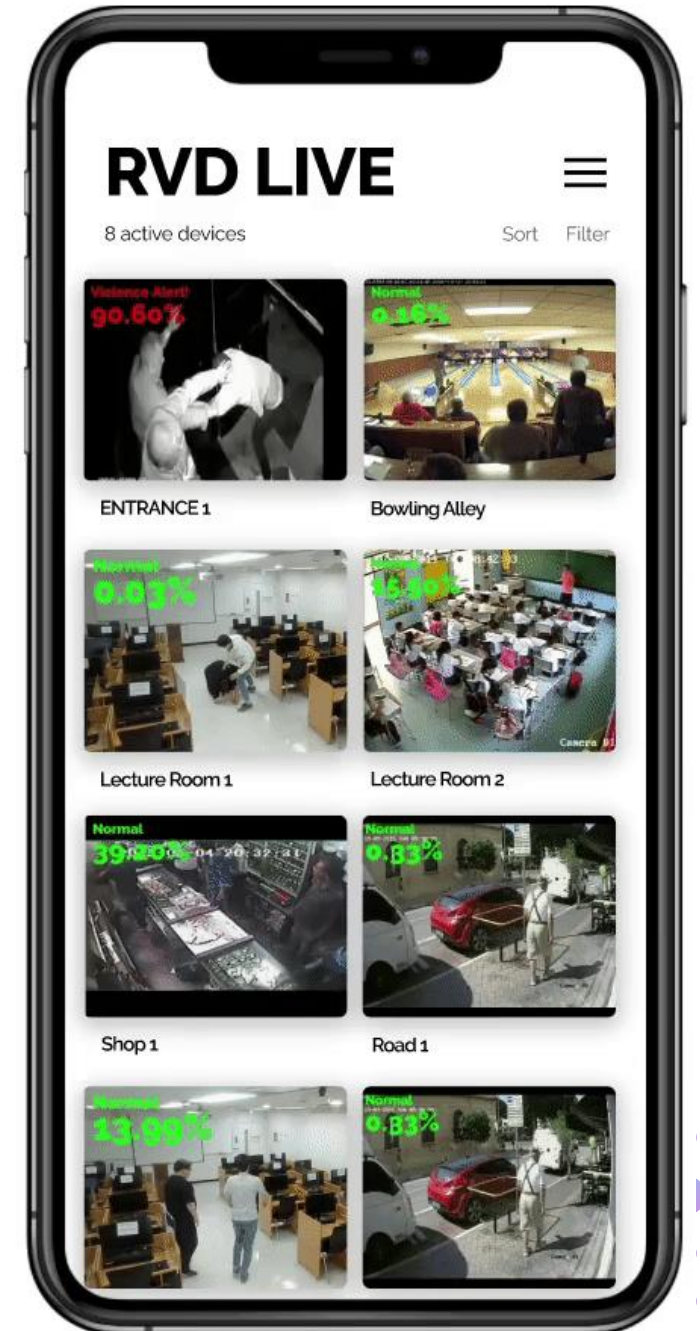
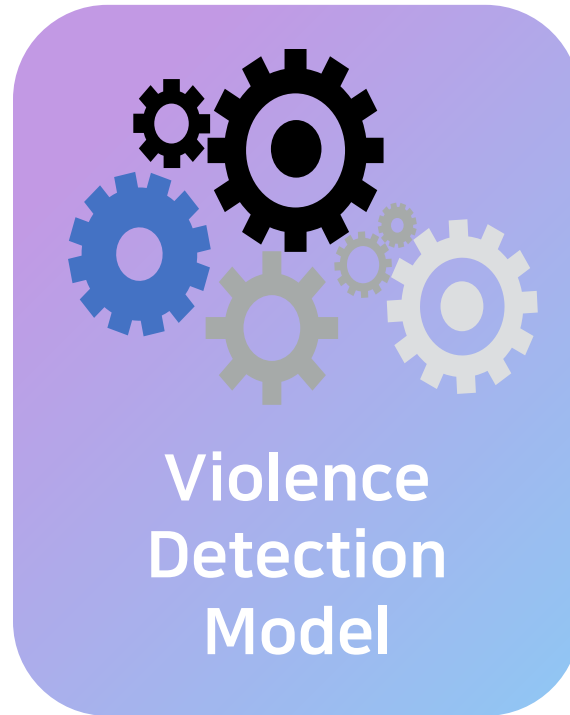
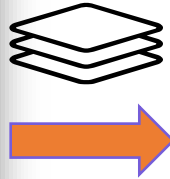
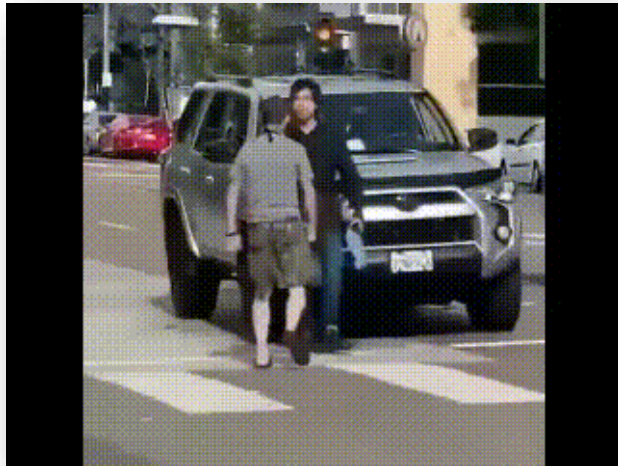
이수광, 채지민, 노혜원, 박정훈, 최영민





# Project Objectives

Real-time  
monitoring to  
detect violence





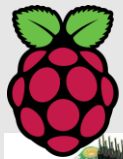
# Development Environment



Windows 10



Operating System



Camera Module



PyCharm

Language environment



TensorFlow



Keras

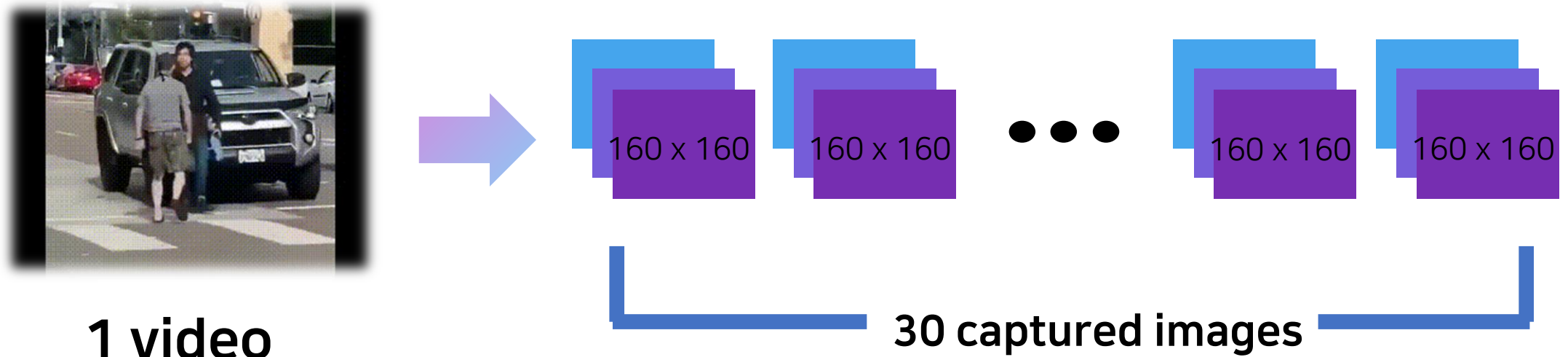
CV2, OS,  
imgzmq, numpy

Packages





## video ndarray extraction



- Resize all images to 160x160
- Convert to npy files on (30, 160, 160, 3) arrays per image and save



# Model Training- MobileNet + LSTM



# 모델 테스트

```
result=model.evaluate(X_test_resaped, y_test)
```

```
23/23 [=====] - 21s 893ms/step - loss: 0.1390 - accuracy: 0.8319
```

#모델 정확도, 손실을 출력

```
for name, value in zip(model.metrics_names, result):  
    print(name, value)
```

```
loss 0.13901832699775696
```

```
accuracy 0.831944465637207
```

- Accuracy : 0.8319
- Loss: 0.1390



## Model Functional Check Video → output video



If there's no violent scene,  
Show 'Normal'



If there's violent scene,  
Show 'Violence Alert!'

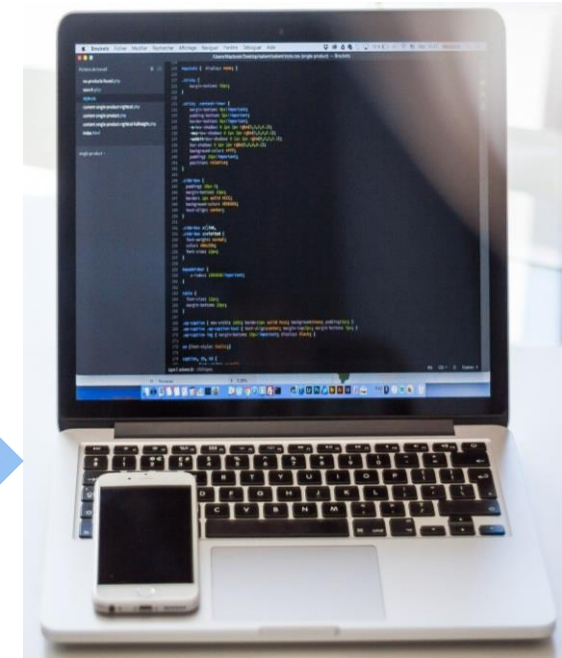
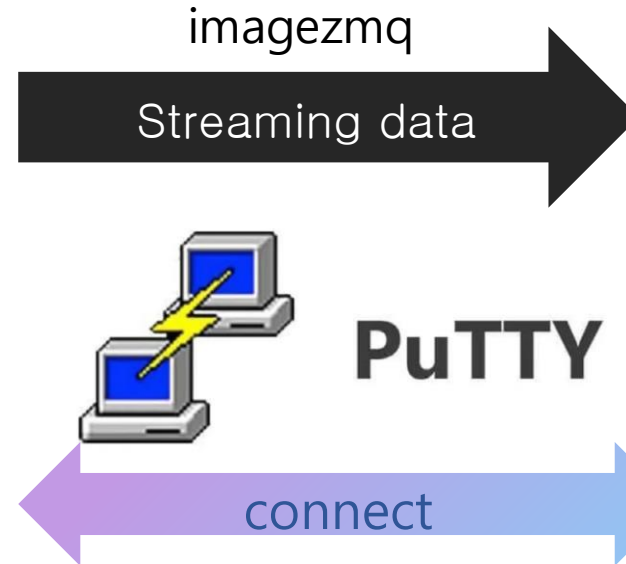




# Raspberry Pi camera to computer

```
pi@raspberrypi: ~  
GNU nano 3.2 client.py  
  
# run this program on each RPi to send a labelled image stream  
import socket  
import time  
from imutils.video import VideoStream  
import imagezmq  
  
sender = imagezmq.ImageSender(connect_to='tcp://10.10.7.96:5555')  
rpi_name = socket.gethostname() # send RPi hostname with each image  
print(rpi_name)  
picam = VideoStream(usePiCamera=True, resolution=(320,240)).start()  
time.sleep(2.0) # allow camera sensor to warm up  
while True: # send images as stream until Ctrl-C  
    image = picam.read()  
    sender.send_image(rpi_name, image)  
  
^C Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos  
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell ^_ Go To Line
```

**Raspberry Pi**



To connect the raspberry pie to the laptop,  
In an environment that shares the same network (WIFI, ip), you must use the PuTTY program to connect your device.





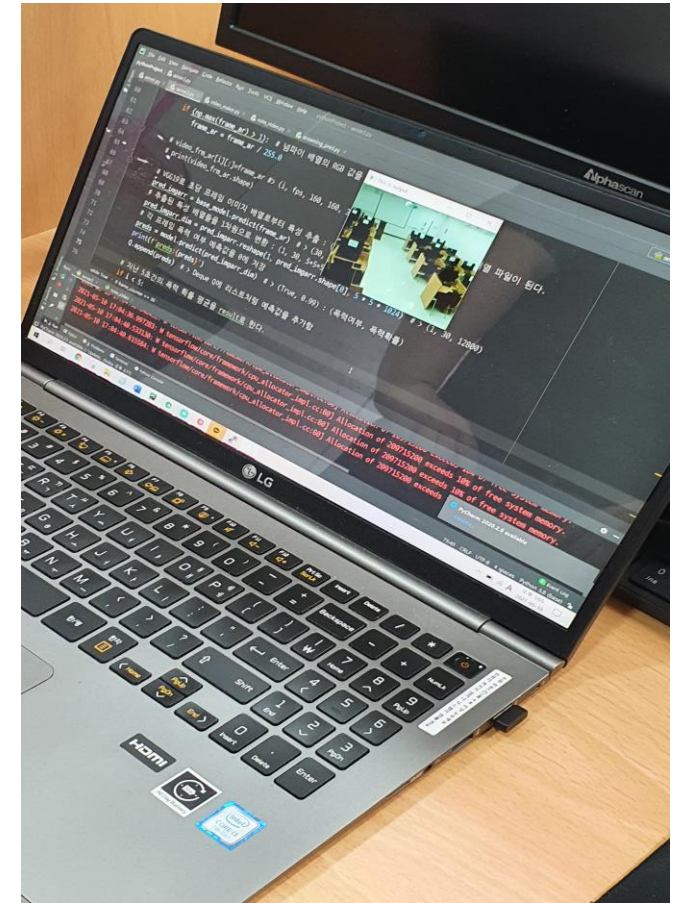
# CCTV setup situation



Improving angle and shaking



Typical CCTV location



Real-time transmission  
and classification



