CoDrone-daechul

Robot Programming

Team. CoDrone-beta
정은수, 유현상, 이하영, 조경찬

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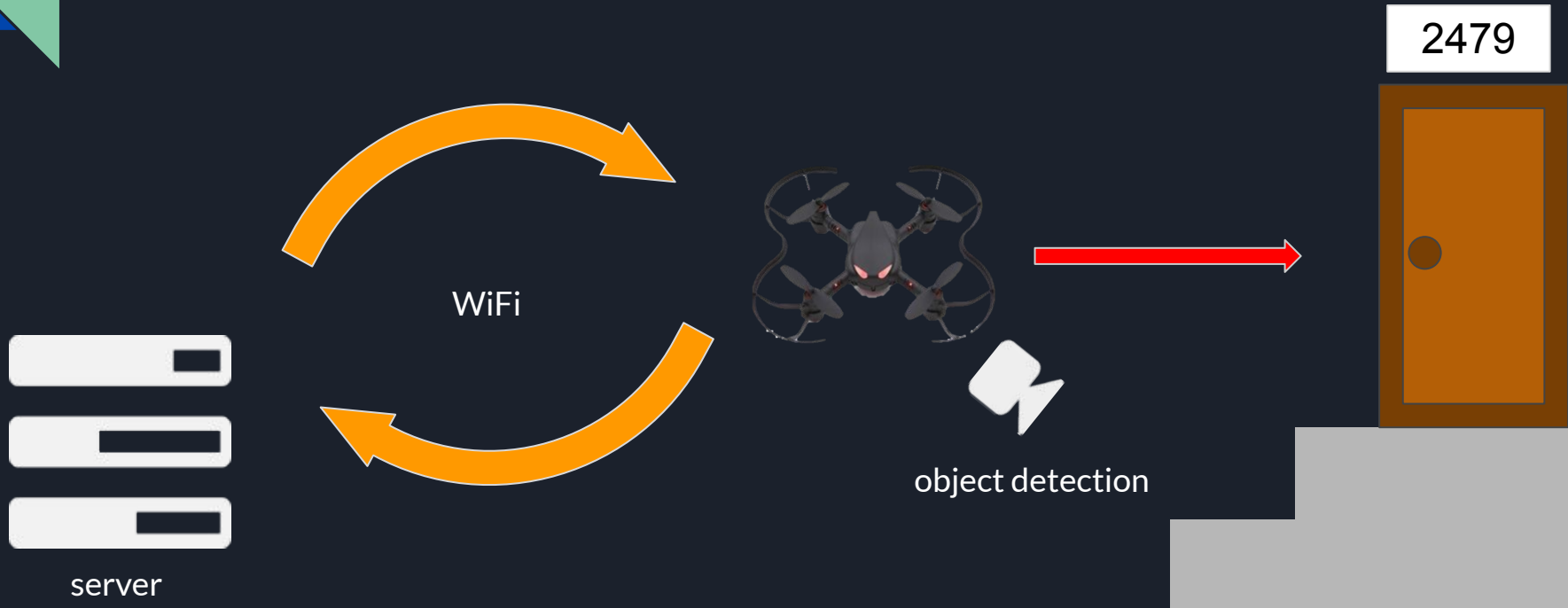
4. 결론

1. 초기 야망

a. 프로젝트 컨셉



b. 개발 계획

① 개발 환경 만들기

- 라즈베리파이0w에 OS 및 ROS 설치
- 라즈베리파이0w에 WiFi 연결
- 서버 컴퓨터에 ROS 설치

② 통신 및 소프트웨어

- 라즈베리파이0w와 서버 간 통신
- HW : e-drone API 사용하여 드론 원격 조종
- SW : object detection(yolov3)를 사용하여 계단, 문, 숫자 인식

2. 역할분담

정은수

드론 원격
조종

유현상

카메라 영상 통신

조경찬, 이하영

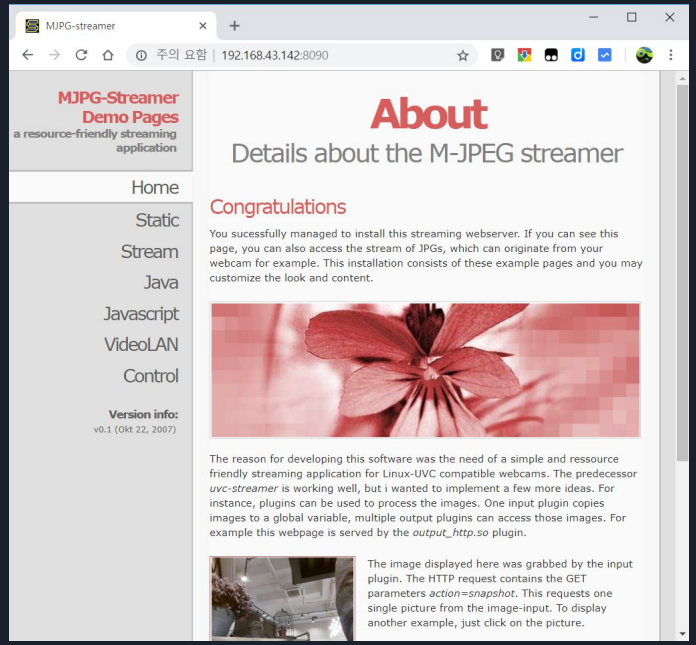
영상
처리

3. 삽질의 역사

a. 영상&통신 삽질

1. 라즈베리 파이 제로의 성능의 한계
2. pip & apt-get 사용 제한
3. ERICA-WiFi 보안

a. 영상&통신 삽질



mjpg-streamer

- 프로그램으로 쉽게 설치 가능
- 작은 용량
- 웹을 통해 포트로 스트리밍
- 라즈베리 파이 사용 최소화

b. HW 삽질

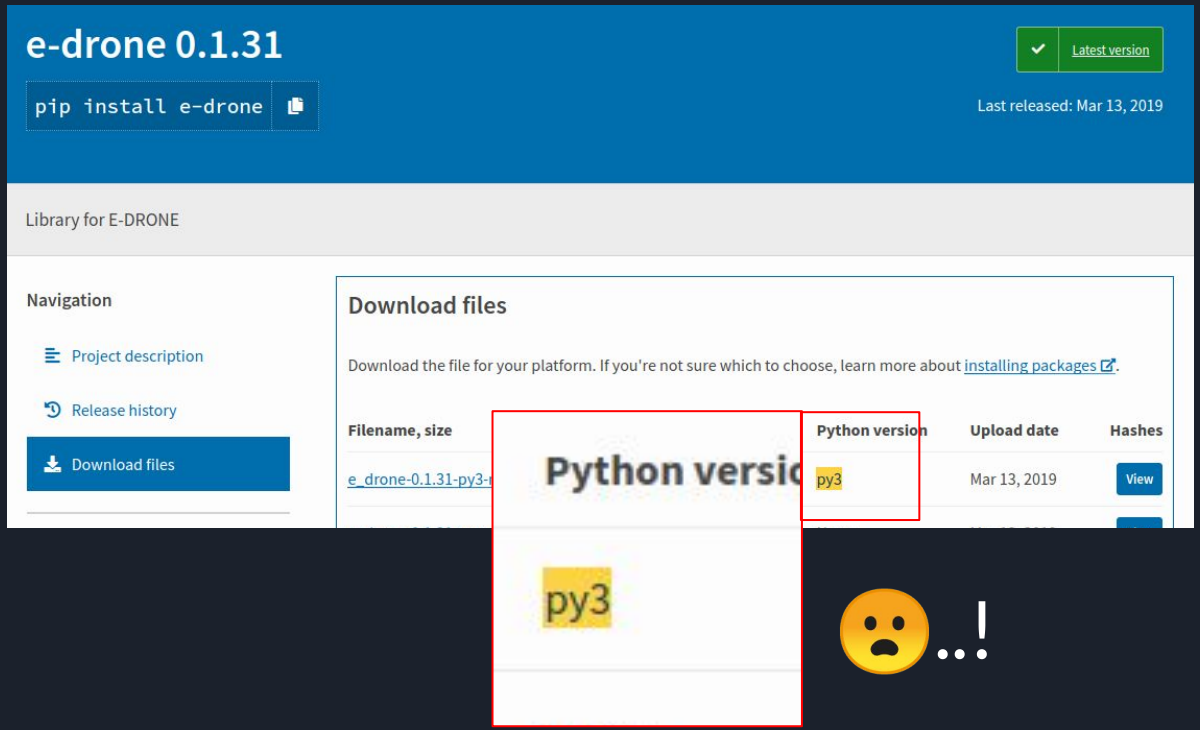
topic msg

serial

버전 문제
포트 문제
...

b. HW 삽질

RPi와 코드론 제어보드와의 serial통신



b. HW 삽질

RPi와 코드론 제어보드와의
serial통신

Instruction/Status Packet

1. **Instruction Packet 기본 구조**

Header			Reserved	Packet ID	Packet Length		Instruction	Parameter			16bit CRC	
0xFF	0xFF	0xFD	0x00	ID	LEN_L	LEN_H	Instruction	Parameter1	…	ParameterN	CRC_L	CRC_H

1) Instruction Packet은 Main Controller가 장치(Device)로 보내는 명령 데이터 입니다.

2) Header : Packet의 시작을 나타내는 필드

3) Reserved : 0x00 (0xFD 는 사용할 수 없음)

4) Packet ID : Instruction Packet을 받아 처리해야 할 장치의 ID를 나타내는 필드

① 범위 : 0 ~ 252 (0x00 ~ 0xFC) 까지 253 개 사용 가능

② Broadcast ID : 254 (0xFE), 연결된 모든 장치가 Instruction Packet 을 실행하도록 함.

③ 253(0xFD), 255(0xFF) : Header와 중복을 피하기 위해 사용하지 않음

5) Packet Length : Packet Length 이후의 길이(Instruction, Parameter, CRC 필드), 즉 Parameter 개수 + 3

6) Instruction : Packet의 용도를 정의하는 필드

Value	Instruction	Description
0x01	Ping	Packet ID와 동일한 ID를 갖은 장치에 Packet이 도달했는지 여부 확인을 위한 Instruction
0x02	Read	장치로부터 데이터를 읽어오기 위한 Instruction
0x03	Write	장치에 데이터를 쓰기 위한 Instruction
0x04	Reg Write	Instruction Packet을 대기 상태로 등록하는 Instruction, Action 명령에 의해 실행됨

어차피 팻킷 생성이면 python 2.7에서 안될게 없다. (당당)
코드를 싹다 고치는 4주간의 여정 시작!! (해맑)

b. HW 삽질

RPi와 코드론 제어보드와의
serial통신

~~serial통신~~으로 하면 문제없이 수정이 되겠지?

```
File "/home/pi/ros_catkin_ws/src/codrone_move/scripts/e_drone/receiver.py", line 40, in __init__
    self.header = Header()
TypeError: Can't instantiate abstract class Header with abstract methods ToArray
```

```
File "/home/pi/ros_catkin_ws/src/codrone_move/scripts/e_drone/storage.py", line 11, in __init__
    self.d = dict.fromkeys(list(DataType))
TypeError: 'type' object is not iterable
```

```
3  import random
4  import Queue
```

queue <-> Queue

b. HW 삽질

RPi와 코드론 제어보드와의 serial통신

serial통신으로 문제없이 수정이 되겠... 왜 안되지?..

핵심 해결 항목1:

```
elif hasattr(data, "__len__"):
    crc2 = crc
    for i in range(0, len(data)):
        index   = ((crc2 >> 8) ^ data[i]) & 0x00FF
        crc2    = ((crc2 << 8) ^ cls.table[index]) & 0xFFFF
return crc2
```

index = ((crc2 >> 8) ^ data[i]) & 0x00FF

TypeError: unsupported operand type(s) for ^: 'int' and 'str'

```
>>> a = '\x70'
>>> a
'p'
>>> ord(a)
112
>>>
```

```
elif hasattr(data, "__len__"):
    crc2 = crc
    for i in range(0, len(data)):
        #tydata = copy.deepcopy(repr(data[i]))
        #print tydata
        #print type(tydata)
        tydata1 = ord(data[i])
        # print tydata1
        index   = ((crc2 >> 8) ^ tydata1) & 0x00FF
        crc2    = ((crc2 << 8) ^ cls.table[index]) & 0xFFFF

return crc2
```

b. HW 삽질

RPi와 코드론 제어보드와의
serial통신

들어줬는데왜 움직이지를않는거야!

핵심 해결 항목2:

Serial.write문제

```
124                 if( self.isOpen() ):
125                     print "1"
126                     self._flagThreadRun = True
127                     print "2"
128                     self._thread = Thread(target=self._receiving, args=(), daemon=True)
129                     print "3"
130                     self._thread.start()
```

```
self._thread = Thread(target=self._receiving, args=())
self._thread.daemon = True
print "3"
self._thread.start()
```

b. HW 삽질

RPi와 코드론 제어보드와의 serial통신

serial통신이 되어야 만족할거야

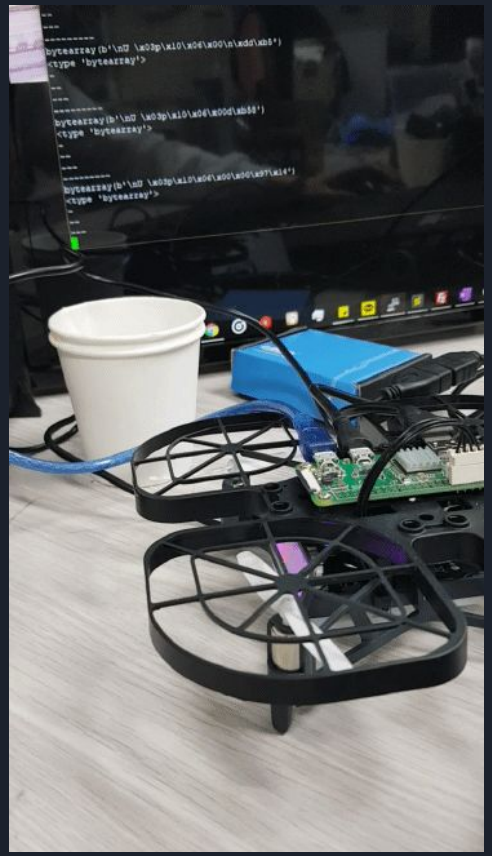
핵심 해결 항목2:

Serial.write문제

```
549             raise writeTimeoutError
550         abort, ready, _ = select.select([self.pipe_abort_write_r], [self.fd], [], timeout.time_left())
551         if abort:
552             os.read(self.pipe_abort_write_r, 1000)
```

라즈베리파이 블루투스 이슈

b. HW 삽질



e_drone for python 2.7 in github

b. HW 삽질

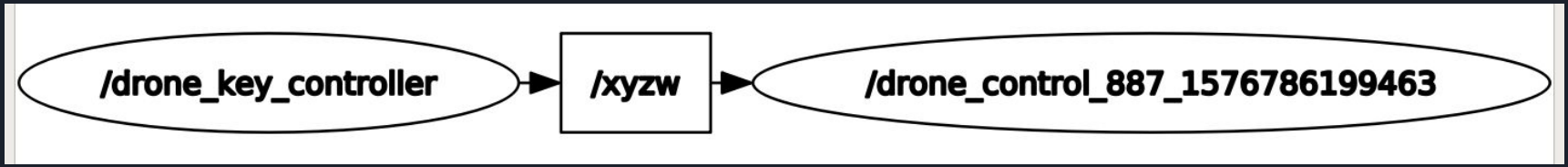
```
binch@binch-TUF-Gaming-FX505GE-FX505GE:~$ rostopic info /xyzw
Type: geometry_msgs/Pose

Publishers:
 * /drone_key_controller (http://192.168.34.4:42739/)

Subscribers:
 * /drone_control_1269_1576781638918 (http://192.168.34.2:36565/)

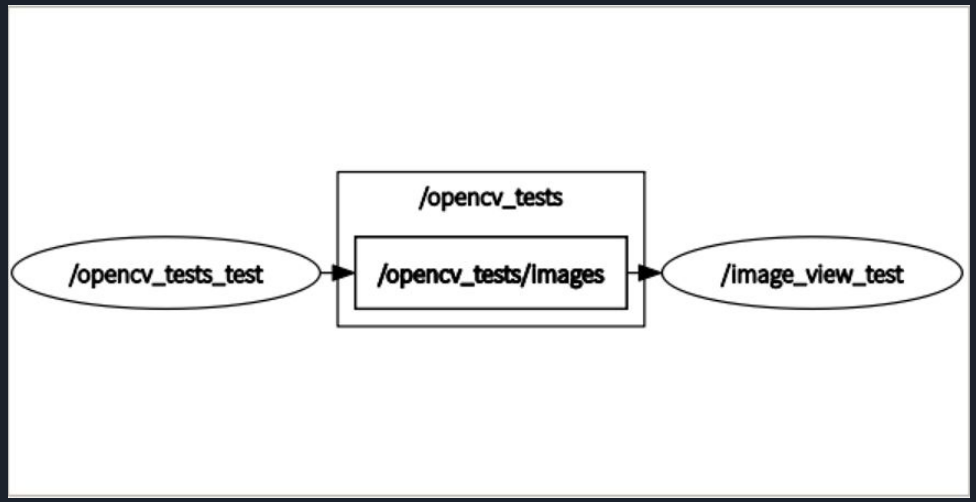

binch@binch-TUF-Gaming-FX505GE-FX505GE:~$ rostopic echo /xyzw
position:
  x: 0.0
  y: 0.0
  z: 0.0
orientation:
  x: 10.0
  y: 0.0
  z: 0.0
  w: 0.0
---
```

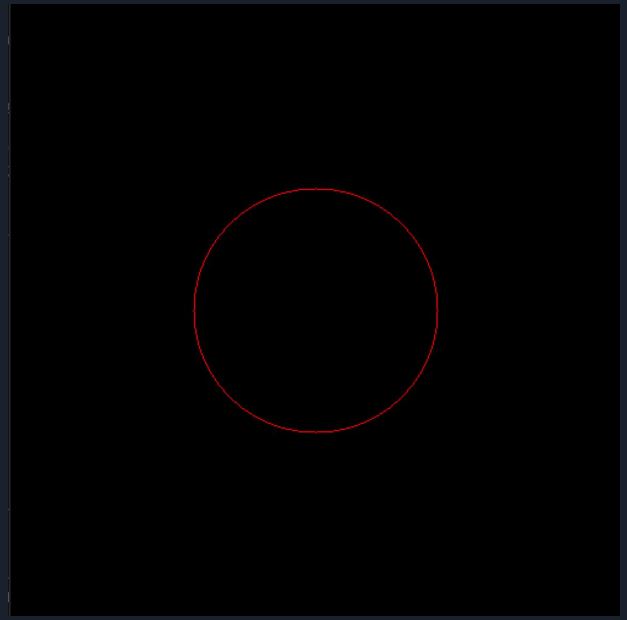
```
ang = 10
pose = Pose()
pose.orientation.x = x*ang
pose.orientation.y = y*ang
pose.orientation.z = z*ang
pose.orientation.w = w
pose.position.z = yaw * 90
pub.publish(pose)
```



c. SW 삽질

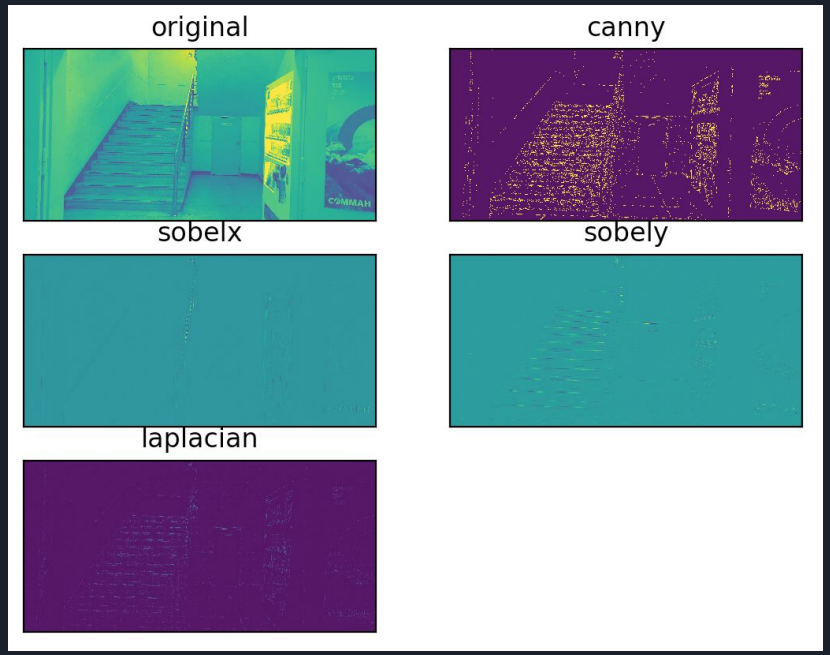
서막...

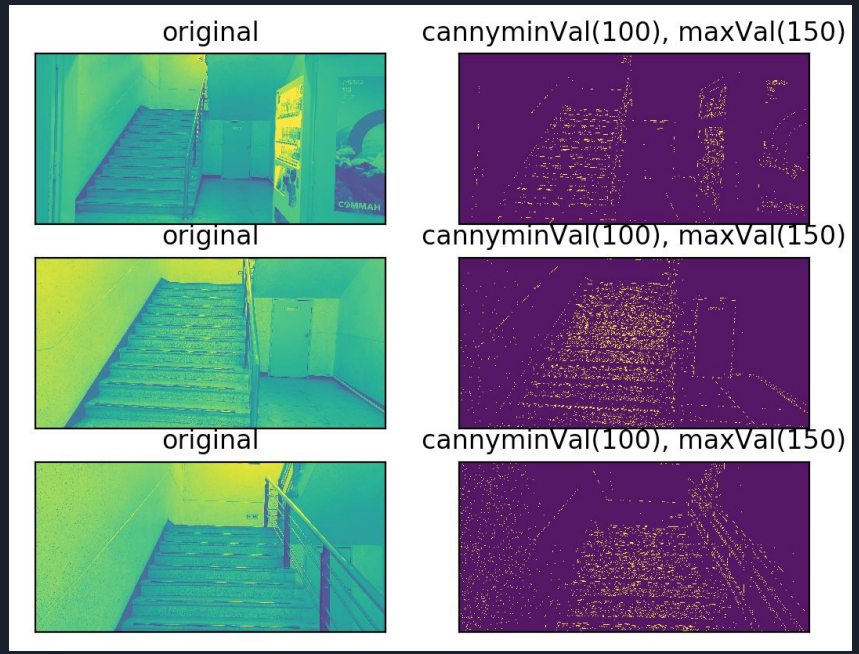

/opencv_tests
/opencv_tests_test
/opencv_tests/images
/image_view_test



c. SW 삽질

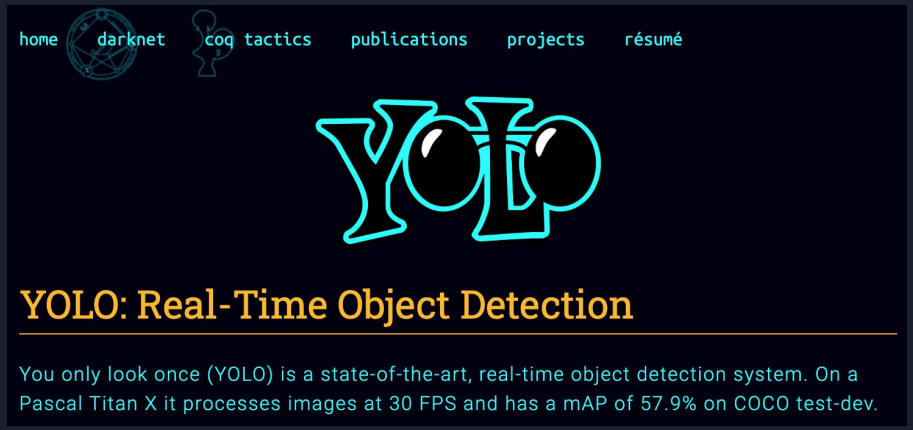
1차 계단을 object detect해보자!

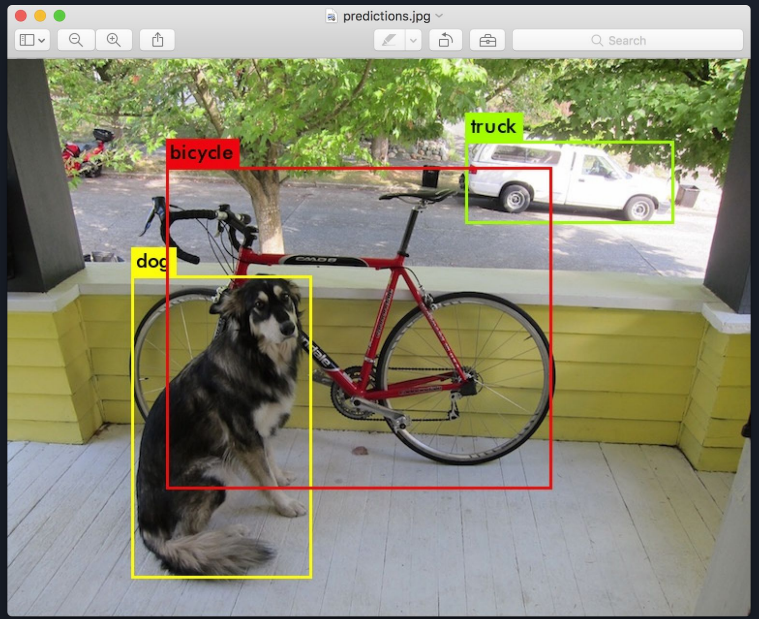




c. SW 삽질

2차 숫자를 object detect해보자!





c. SW 삽질

2차 숫자를 object detect해보자!

https://github.com/dkarunakaran/ROS-node-YOLO-v3-tiny

195 lines (168 sloc) | 7.68 KB

```
1   #! /usr/bin/env python
2   # -*- coding: utf-8 -*-
3   """
4   Run a YOLO_v3 style detection model on test images.
5   """
6
7   import colorsys
8   import os
9   from timeit import default_timer as timer
10  import tensorflow as tf
11  import numpy as np
```

ModuleNotFoundError?
tensorflow

c. SW 삽질

2차 숫자를 object detect해보자!

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6
7  import colorsys
8  import os
9  from timeit import default_timer as timer
10 import tensorflow as tf
11 import numpy as np
```

가장 중요한 녀석...

python 2.x

pip install tensorflow

c. SW 삽질

2차 숫자를 object detect해보자!

PinkWink / YOLOv3-ROS
forked from yehengchen/YOLOv3-ROS

Watch 0 | Star 0 | Fork 6

Code | Pull requests 0 | Actions | Projects 0 | Wiki | Security | Insights

Real-time Object Grasp Detection ROS package for YOLOv3

83 commits | 1 branch | 0 packages | 0 releases | 2 contributors

Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

This branch is 3 commits ahead, 6 commits behind yehengchen:master. | Pull request | Compare

PinkWink delete_some_pkg — Latest commit 72aaf1b 25 days ago

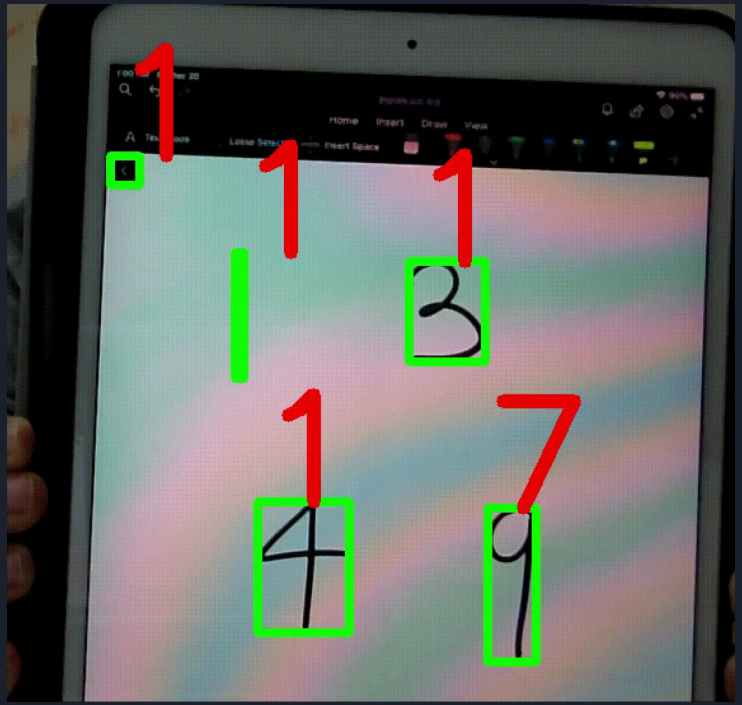
yolov3_pytorch_ros	delete_some_pkg	25 days ago
.DS_Store	delete_some_pkg	25 days ago
README.md	Update README.md	last month

README.md

YOLOv3-ROS

Development Environment

- Ubuntu 16.04 / 18.04
- ROS Kinetic / Melodic
- OpenCV



c. SW 삽질

2차 숫자를 object detect해보자!

How to train (to detect your custom objects)

Training YOlOv3:

- [yolov3]

Download the dakrnet source code

```
git clone https://github.com/pjreddie/darknet
cd darknet

vim Makefile
...
GPU=1 # if no using GPU 0
CUDNN=1 # if no 0
OPENCV=0
OPENMP=0
DEBUG=0

make
```

친절한 안내^^

0. Create folder yolov3

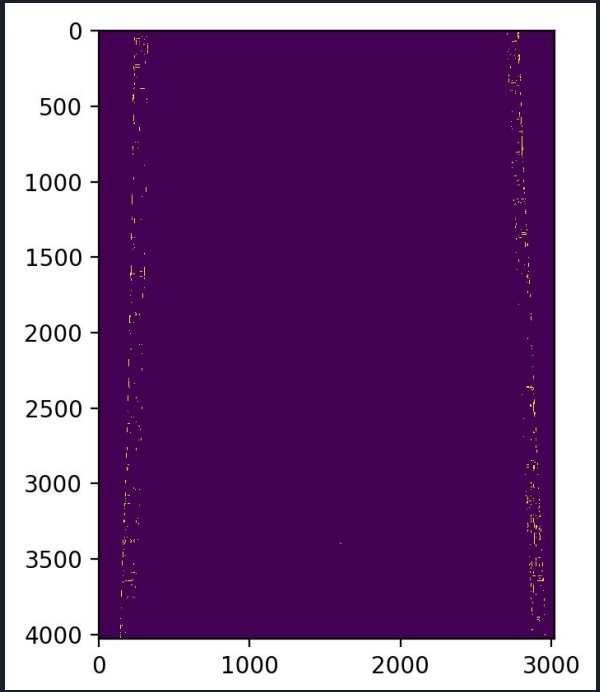
```
mkdir yolov3
cd yolov3
mkdir JPEGImages labels backup cfg
```

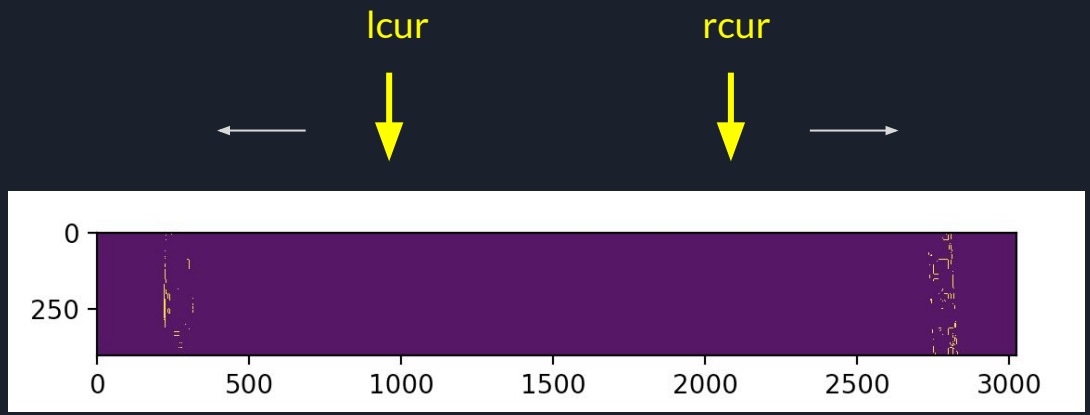
####yolov3

```
├── JPEGImages
| ├── object-00001.jpg
| └── object-00002.jpg
| ...
```

c. SW 삽질

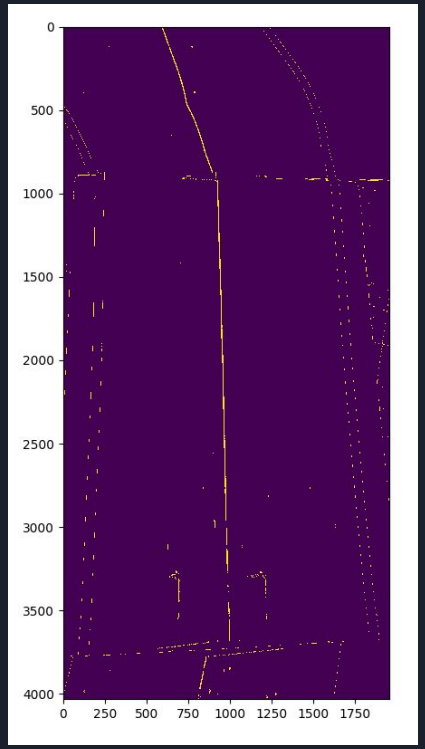
3차 코스(lane)을
인식해보자...!

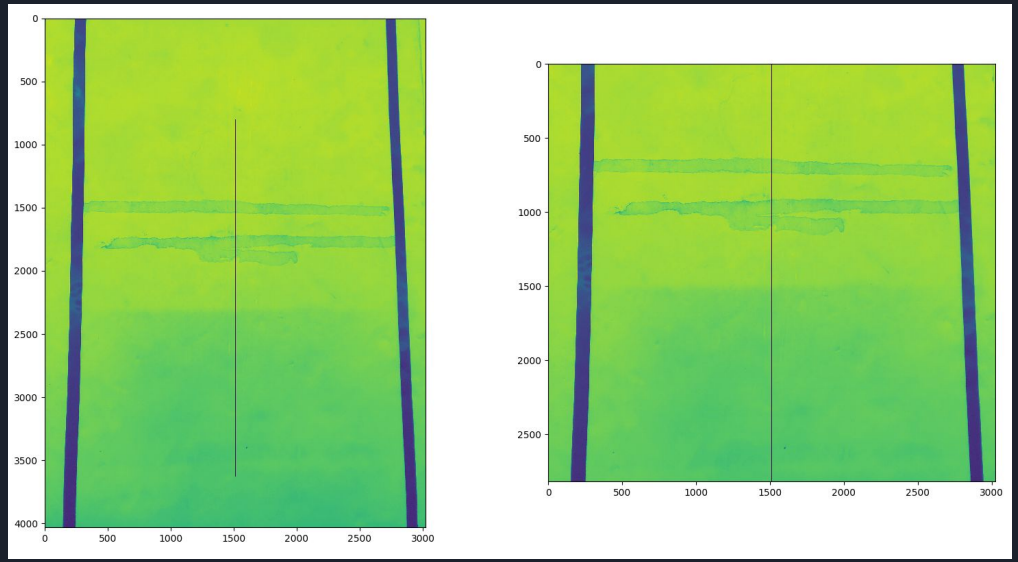




c. SW 삽질

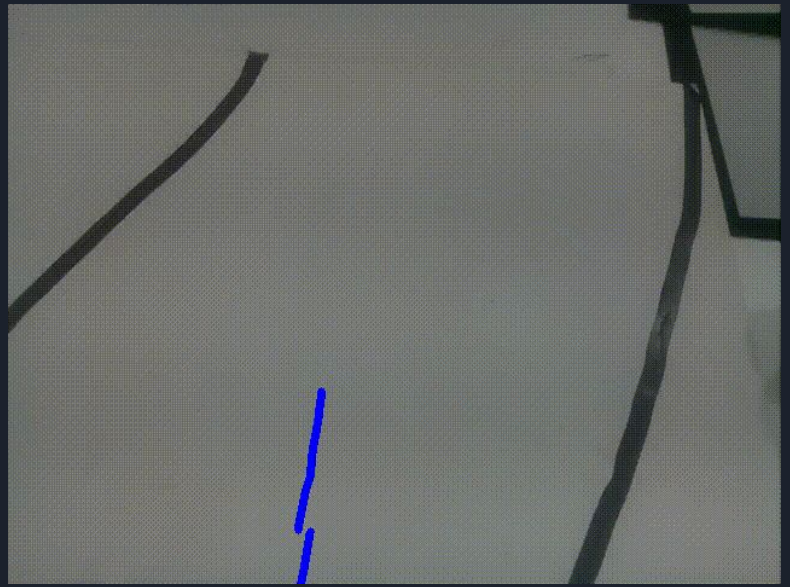
3차 코스(lane)을
인식해보자...!



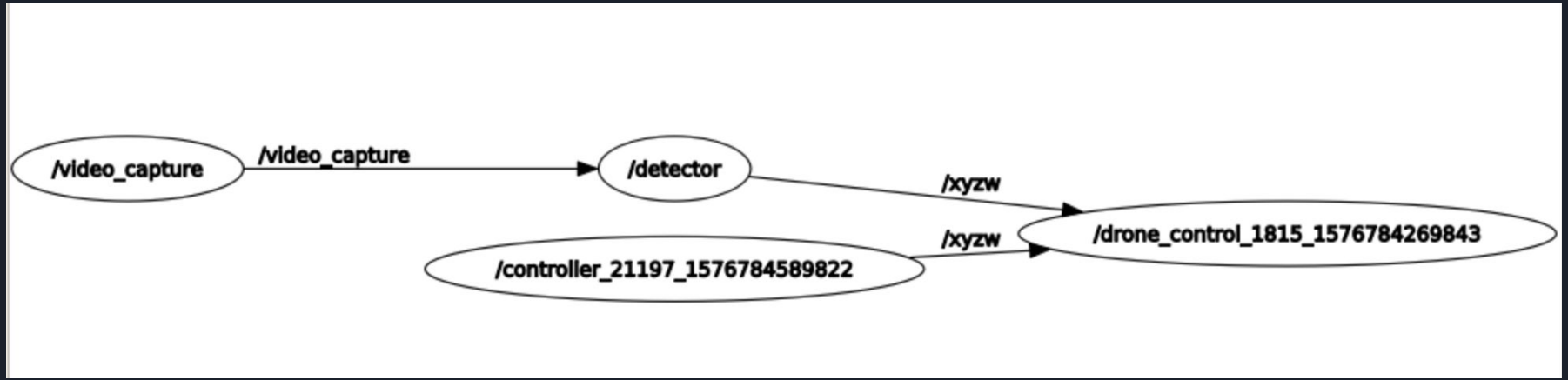


4. 결론

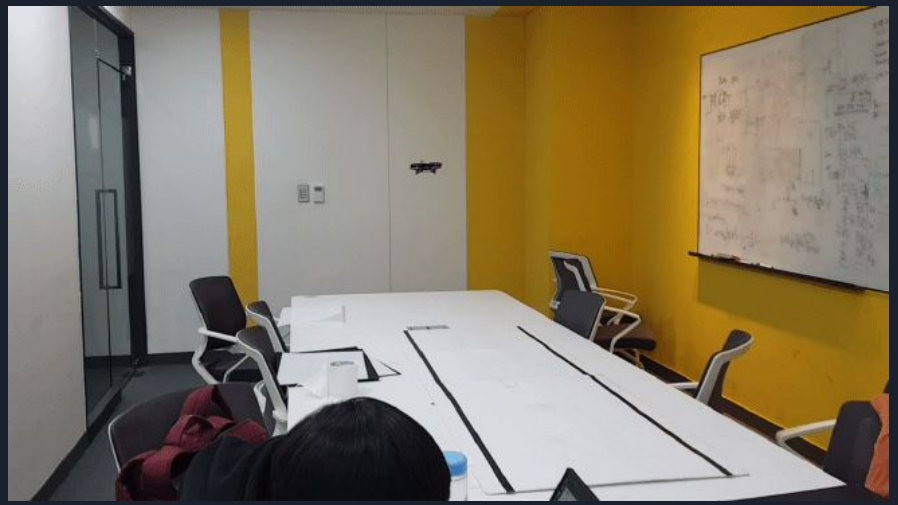
https://github.com/hy-kiera/CoDrone-daechul



https://github.com/hy-kiera/CoDrone-daechul



QnA



감사합니다.😂