Follow Person VI

Pedro Arias

LOCAL

nvidia drivers -- v470.57.02
CUDA -- v11.4
nvcc -- v11.4
cuDNN -- v8.2.2
OpenCV -- v4.5.4
cmake -- v3.21.3

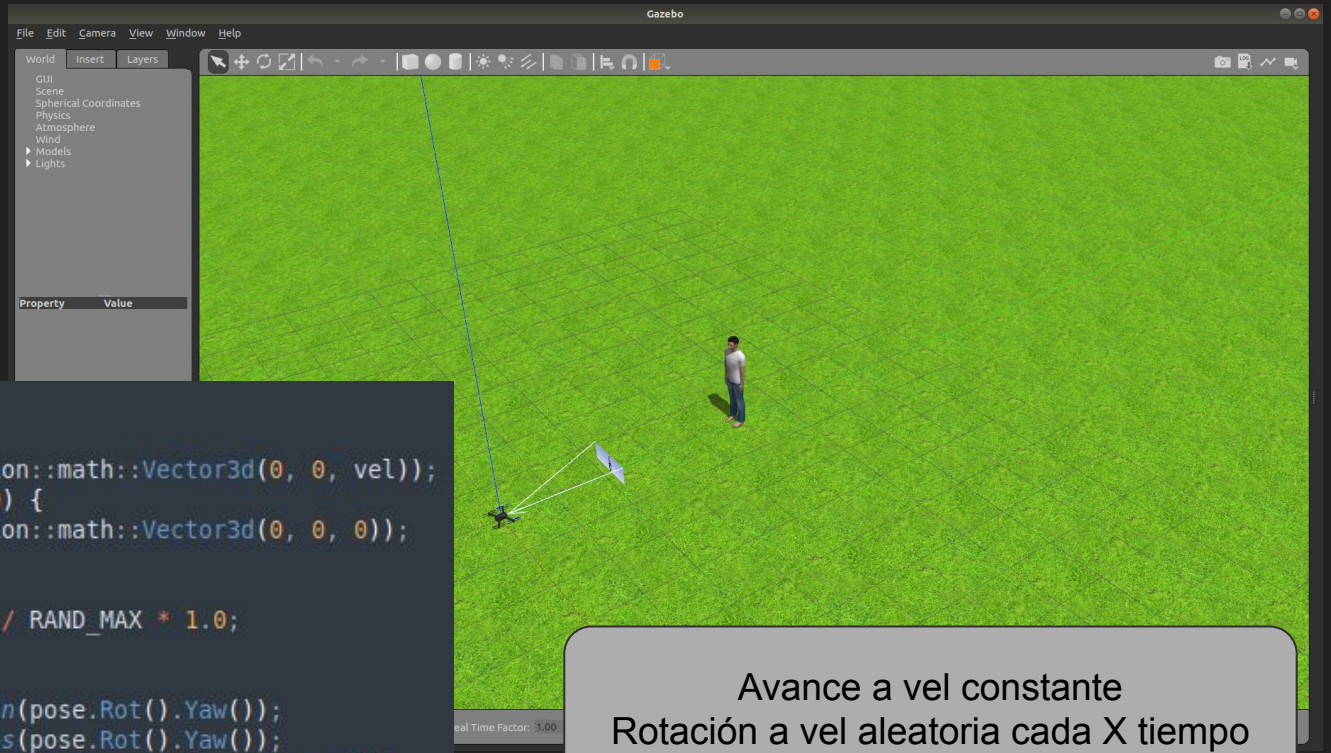
```
parias@stick: ~
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
parias@stick:~$ nvidia-smi
NVIDIA-SMI has failed because it couldn't communicate with the NVIDIA driver. Ma
ke sure that the latest NVIDIA driver is installed and running.

parias@stick:~$
```

No se detectan los drivers después de una actualización automática del kernel

```
parias@stick: ~
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
parias@stick:~$ nvidia-smi
Thu Oct 21 12:49:22 2021
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 470.57.02    Driver Version: 470.57.02    CUDA Version: 11.4     |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|                               |                      |               MIG M. |
|===============================+======================+======================|
|   0  NVIDIA GeForce ...  On   | 00000000:01:00.0 Off |                  N/A |
| N/A   51C    P8    N/A /  N/A |    465MiB /  4042MiB |      0%      Default |
|                               |                      |                  N/A |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                                  |
|  GPU   GI   CI        PID   Type   Process name                  GPU Memory |
|        ID   ID                                                   Usage      |
|=============================================================================|
|    0   N/A  N/A      1937      G   /usr/lib/xorg/Xorg                 28MiB |
|    0   N/A  N/A      2084      G   /usr/bin/gnome-shell               68MiB |
|    0   N/A  N/A      3073      G   /usr/lib/xorg/Xorg                169MiB |
|    0   N/A  N/A      3303      G   /usr/bin/gnome-shell               26MiB |
|    0   N/A  N/A      3673      G   /usr/lib/firefox/firefox          154MiB |
|    0   N/A  N/A      3796      G   /usr/lib/firefox/firefox            1MiB |
|    0   N/A  N/A      4004      G   /usr/lib/firefox/firefox            1MiB |
|    0   N/A  N/A      4350      G   /usr/lib/firefox/firefox            1MiB |
|    0   N/A  N/A      4886      G   .../debug.log --shared-files        4MiB |
|    0   N/A  N/A      6940      G   /usr/lib/firefox/firefox            1MiB |
|    0   N/A  N/A      7304      G   /usr/lib/firefox/firefox            1MiB |
|    0   N/A  N/A      7335      G   /usr/lib/firefox/firefox            1MiB |
|    0   N/A  N/A     31319      G   /usr/lib/firefox/firefox            1MiB |
+-----------------------------------------------------------------------------+
parias@stick:~$ nvcc --version
nvcc: NVIDIA (R) Cuda compiler driver
Copyright (c) 2005-2021 NVIDIA Corporation
Built on Sun_Aug_15_21:14:11_PDT_2021
Cuda compilation tools, release 11.4, V11.4.120
Build cuda_11.4.r11.4/compiler.30300941_0
parias@stick:~$
```

Sim Follow Polar Person

- Launch
- World
- Model[1]
- Plugin




```
if (cont <= 250) {
    // Init vels
    this->model->SetAngularVel(ignition::math::Vector3d(0, 0, vel));
} else if (cont > 250 && cont <= 1000) {
    this->model->SetAngularVel(ignition::math::Vector3d(0, 0, 0));
} else {
    this->cont = 0;
    this->vel = 0.5 + double(rand()) / RAND_MAX * 1.0;
}
this->cont = this->cont + 1;
vx = 0*cos(pose.Rot().Yaw()) - 0.5*sin(pose.Rot().Yaw());
vy = 0*sin(pose.Rot().Yaw()) + 0.5*cos(pose.Rot().Yaw());
this->model->SetLinearVel(ignition::math::Vector3d(-vx, -vy, 0));
```

Avance a vel constante
Rotación a vel aleatoria cada X tiempo

Sim Follow Polar Person

- Yaw Rate:

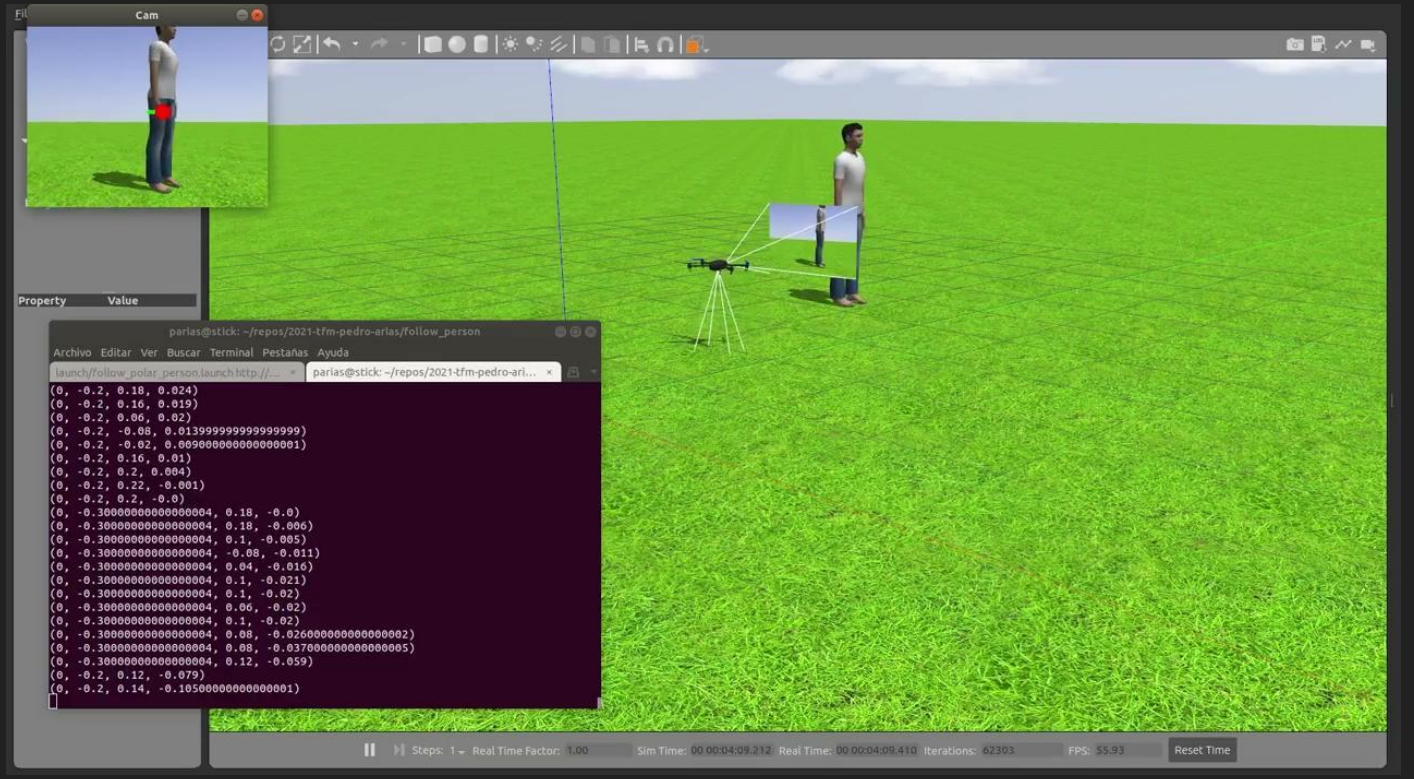
P=0.005, I=0, D=0.001

- Vz:

P=0.02, I=0, D=0.001

- Vx:

P=0.1, I=0, D=0.001

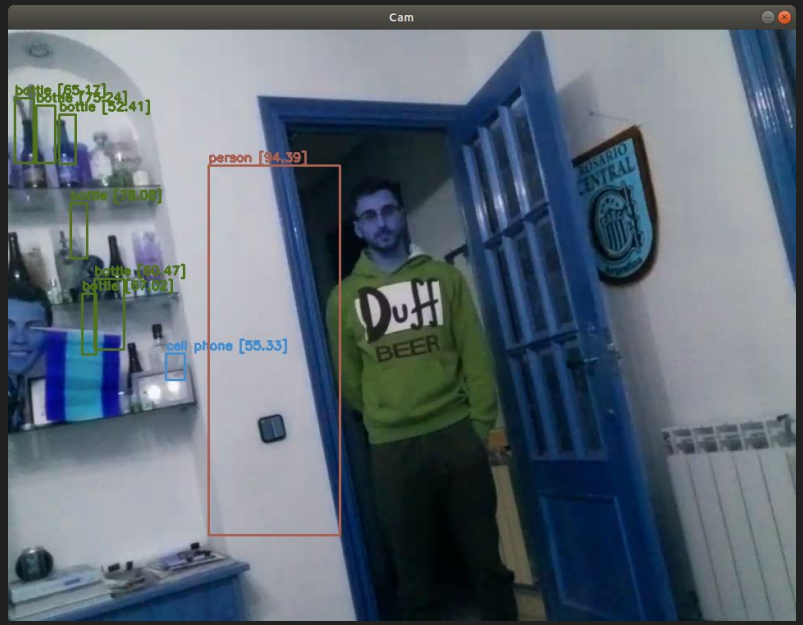


Detectada fuente de interferencias

Tello Follow Person

- Latencia baja
- GBR → RGB
- Offset de bbox

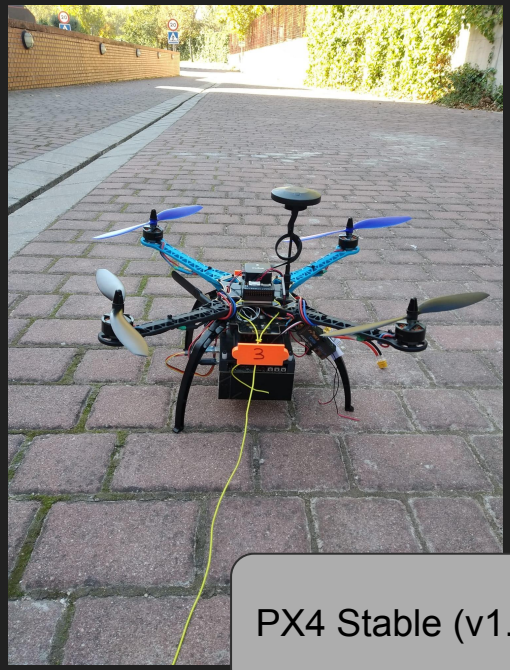
```python
def main():
    drone = DroneWrapper()
    yolo4 = yolo_utils.YOLOv4()

    drone.takeoff(h=2, precision=0.2)
    print("Taken off")

    rate = rospy.Rate(RATE)  # 50hz
    while not rospy.is_shutdown():
        try:
            img = drone.get_frontal_image()
            rgb_img = cv2.cvtColor(img, cv2.COLOR_RGB2BGR)
            label, confidence, points = yolo4.detect_object(img, 'person')
            vx, vy, vz, yaw_rate = execute(img, label, points)
            drone.set_cmd_vel(vy, vx, vz, yaw_rate)
        except CvBridgeError:
            print("Error")
            pass

        rate.sleep()  # sleeps (50Hz)

    drone.land()
```



NVIDIA Drivers...

PX4 Real

- Drone como AP



PX4 Stable (v1.12.3)

ROS_IP=10.42.0.1

ROS_IP=10.42.0.180

ROS_MASTER_URI=
http://10.42.0.1:11311/

Plan de Prueba de Vuelo

- Establecimiento de conexión y muestra de parámetros ✓
- Armado ✓
- Despegue (h=1) y Aterrizaje ✓
- Despegue (h=1), Movimiento de guiñada en ambos sentidos y Aterrizaje ✓
- Follow person con control por guiñada

Sobre MAVROS y sobre DroneWrapper

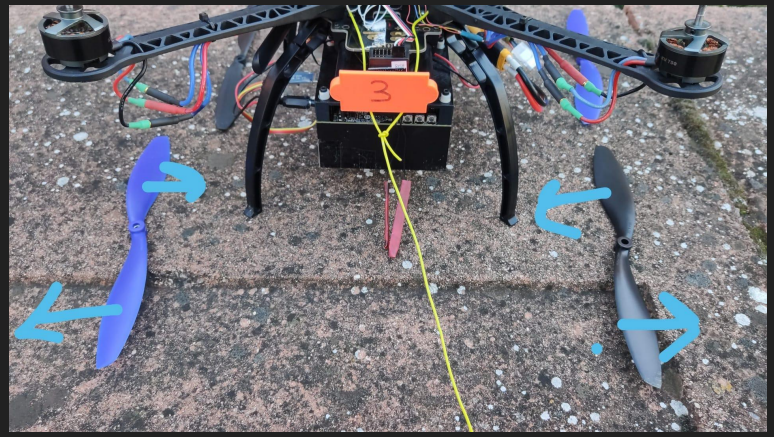
Diversos scripts

Takeoff ¿?

- Mala conexión en pines ¿?
- Viento ¿?
- Mala calibración ¿?
- Hélices ¿?

Takeoff ¿?

- ~~Mala conexión en pines ¿?~~
- ~~Viento ¿?~~
- Mala calibración ¿?
- Hélices



Drone 1

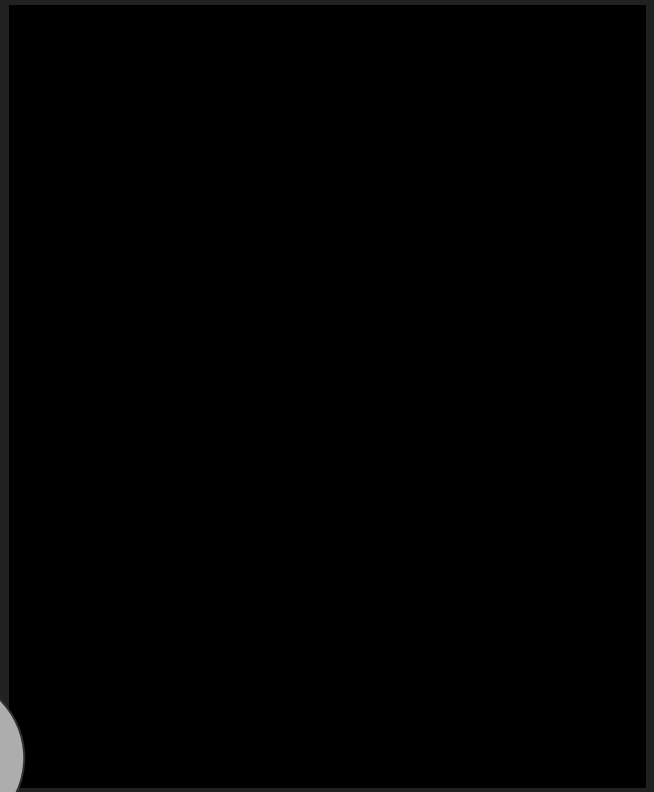
Drone 3

QGC

MAV ROS

MAV SDK

Takeoff



MAV SDK

QGC

Misión preprogramada

- Misión preprogramada
  - Avanza un metro
  - Vira 180º
  - Avanza un metro
- Vuelo en automático