

Follow Person IX

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Cámaras

TELLO

Vídeo: HD 720x960p 30 fps

$f = 25\text{mm}$

<https://www.ryzerobotics.com/es/tello/specs>

<https://tellopilots.com/threads/tello-camera-sensor-detailed-specs-sensor-width-in-mm-for-photogrametry.3427/>

SIM

- $\text{hfov} = 1.047$
- 320x240p 30 fps
- $\text{cx} = 320.5$
- $\text{cy} = 240.5$
- $f = 277.2$

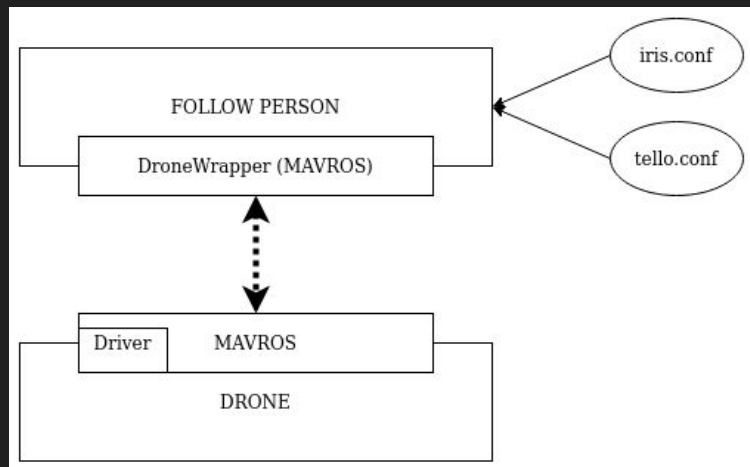
Follow Person

- Área generalizada → relación aspecto (AR)

$$e = AR - AR_t$$

$$e = \text{int}\left(\frac{\text{area}_{img}}{\text{area}_{det}}\right) - \text{int}\left(\frac{\text{area}_{img}}{\text{area}_t}\right)$$

$$e = AR - 20$$

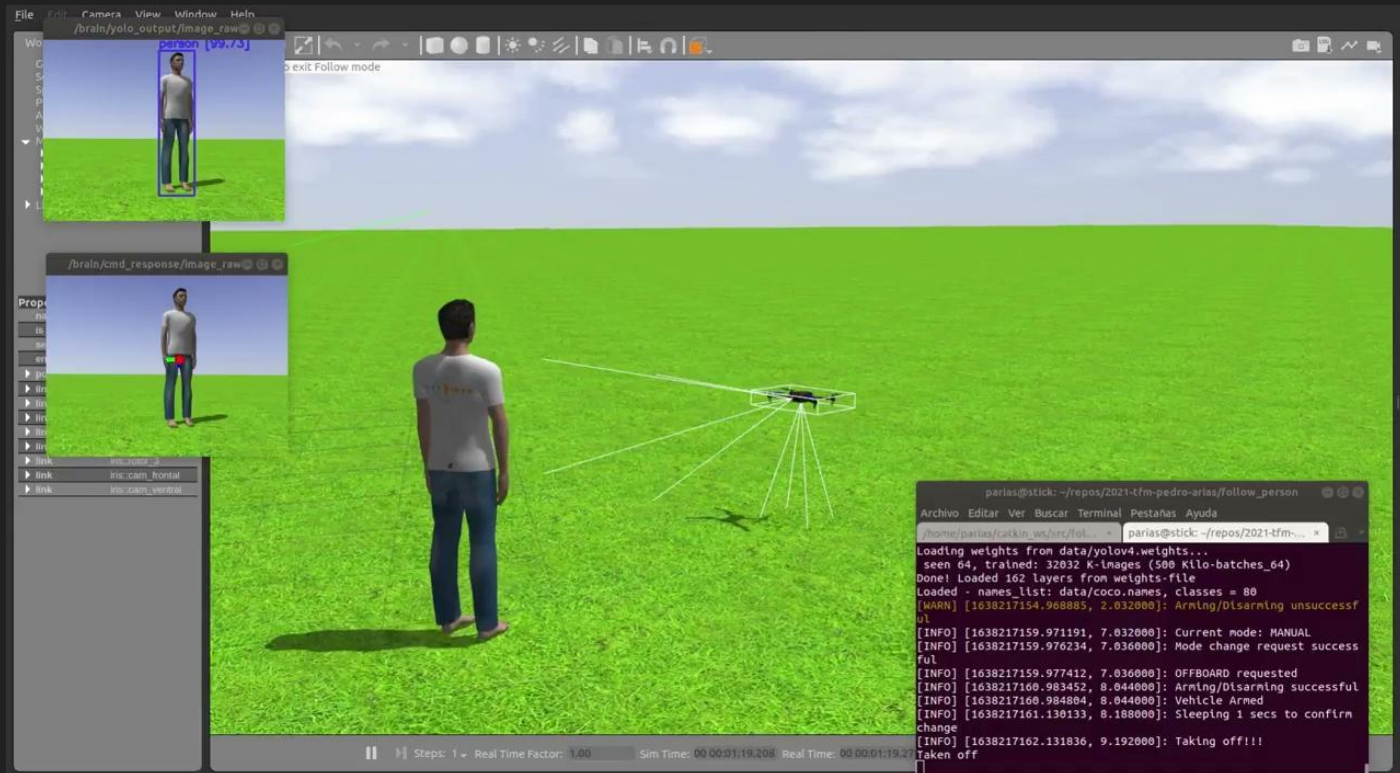


```
drone:
  model: 'tello'
  vx:
    kp: -0.02
    ki: 0.0
    kd: 0.0002
  yaw_rate:
    kp: 0.002
    ki: 0.0
    kd: 0.0001
  vz:
    kp: -0.0015
    ki: 0.0
    kd: 0.0
```

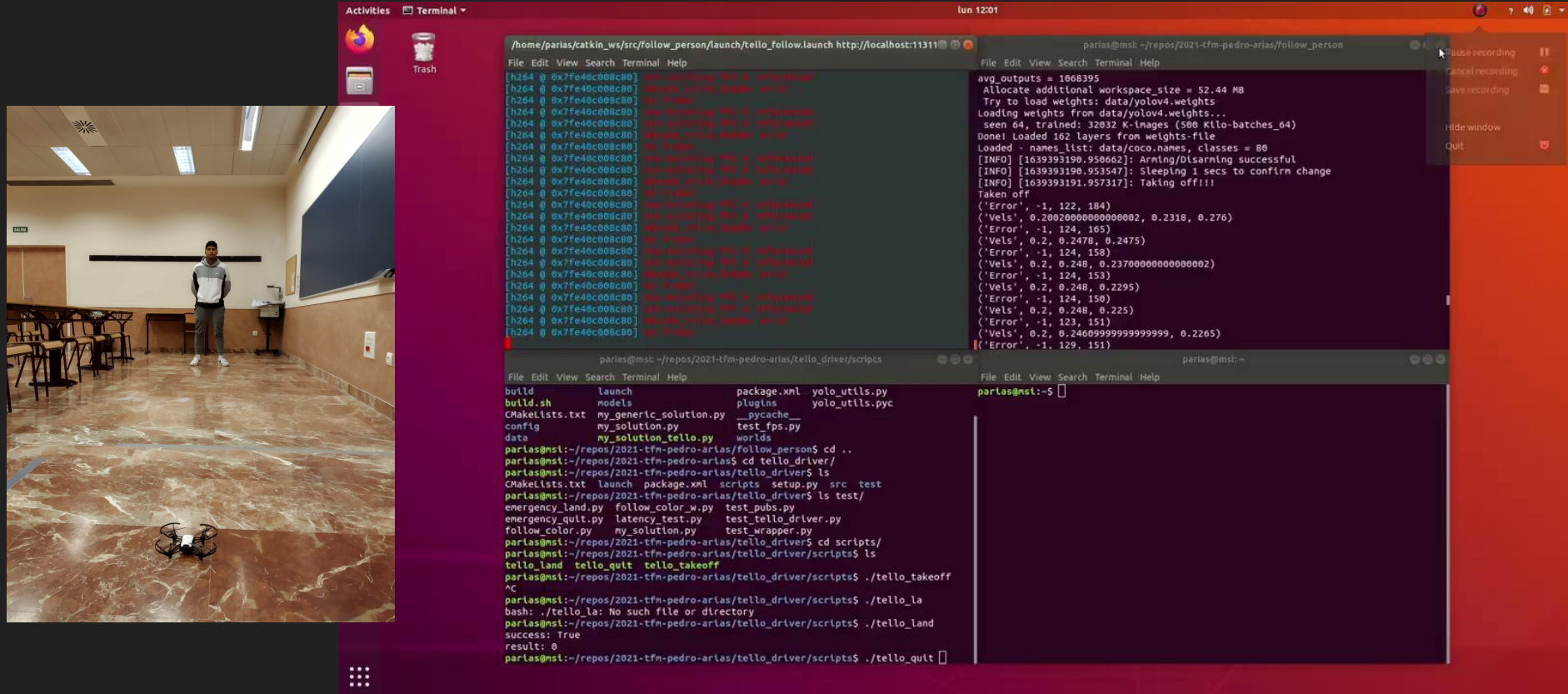
```
drone:
  model: 'iris_sim'
  vx:
    kp: -0.05
    ki: 0.0
    kd: 0.001
  yaw_rate:
    kp: -0.005
    ki: 0.0
    kd: 0.001
  vz:
    kp: -0.02
    ki: 0.0
    kd: 0.001
```

Sim Follow Person

```
drone:
  model: 'iris_sim'
  vx:
    kp: 0.5
    ki: 0.0
    kd: 0.001
  yaw_rate:
    kp: -0.005
    ki: 0.0
    kd: 0.001
  vz:
    kp: -0.02
    ki: 0.0
    kd: 0.001
```



Tello Follow Person



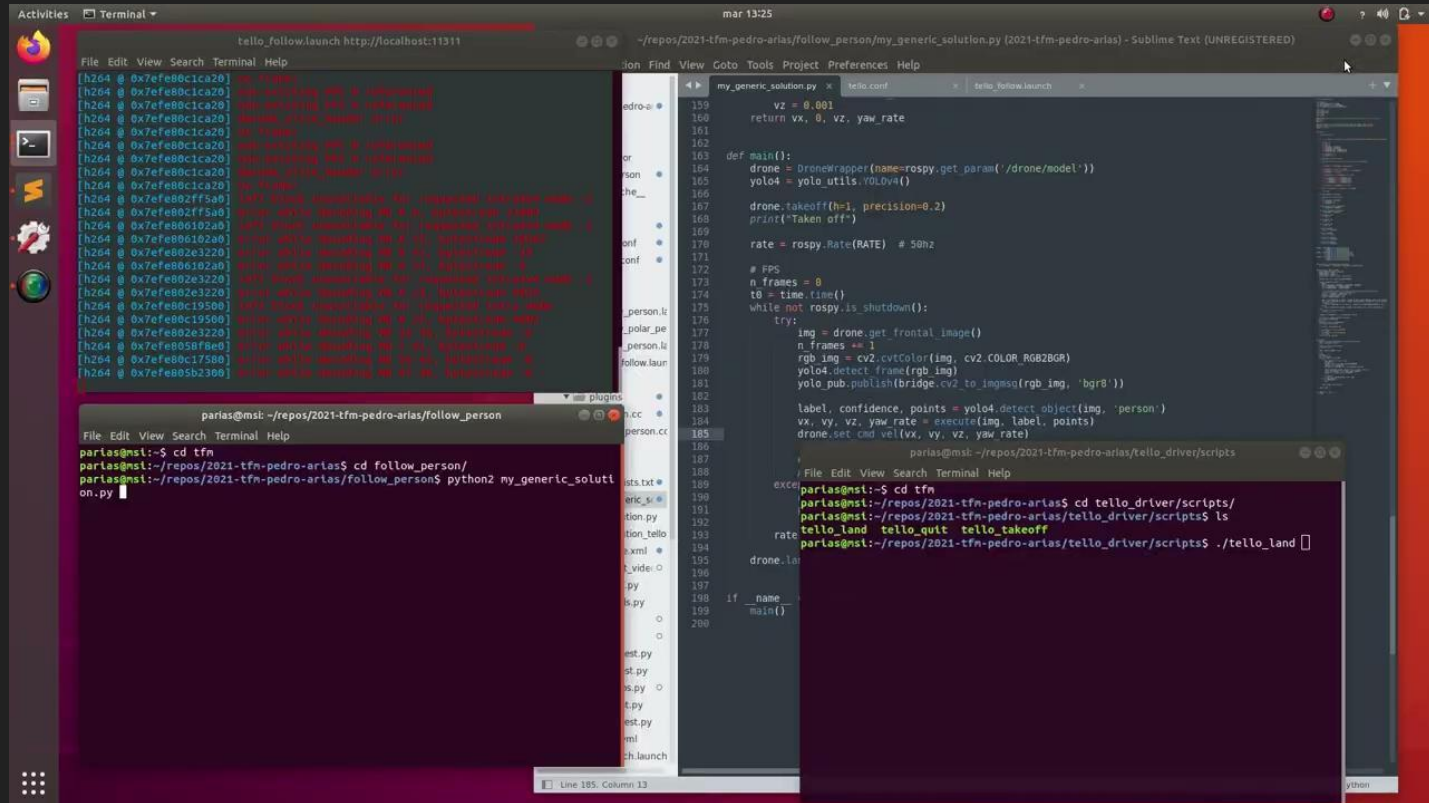
The image displays a Tello drone in a room, alongside a terminal window showing the execution of a script to follow a person. The terminal output includes the following details:

```
avc_outputs = 1068395
Allocate additional workspace_size = 52.44 MB
Try to load weights: data/yolov4.weights
Loading weights from data/yolov4.weights...
seen 64, trained: 32032 K-images (500 Kilo-batches_64)
Done! Loaded 162 layers from weights-file
Loaded - names list: data/coco.names, classes = 80
[INFO] [1639393190.950662]: Arming/Disarming successful
[INFO] [1639393190.953547]: Sleeping 1 secs to confirm change
[INFO] [1639393191.957317]: Taking off!!!
Taken off
('Error', -1, 122, 184)
('Vels', 0.20020000000000002, 0.2318, 0.276)
('Error', -1, 124, 165)
('Vels', 0.2, 0.2478, 0.2475)
('Error', -1, 124, 158)
('Vels', 0.2, 0.248, 0.23700000000000002)
('Error', -1, 124, 153)
('Vels', 0.2, 0.248, 0.2295)
('Error', -1, 124, 150)
('Vels', 0.2, 0.248, 0.225)
('Error', -1, 123, 151)
('Vels', 0.2, 0.2460000000000000, 0.2265)
('Error', -1, 129, 151)
```

The terminal also shows the file structure of the project:

```
build launch package.xml yolo_utils.py
build.sh models plugins yolo_utils.pyc
CMakeLists.txt my_generic_solution.py pycache_
config my_solution.py test_fps.py
data my_solution.tello.py worlds
parias@msi:~/repos/2021-tfm-pedro-arias/follow_person$ cd ..
parias@msi:~/repos/2021-tfm-pedro-arias$ cd tello_driver/
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver$ ls
CMakeLists.txt launch package.xml scripts setup.py src test
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver$ ls test/
emergency_land.py follow_color_w.py test_pubs.py
emergency_quit.py latency_test.py test_tello_driver.py
follow_color.py my_solution.py test_wrapper.py
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver$ cd scripts/
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver/scripts$ ls
tello_land tello_quit tello_takeoff
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver/scripts$ ./tello_takeoff
^C
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver/scripts$ ./tello_la
bash: ./tello_la: No such file or directory
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver/scripts$ ./tello_land
success: True
result: 0
parias@msi:~/repos/2021-tfm-pedro-arias/tello_driver/scripts$ ./tello_quit
```

Tello Follow Person II



The screenshot displays a Linux desktop environment with a terminal window, a file explorer, and a code editor. The terminal window shows the execution of ROS commands to launch the Tello drone and the follow_person script. The file explorer shows the project structure, including the follow_person directory and the my_generic_solution.py file. The code editor displays the Python script for the drone's movement, which includes a main function that initializes the drone, sets the rate, and calls the follow_person function.

```
parias@msb:~/repos/2021-tfm-pedro-arias/follow_person$ cd tfm
parias@msb:~/repos/2021-tfm-pedro-arias$ cd follow_person/
parias@msb:~/repos/2021-tfm-pedro-arias/follow_person$ python2 my_generic_solution.py
```

```
my_generic_solution.py
159 vx = 0.001
160 return vx, 0, vz, yaw_rate
161
162
163 def main():
164     drone = DroneWrapper(name=rospy.get_param('/drone/model'))
165     yolo4 = yolo_utils.YOLOv4()
166
167     drone.takeoff(h=1, precision=0.2)
168     print("Taken off")
169
170     rate = rospy.Rate(RATE) # 50hz
171
172     # FPS
173     n_frames = 0
174     t0 = time.time()
175     while not rospy.is_shutdown():
176         try:
177             img = drone.get_frontal_image()
178             n_frames += 1
179             rgb_img = cv2.cvtColor(img, cv2.COLOR_RGB2BGR)
180             yolo4.detect_frame(rgb_img)
181             yolo_pub.publish(bridge.cv2_to_imgmsg(rgb_img, 'bgr8'))
182
183             label, confidence, points = yolo4.detect_object(img, 'person')
184             vx, vy, vz, yaw_rate = execute(img, label, points)
185             drone.set_cmd_vel(vx, vy, vz, yaw_rate)
186
187         except:
188             pass
189
190     # File Edit View Search Terminal Help
191     exec
192
193     rate
194
195     drone.land()
196
197     if __name__ == '__main__':
198         main()
199
200
```

PX4 Real

Cuadricóptero:

- Se ha roto un motor
 - No se ha podido probar el código de GAAS
-
- ¿Falla el código o falla el drone?

GAAS:

- Muy similar que drone_wrapper
- Control en posición con /setpoint_raw/local
- Despegue en OFFBOARD

[@generalized-intelligence/GAAS](https://github.com/generalized-intelligence/GAAS)

Memoria

Títulos:

- Middleware y aplicaciones con robots aéreos autónomos
- Sugerencias??

1. Introducción

- 1.1. Robótica Aérea
- 1.2. Motivación
- 1.3. Problema
- 1.4. Objetivos

ESTRUCTURA

2. Herramientas (Estado del Arte)

- 2.1. Segmento Tierra
- 2.2. Segmento Aire
- 2.3. Comunicaciones

3. Infraestructura / Arquitectura

- 3.1. HW: px4, tello
- 3.2. SW: drone_wrapper, tello_driver, otro

4. Aplicación

- 4.1. Diseño: Percepción + Control
- 4.2. Implementación
- 4.3. Experimentos: Base, FC, FP

5. Conclusiones y Líneas Futuras

Estado del TFM

- Drone Wrapper
- Tello Driver
- Victure Driver
- Integración YOLO

\	Tello	Sim PX4	PX4
FollowColor	✓	✓	-
FollowPerson	✓	✓	✗