TELLO EDU DJI API

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BY DEFAULT, IF NO COMMAND IS RECEIVED BY THE DRONE IN 15 SECONDS IT WILL AUTOMATICALLY LAND.

VIDEO COMMANDS NOT INCLUDED DUE TO CHROMEBOOK LIMITATIONS; USE PHONE APP FOR VIEWING INSTEAD.

```
##################################### REQUIRED #####################################
tello = Tello() # Create Tello Object
tello.connect() # Connect to drone
tello.takeoff() # Take off drone from ground
##################################### REQUIRED #####################################


##################################### BEGINNER #####################################
tello.land() # Land to the ground

tello.set_speed(x) # Set speed from [10-100] cm/s

tello.move_up(x) # Move x cm up [20-500]
tello.move_down(x) # Move x cm down [20-500]
tello.move_left(x) # Move x cm left [20-500]
tello.move_right(x) # Move x cm right [20-500]
tello.move_forward(x) # Move x cm forward [20-500]
tello.move_back(x) # Move x cm backwards [20-500]

tello.rotate_clockwise(x) # Turn x degrees clockwise [1-360]
tello.rotate_counter_clockwise(x) # Turn x degrees counterclockwise [1-360]

tello.flip_left() # Flip the drone to the left
tello.flip_right() # Flip the drone to the right
tello.flip_forward() # Flip the drone forward
tello.flip_back() # Flip the drone backwards

tello.end() # Closes the connection to the drone
##################################### BEGINNER #####################################
```

```
##################################### ADVANCED #####################################
tello.enable_mission_pads() # Enables the use of mission pads.

tello.disable_mission_pads() # Disables the use of mission pads.

tello.get_mission_pad_id() # Returns an integer that represents the current ID of the
mission pad. If no mission pad is detected return -1.

tello.set_mission_pad_detection_direction(x) # Set the direction of mission pad
direction to [0: Downwards only] [1: forwards only] [2: Both forward and downward].
Choose 2 if you are unsure for maximum detection. If you are an EXPERT, keep in mind
that 0 and 1 refresh at 20hz each and 2 at only 10hz.

tello.get_mission_pad_distance_x() # Returns the X distance between the drone and the
detected mission pad.

tello.get_mission_pad_distance_y() # Returns the Y distance between the drone and the
detected mission pad.

tello.get_mission_pad_distance_z() # Returns the Z distance between the drone and the
detected mission pad.

tello.initiate_throw_takeoff() # If you throw your drone up within 5 seconds of
calling this command the drone will automatically takeoff

tello.emergency() # Immediately turns off every motor; Simply drops from the sky

##################################### ADVANCED #####################################
```

```
###################################### EXPERT ######################################
tello = Tello(“192.168.1.1”) # Create Tello Object that is on IP 192.168.1.1

tello.go_xyz_speed(x, y, z, speed) # Flies to x, y, z relative to the current
position. X,Y,Z should be between [-500, 500] and speed [10, 100]

tello.curve_xyz_speed(x1, y1, z1, x2, y2, z2, speed) # Curves through two points (x1,
y1, z1) and (x2, y2, z2). All X,Y,Z should be between [-500, 500] and speed [10, 100]

tello.go_xyz_speed_mid(x, y, z, speed, mid) # Flies to x, y, z relative to the ID of
a mission pad [mid: 1-8]. X,Y,Z should be between [-500, 500] and speed [10, 100]

tello.curve_xyz_speed_mid(x1, y1, z1, x2, y2, z2, speed, mid) # Curves through two
points (x1, y1, z1) and (x2, y2, z2) relative to mid [1-8]. All X,Y,Z should be
between [-500, 500] and speed [10, 100].

tello.go_xyz_speed_yaw_mid(x, y, z, speed, yaw, mid1, mid2) # Fly to x,y,z relative
to mid1 [1-8]. Then fly and hover over to mid2 [1-8] and rotate (yaw) to the same
heading as it.

tello.send_keepalive() # Reset 15 second safety timeout back to 0

tello.send_rc_control(left_right_vel, forward_back_vel, up_down_vel, yaw_vel) # Send
direct RC commands via four channels. This is 10x better for manual driving rather
than autonomous driving. Limits are as follows:
      left_right_vel [-100, 100]
      forward_back_vel [-100, 100]
      up_down_vel [-100, 100]
      yaw_vel [-100, 100]
###################################### EXPERT ######################################

####################################### MISC #######################################
tello.query_serial_number() # [string]
tello.query_sdk_version() # [string]
tello.query_wifi_signal_noise_ratio() # [string]
tello.query_distance_tof() # [float 30 - 1000] cm
tello.query_barometer() # [int 0 - 100] cm
tello.query_attitude() # {'pitch': int, 'roll': int, 'yaw': int}
tello.query_temperature() # [int 0 - 90 Celsius]
tello.query_height() # [int 0 - 3000] cm
tello.query_flight_time() # [int] seconds
tello.query_battery() # [int 0 - 100] in %
tello.query_speed() # [int 1 - 100] cm/s ; Only queries speed setting
####################################### MISC #######################################
```

#################################### SWARM SETUP ####################################
READ THIS SECTION CAREFULLY AND ENTIRELY.

To control multiple drones at once, you need to have them all on the same wifi network. However, the Tello EDU drone starts up in AP mode, meaning it has its own wifi signal. To have it connect to a wifi network, you need to run this code:

```
tello = Tello() # Create Tello Object
tello.connect() # Connect to drone
tello.connect_to_wifi(“SSID”, “PASSWD”)
```

Replace SSID and PASSWD with the name of the wifi network and its password. The wifi network could be another Tello drone, a phone hotspot, a router, or anything that has a wifi signal. After this, the drone will restart, and it will connect to the wifi network on boot; This is the only time you need to call “connect_to_wifi”. Note that you will NOT be able to connect to the drone at all if you are not on the same network as it.

If by chance you are unable to have access to the wifi network or mistyped the credentials, simply hold the power button of the drone; This will reset its network settings and it will go back to outputting its own wifi signal.

If you are able to connect to the drone and want to change the name of its wifi or set a password, run this code:

```
tello = Tello() # Create Tello Object
tello.connect() # Connect to drone
tello.set_wifi_credentials(“SSID”, “PASSWD”)
```

Replace SSID and PASSWD with the name of the changed wifi network and its new password. After this, the drone will restart, and it will output a wifi signal with the chosen SSID and password.

NOTE: There is currently no way to view each individual video stream of each Tello drone if it is in a swarm.
#################################### SWARM SETUP ####################################

################################## BASIC SWARM API ##################################
Controlling a swarm of drones is actually pretty simple. Here is the basic gist:

```
swarm = TelloSwarm.fromIps([
       "192.168.178.42",
       "192.168.178.43",
       "192.168.178.44"
])

swarm.connect()

swarm.takeoff()
swarm.move_up(100)
swarm.sync()
swarm.land()

swarm.end()
```

As you can see, to create a swarm you simply need to feed in IPs from the network into the TelloSwarm constructor. After that, you can simply call the swarm the same as the drone. In this case, calling takeoff() for example takes off all the drones at the exact same time.

The sync() command waits until ALL drones have completed the command. This is important, as it makes extra sure drones will be doing the same things for the same duration at the same time.
################################## BASIC SWARM API ##################################

################################# EXPERT SWARM API #################################
If you are an EXPERT in python and want finer control, you can also run this:

```
swarm = TelloSwarm.fromIps([
       "192.168.178.42",
       "192.168.178.43",
       "192.168.178.44"
])

swarm.connect()
swarm.takeoff()

swarm.sequential(lambda i, tello: tello.move_forward(20))
swarm.parallel(lambda i, tello: tello.move_forward(20))

swarm.land()
swarm.end()
```

With this, you can call swarm.sequential and swarm.parallel. What these functions do is take in a function and call them on each drone; Sequential runs it one drone at a time and Parallel runs the command on all drones at the same time. This is actually what is happening under the hood whenever you use something like takeoff() on the swarm; It is simply calling swarm.parallel and passes the appropriate command in.
################################# EXPERT SWARM API #################################