



# USER MANUAL for FOLLOW ME DRONES

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# System Overview

This document outlines how the system can be setup and used for the average user, further configuration in the developer manual.

This involves getting the object detection loaded on the jetson and having the app to control it.

## 1.1 Deployment Diagram

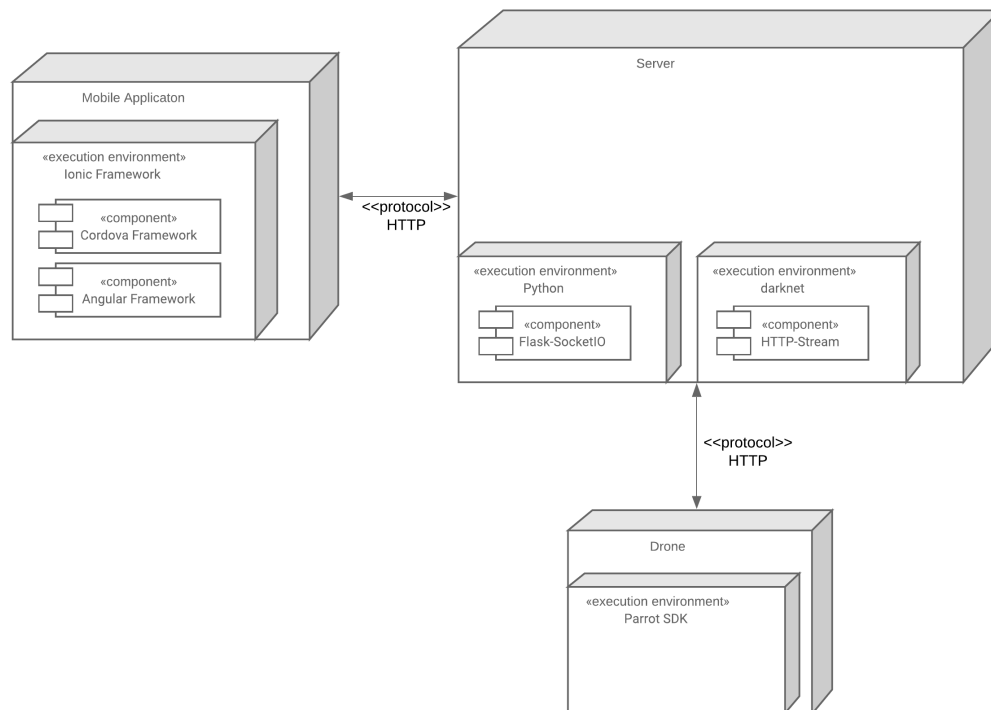


Figure 1: Deployment diagram

# Getting Started

## 2.1 Requirements

### 2.1.1 Software Requirements

- Ubuntu running on Jetson device (Nano, TX1, TX2, ...)

#### Jetson Nano

- Minimum 64GB SD card
- Wi-fi adapter
- DC Power adapter (*See jetson spec sheet*)
- Bridge to complete DC power circuit
- **Follow the Nvidia guide to setting up your jetson**
  - *Nvidia Guide*

#### Mobile Application

- Android v4.4+ mobile phone.
- GPS capable device

### 2.1.2 User Requirements

#### Jetson Nano

- Knowledge on linux and how to set up a distribution
- Networking knowledge
- SSH

#### Mobile Application

- Knowledge on how to use a mobile phone

# System Installation

## 3.1 Communcation Server

To install the appropriate server side software. In a terminal, paste the following commands:

```
$ wget -P ~/ https://raw.githubusercontent.com/cos301-2019-se/Follow-Me-Drones/master/jetson/jetson.
```

```
$ chmod +x jetson.sh
```

```
$ ./jetson.sh
```

## 3.2 Mobile Application

- **APK installation**
  - Download APK (Google Play Store)
  - Install via Android package manager

# System Usage

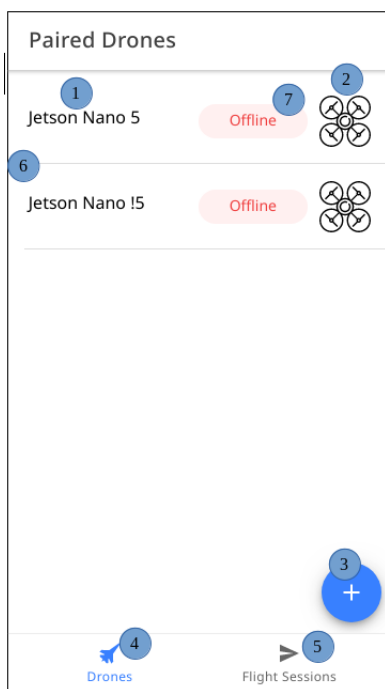
## 4.1 Communication Server

The setup enabled the server to start automatically with the Jetson, so after installation be sure to restart your device.

## 4.2 User Application

### 4.2.1 Drone list page (main page)

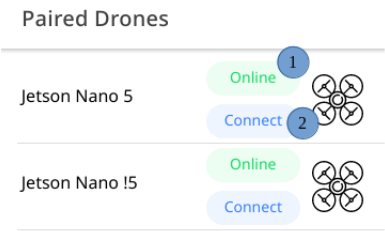
#### 4.2.1.1 Drone(s) offline



- (1) Drone name
- (2) Drone icon
- (3) Navigate to 'add new drone' page
- (4) Navigate to drone list page
- (5) Navigate to flight sessions page
- (6) Drone list

Figure 2: Drone list page (with offline drones)

4.2.1.2 Drone(s) online



- (1) Server status (online)
- (2) Connect to drone/server button

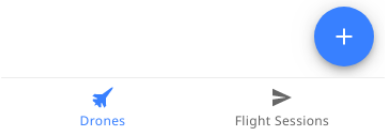
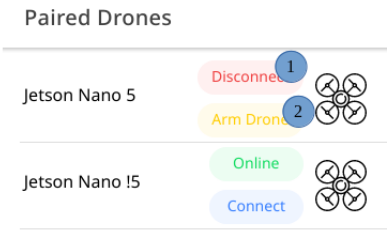


Figure 3: Drone list page (with online drones)

4.2.1.3 Drone(s) online and connected



- 1. Disconnect drone button
- 2. Arm drone button (which initialises object recognition [1] and launches the drone)

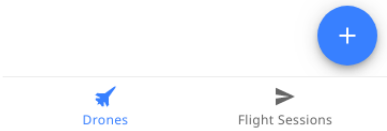
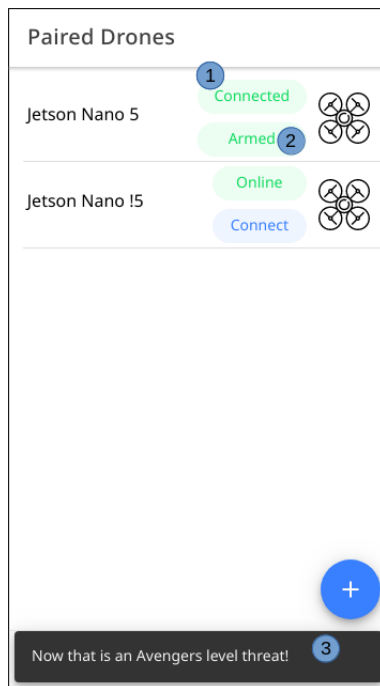


Figure 4: Drone list page (with online and connected drones)

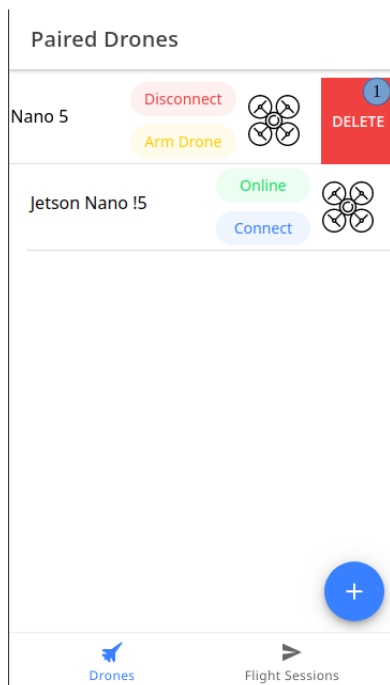
#### 4.2.1.4 Drone(s) connected and armed



- (1) Connection status (connected)
- (2) Armed status button (currently armed). If this button is clicked, the drone will disarm itself (which turns off object recognition and the drone will proceed to land itself)
- (3) Notification alerting user of detection from drone

Figure 5: Drone list page (with connected and armed drones)

#### 4.2.1.5 Delete an existing drone

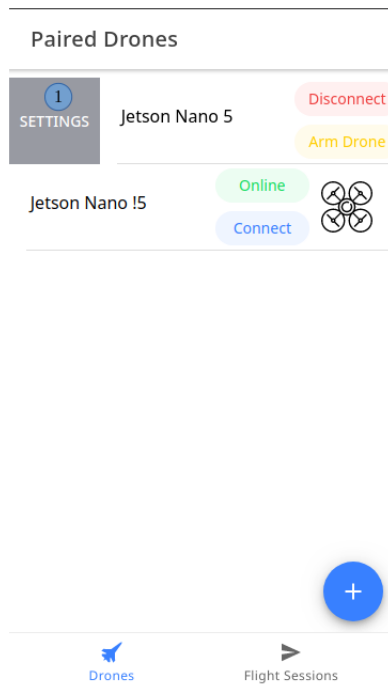


- (1) Delete button (which deletes currently selected drone). This button is reached by swiping from Right -> Left on a specific drone.

Figure 6: Drone list page (with delete action)



#### 4.2.1.6 Modify an existing drone's settings



- (1) Settings button (which navigates to the drone settings menu where the currently selected drone's settings can be modified). This button is reached by swiping from Left -> Right on a specific drone.

Figure 7: Drone list page (with settings action)

### 4.2.2 Drone settings page

#### 4.2.2.1 Add a new drone or modify an existing drone's settings

- (1) Drone name
- (2) Drone IP address
- (3) Drone connection port
- (4) General comments
- (5) Submit button
- (6) Cancel button (navigate back to drone list page)

Figure 8: New drone page

### 4.2.3 Flight sessions page

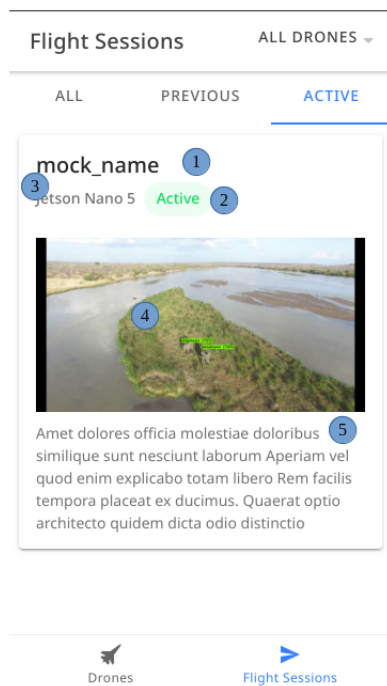
#### 4.2.3.1 All sessions tab



- (1) Navigates to "all sessions" tab
- (2) Navigates to "previous sessions" tab
- (3) Navigates to "active sessions" tab
- (4) Tappable dropdown list to filter sessions pertaining to a specific drone that exists on the main page

Figure 9: Flight sessions page (with "all sessions" tab selected)

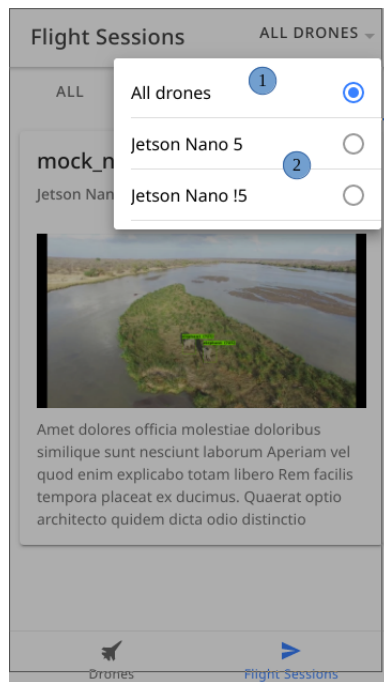
#### 4.2.3.2 Active sessions tab



- (1) Session name
- (2) Session status (active)
- (3) Drone name (that was active for the specified session)
- (4) Image of first detection during the specified session, which came from the drone's video feed
- (5) Session description (provided by ranger after ending session)

Figure 10: Flight sessions page (with "active sessions" tab selected)

### 4.2.3.3 Filter sessions dropdown



- (1) All drones option (which does not apply a filter and consequently displays all sessions from all drones)
- (2) Option to choose a specific drone from the list. Filter will then be applied and only sessions pertaining to the selected drone name will be displayed.

Figure 11: Flight sessions page (with session filter dropdown tapped)

# Troubleshooting

- Connectivity Issues:
  - Make sure the mobile device is wifi enabled.
  - Make sure the application and drone is on the same network.
  - Make sure the mobile device's antivirus is non blocking.
  - Make sure the server is set up correctly and running.
- Performance Issues:
  - Make sure the Nvidia Jetson is connected with an adapter that can provide sufficient power.
  - Running camera at lower resolution.
  - Decrease the input video's height and width properties in the `cfg/animals.cfg` file.
  - Ensure that heatsink is properly attached, there is sufficient airflow and the Nvidia Jetson is not in direct sunlight.
- Server Issues:
  - Ensure that the correct IP address and port are specified.

# Bibliography

- [1] “Darknet.” <https://github.com/AlexeyAB/darknet>. Accessed: 2019-04-30.