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Drones & AI

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AI Workshop

Robomaster Tello Talent

- **DJI RoboMaster Tello Talent (TT): The Ultimate Educational Drone**
- **Compact and durable design** with propeller guards for enhanced safety during indoor flights.
- **5MP HD camera** that captures photos and streams 720p video with electronic image stabilization.
- **Impressive flight performance** with a flight time of up to 13 minutes and a maximum control range of 100m.
- **Intelligent Flight Modes** like 8D Flips, Bounce Mode, and EZ Shots make flying fun and easy for beginners.
- **Stable flight** is ensured by DJI's advanced flight control algorithms.

Adv. Programming & Customization

- **Unlock Creativity with Open-Source Programming**
- **Built-in ESP32 open-source module** allows for extensive programming and customization.
- **Supports multiple programming languages**, including block-based coding (Scratch), Python, Arduino, and MicroPython, catering to all skill levels.
- **Programmable 8x8 LED dot-matrix screen** can display custom animations, characters, and scrolling text.
- **Full-color programmable LED indicator** provides visual feedback and can be coded to change colors based on events.
- **14-pin extension interface** enables the connection of third-party sensors (I2C, UART, SPI, GPIO, PWM) for limitless project possibilities.

Applications & Swarm Technology

- **Ideal for teaching AI, robotics, and programming** concepts in a hands-on, engaging way.
- **Integrated ToF infrared sensor** allows for obstacle avoidance and precise distance measurement up to 1.2 meters.
- **Supports multi-drone swarm control**, enabling students to program and perform synchronized flight formations.
- **Dual-band Wi-Fi (2.4GHz/5.8GHz)** ensures a stable connection, which is crucial in complex environments like classrooms with many wireless devices.

Tello App – Manual Control

Download Software

1. Download the Tello app for activation, flying the aircraft, recording footage, and updating firmware. The iOS version of the Tello app is compatible with iOS v9.0 and later. The Android version of the Tello app is compatible with Android v4.4 and later.

2. Download the Tello EDU app for programming. The iOS version of Tello EDU app is compatible with iOS v10.0 and later. The Android version of Tello EDU app is compatible with Android v4.4 and later.

3. Download and install the DJI Education Hub at http://edu.dji.com/download and update the open-source controller firmware to the latest version using RoboMaster Assistant.

https://dl.djicdn.com/downloads/RoboMaster+TT/RoboMaster_TT_Tello_Talent_User_Manual_en.pdf

Rules – Rules - Rules

- Make sure the batteries are fully charged before each mission.
- When battery is low – place them back in the charging dock – place all batteries back in the charging dock at the end of the class.
- If you are unable to connect to the TT access point – mostly the battery is low.
- Make sure the propellers are firmly intact before each mission. Use your hands to hold the motor and press (do not use excessive power) to check the propeller is firmly attached to the motor shaft.
- If you want to replace the propellors use the tool provided - do not use your hands to pull the propeller out. Always hold on to the motor when you pull the propellers out.

Rules – Rules - Rules

- This is an indoor drone – do not fly outdoors
- Always be respectful of other people's space and privacy – only fly in your space.
- Do not fly the drone close to objects, people, wall, and ceiling.
- If the drone crashes the drone will drop down and the propellers may fly off – be careful of the propeller flying off.
- Do not hold or grab the drone with your bare hands – the propeller rotates at very high velocity and could hurt your fingers/hand. Always use controls to land/abort the drone.
- Use caution when operating the drone.

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Our Plan for the drone

- Task 1: Manually operate the drone and become accustomed to the mobility of the drone.
- Task 2: Setup a virtual env in the PC/Host system to install DJITellopy packages to control the drone using python scripts
- Task 3: Control the drone using python scripts
- Task 4: Capture images and videos from the drone and transmit them back to the PC/Host system.
- Task 5: Use basic image processing algorithms on the transmitted images/video.
- Task 6: Use advance CNN image processing algorithms on the transmitted images/video.

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Projects

- Here are some example projects:
- Object Recognition – use of YOLO DL model to detect object of interests
- Object Tracking - use of YOLO DL model to track object of interests
- Voice Command Control – use voice commands to control the motion of the drone.