

# AI 드론 프로그래밍

동의과학대학교

인공지능컴퓨터정보과

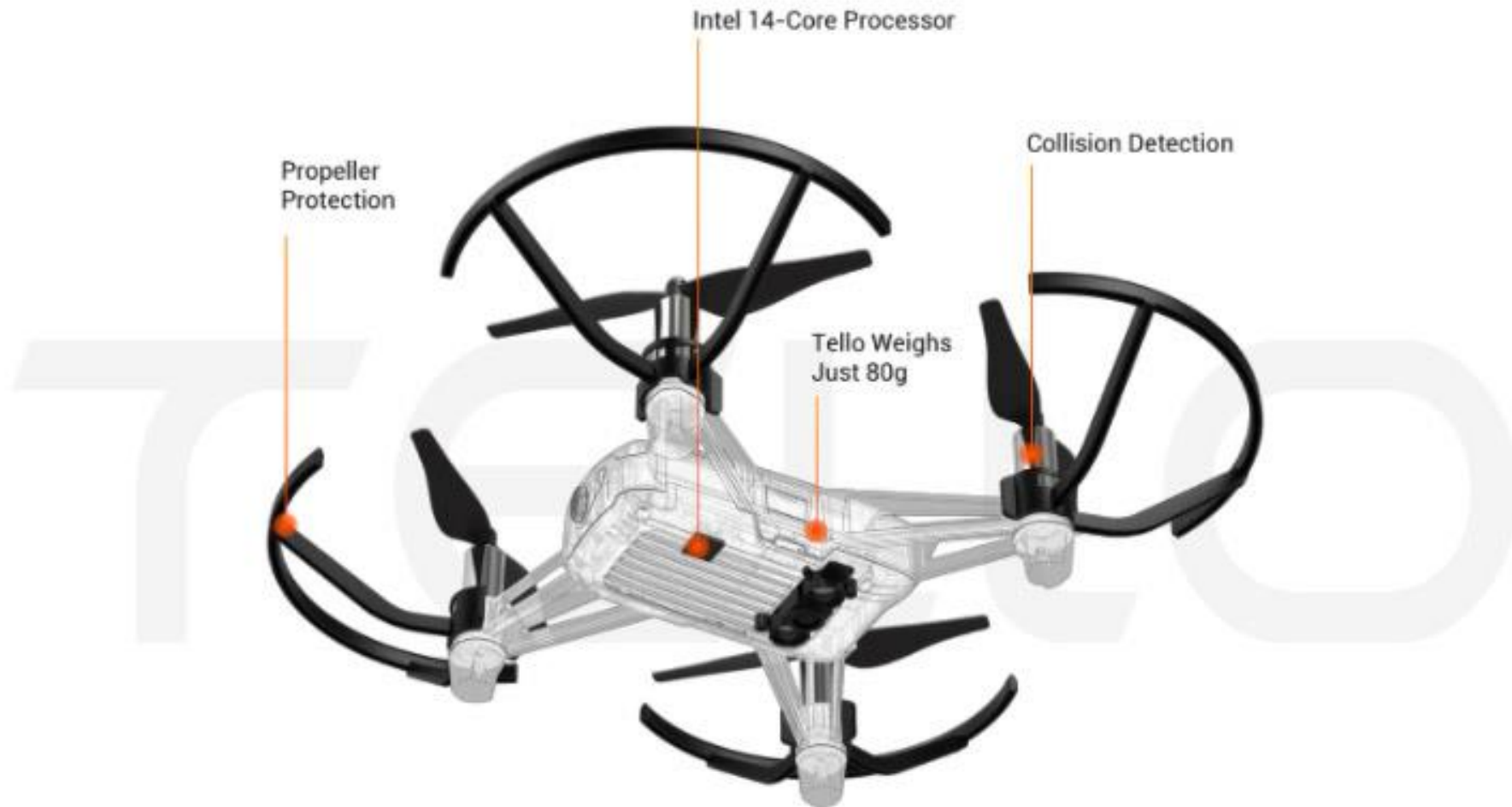
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# 강의 내용

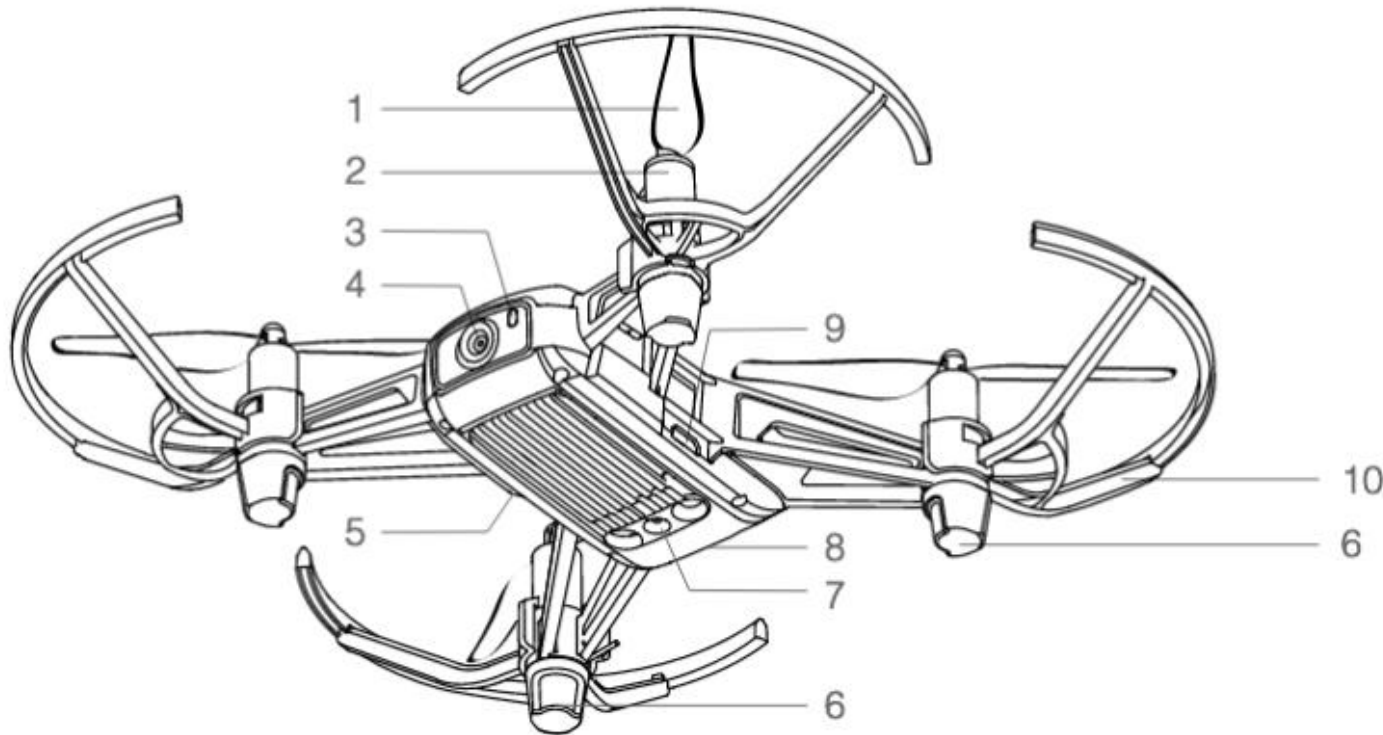
- DJI Tello 드론 기초
  - 드론의 종류, 비행원리, Tello 드론 구성요소(HW, SW) 등
  - 드론 앱을 사용한 드론 비행 기초 실습
  - DroneBlocks를 이용한 기초 드론 코딩
  - 드론 비행시 주의 할 점
- Tello SDK를 이용한 파이썬 코딩(1)
  - DJITelloPy 모듈
  - 기본 동작 제어
    - takeoff, land, up/down, forward/backward, cw/ ccw 등
  - 키보드 제어
- Tello SDK를 이용한 파이썬 코딩(2)
  - OpenCV 기초
  - 드론 카메라 이미지 캡처 및 저장
  - 드론 동영상 전송 및 저장
- 파이썬 기반 AI 드론 코딩
  - Cascade Classifier를 이용한 안면 인식
  - 드론 제어(PID 제어)
  - following me 드론 제작
- 팀 프로젝트 : 창의적인 AI 드론 제작



# Tello Drone 구성 요소



# Tello Drone 구성 요소



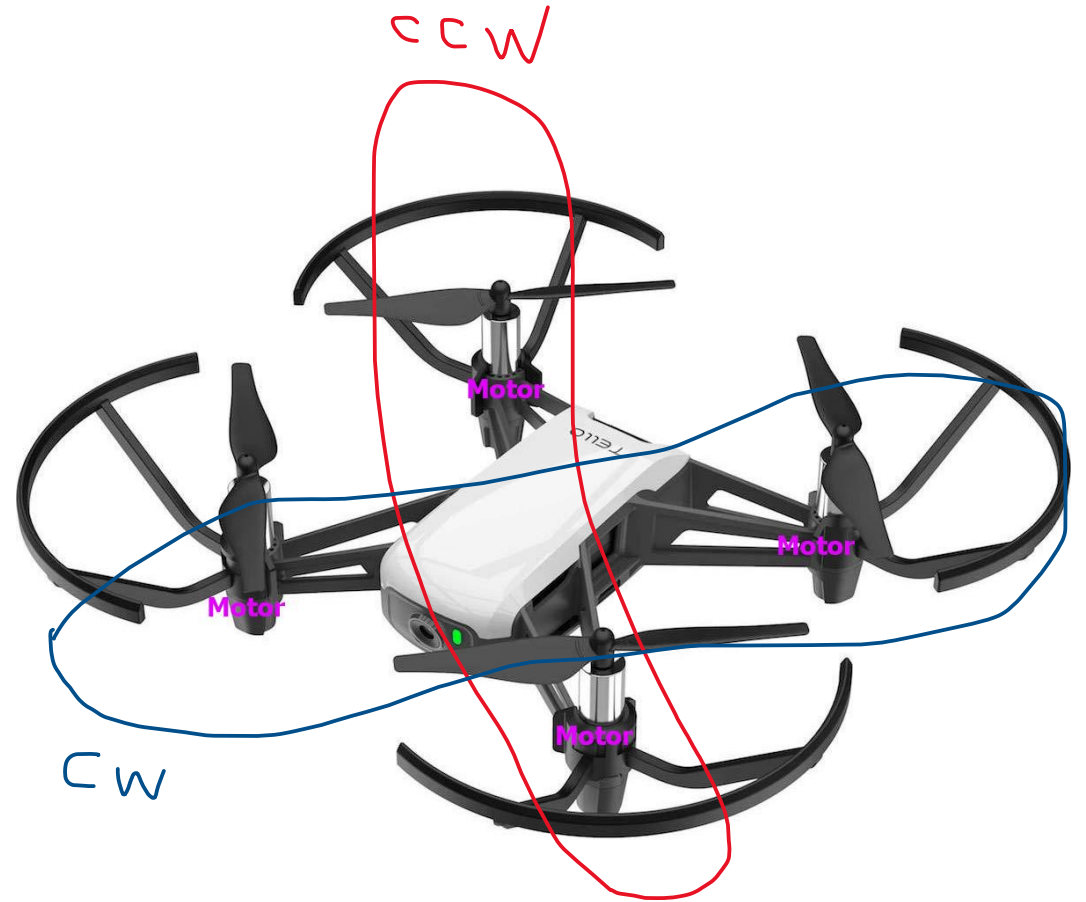
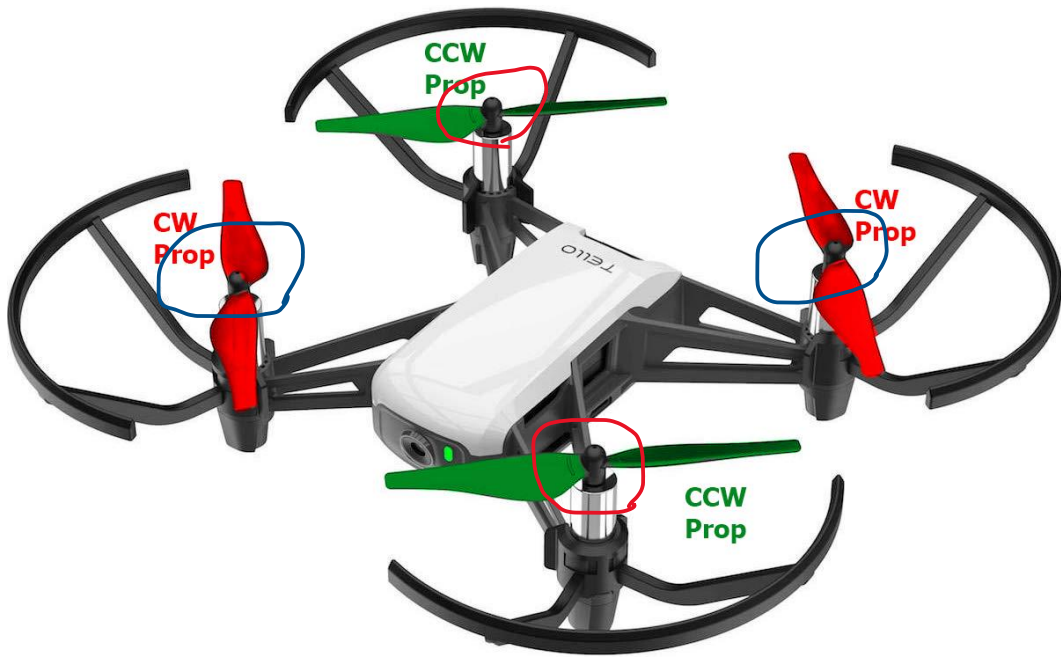
1. Propellers
2. Motors
3. Aircraft Status Indicator
4. Camera
5. Power Button
6. Antennas
7. Vision Positioning System
8. Flight Battery
9. Micro USB Port
10. Propeller Guards

# Tello 드론 사양

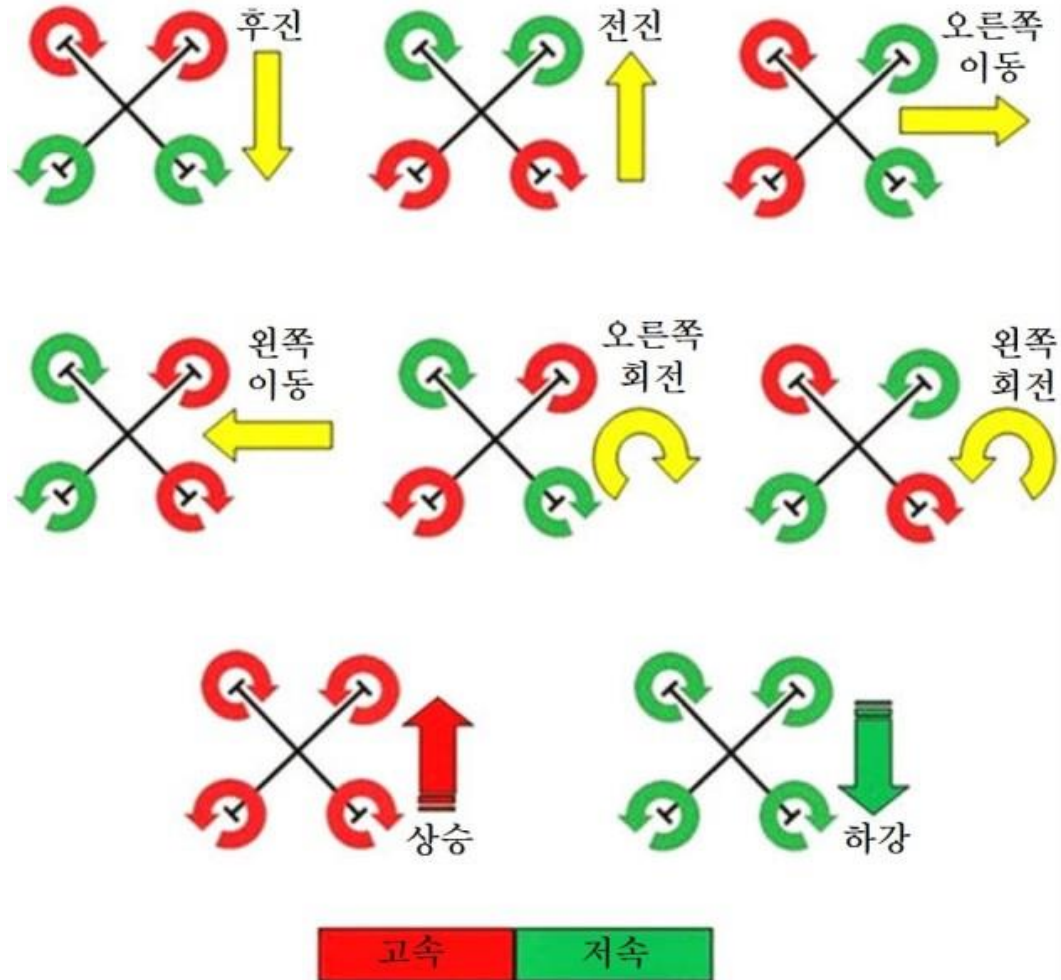
|                             |                           |
|-----------------------------|---------------------------|
| Weight                      | 87 g                      |
| Dimensions                  | 98×92.5×41 mm             |
| Propeller                   | 3 inches                  |
| Integrated Functions        | Telemetric sensor         |
|                             | Barometer                 |
|                             | LED                       |
|                             | Vision System             |
|                             | Wi-Fi 2.4 GHz 802.11n     |
|                             | Real-time streaming 720p  |
| Port                        | USB battery charging port |
| Operating temperature range | from 0° to 40°            |
| Operating frequency range   | from 2.4 to 2.4835 GHz    |
| Transmitter (EIRP)          | 20 dBm (FCC)              |
|                             | 19 dBm (CE)               |
|                             | 19 dBm (SRRC)             |

참고 : <https://dl-cdn.ryzerobotics.com/downloads/Tello/Tello%20User%20Manual%20v1.4.pdf>

# 프로펠러/ 모터



# 드론의 비행 원리 : Quadcopter





# Tello 드론 전용 앱



## Tello App

Tello App can experience more flight modes of Tello, with real-time image-transmission interface and camera, video-recording functions, which can easily experience the fun of aerial-photography. Tello app can also set the parameters of the drone, upgrade the firmware and calibrate the drone. Therefore, the Tello app is an essential software for using the Tello.



Requires iOS 9.0 or later.



Android version 4.4.0 or later.





# Tello 드론 전용 앱



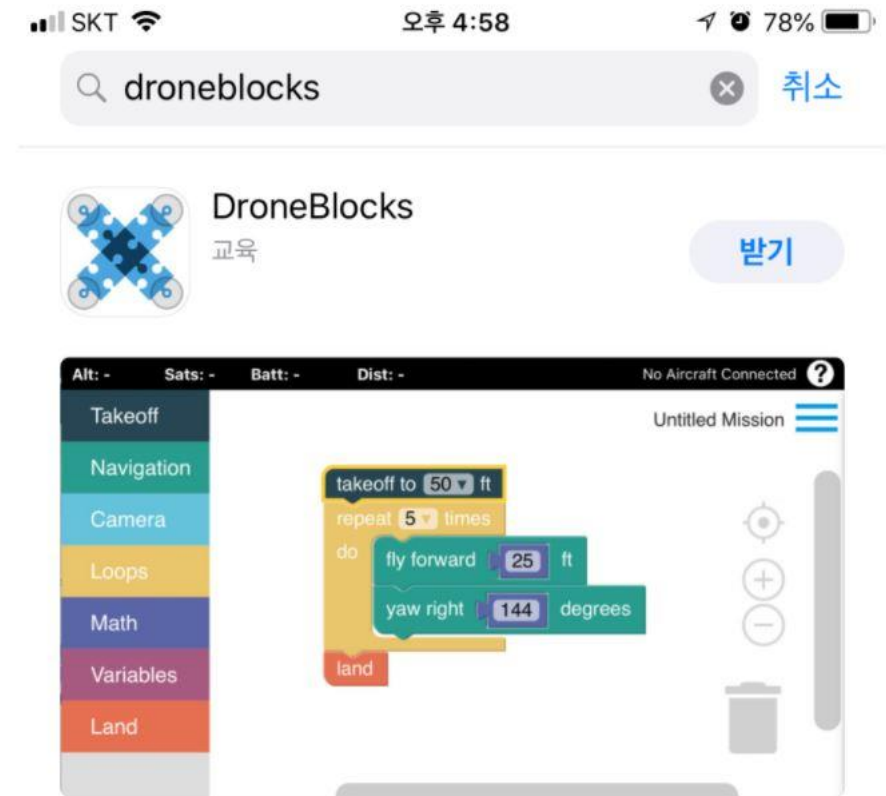
- Tello 사용자 매뉴얼 : <https://bit.ly/3ygby6T>

# 실습01 : 드론 앱 사용하기



# DroneBlocks 블록 코딩

- 전용 코딩 앱
  - 크롬 앱 : <https://bit.ly/3xi6qPr>
  - iOS : <https://apple.co/3hek00N>
  - Android : <https://bit.ly/3qLuuYM>



# DroneBlocks 블록 코딩

The screenshot displays the DroneBlocks application interface for a Tello drone. At the top, a status bar shows: Batt: 68%, Alt: 220 cm, ToF: 222 cm, Pitch: -1°, Roll: -2°, Yaw: 0°, and Tello with a help icon. On the left is a category menu with: Takeoff, Navigation, Camera, Flip, Loops, Logic, Math, Variables, and Functions. The main workspace contains a mission sequence of blocks: takeoff, fly forward (36 in), fly up (100 in), hover (5 seconds), take photo, fly forward (20 in), fly down (100 in), fly backward (40 in), and land. A red 'Abort Mission' button is positioned below the 'fly backward' block. To the right of the blocks is a live video feed showing a snowy landscape. Further right are controls for a camera view: a target icon, zoom in (+) and zoom out (-) buttons, and a trash icon. The mission is titled 'Untitled Mission'.

# 실습02 : Droneblocks 앱 사용하기

