**ESP32-WiFi**

The ESP32-WiFi handles the automation logic, with the provided code managing sensor data and controlling the pumps. It connects to the internet via an AIR Card (Access Point) for communication with Arduino Cloud, where a dashboard displays the sensor data.

An additional external variable, ‘ripeness,’ needs to be integrated. This data will be provided by the ESP32-CAM, either through Bluetooth communication or via the Access Point. You will need to decide which method is easier to implement.

**ESP32-CAM**

The ESP32-CAM connects to the internet via the same Access Point and:

1. Every 4 minutes, it captures an image and sends it to Roboflow for processing using the YOLO v8 model. The progress, such as "image uploaded successfully," should be reported in the serial monitor.

Additionally, the processed image (with bounding boxes from Roboflow) should be viewable under Roboflow project.

1. Calculation on the JSON response from Roboflow provides the results, including the total number of tomatoes detected and the percentage of ripe tomatoes. This information should be printed to the serial monitor in the format: "All tomatoes = #; ripe tomatoes = #.

Variable ‘ripeness’ has to be made available for use in ESP32-WiFi.

But before that, it has to be averaged with ‘ripeness\_tello’ (by default = 0)

so, ripeness = (ripeness + ripeness\_tello)/2

1. Getting ripeness\_tello:

After calculating ‘ripeness’ (from the JSON response from Roboflow), check if it exceeds 30%. If it does not, send the ‘ripeness’ value (as described above) to the ESP32-WiFi. If it exceeds 30%, proceed with the following steps:

* 1. The ESP32-CAM disconnects from the Access Point.
  2. The ESP32-CAM connects to the TELLO WiFi (Access Point) and requests images from the drone.

*The Tello drone will take off, ascend 50 cm, turn left 90°, and fly 3 meters to the right, capturing 1 image at each meter (3 images total). It will then stop, turn 180°, and fly 3 meters back to the base, again capturing 1 image at each meter (3 images total). After turning left 90° and landing, the drone will transfer the images to the ESP32-CAM and wait for the next command.*

* 1. Images captured during the TELLO Wi-Fi session are stored on the ESP32-CAM's SD card (4GB available). If TELLO Wi-Fi is unavailable (after a reasonable wait time, e.g., 30 seconds), set ‘ripeness\_tello’ = 0 and pass the averaged ‘ripeness’ value to the ESP32-WiFi, skipping the next step.
  2. Once the session is complete, disconnect from TELLO Wi-Fi, reconnect to the original Access Point, and send the stored images from the SD card to Roboflow for YOLO processing. Afterward, delete the images from the SD card to save space. For the experiment, 5 images will be taken (the drone will be programmed to capture 5 shots). The JSON responses from these images will be averaged and saved as ‘ripeness\_tello,’ which will then be passed for further processing.