Deep Vision

Better object recognition with less power
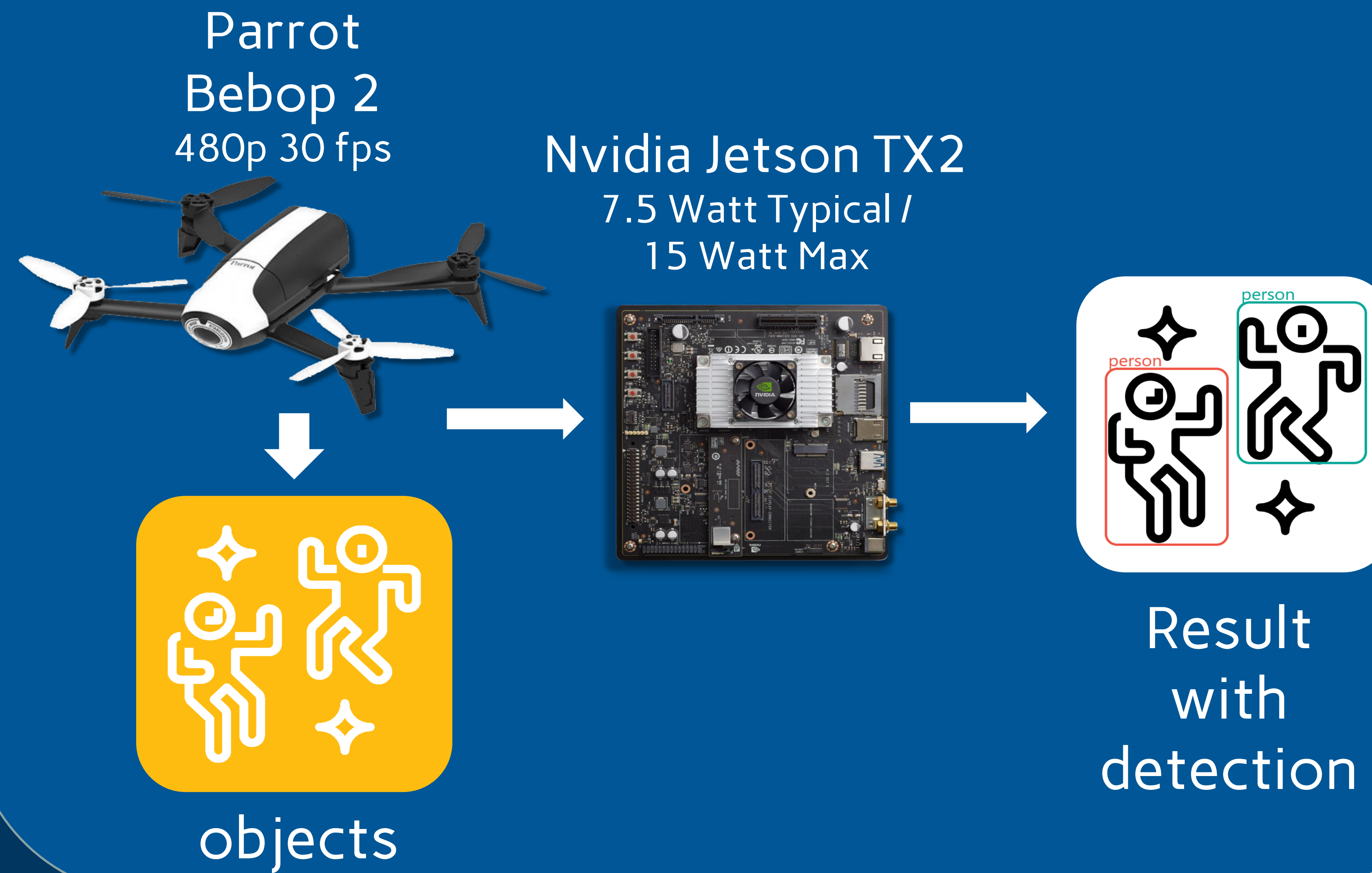
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Overview

The project Deep Vision features **GPU implementation** of **neural network** based **object detection** algorithm for **drones**.

The drone first captures the video in real time and sends the data as frames to the processing unit.

The processing unit uses the pre-trained weights to inference and **detect** objects in the video, then outputs the **real time video** with the boxes that mark the detected objects' **positions and classes**.

Hardware & Design

Parrot Bebop 2
480p 30 fps

Nvidia Jetson TX2
7.5 Watt Typical /
15 Watt Max

objects → Result with detection

Algorithm

To detect a object, **a weight** is trained from a large **dataset** of many pictures with different objects. The dataset specifies the **bounding location** of the object as well as the **group the object belongs to**.
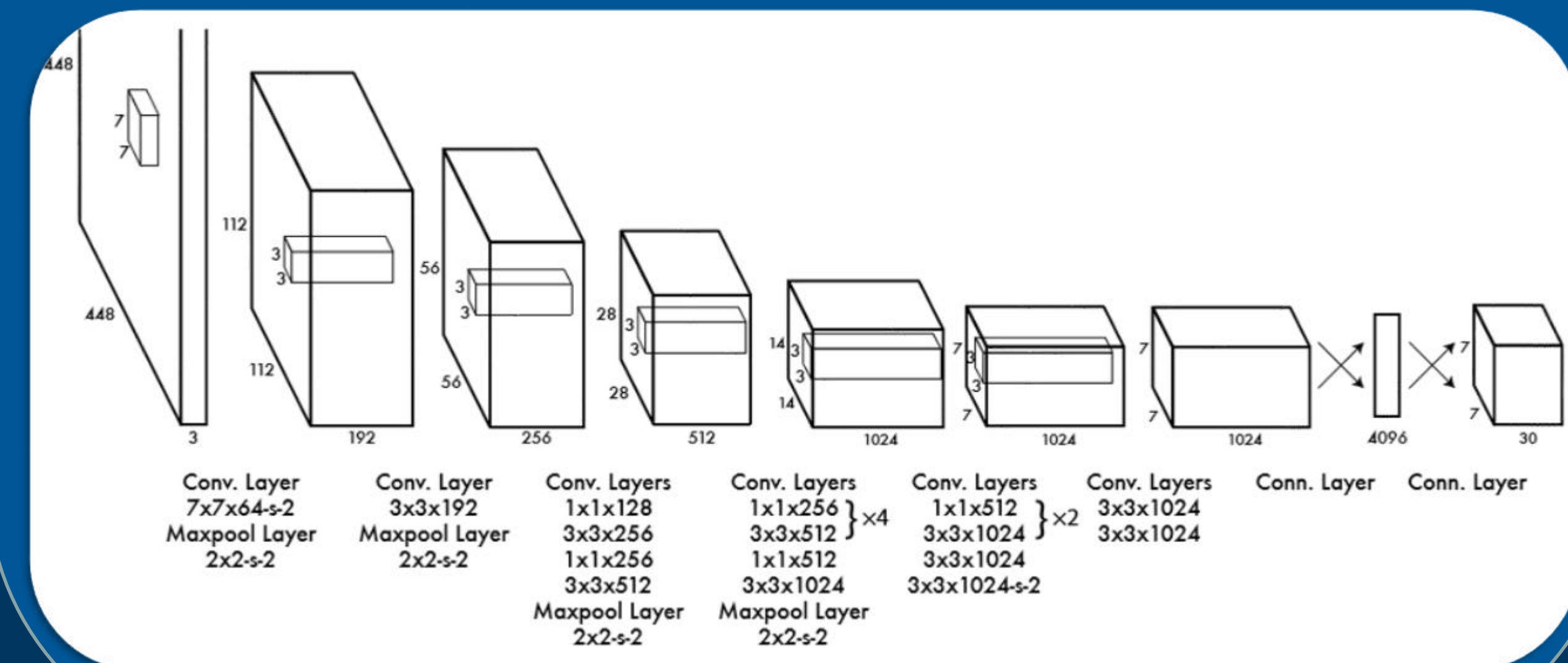
In real time detection, **CNN (Convolutional Neural Network)** uses the weights trained from the previous dataset to infer objects in each frame of the video. This is done through many **convolutional layers** with different resizing schemes. The CNN network divides the image into regions and predicts bounding boxes and probabilities for each region.

Sample detection result
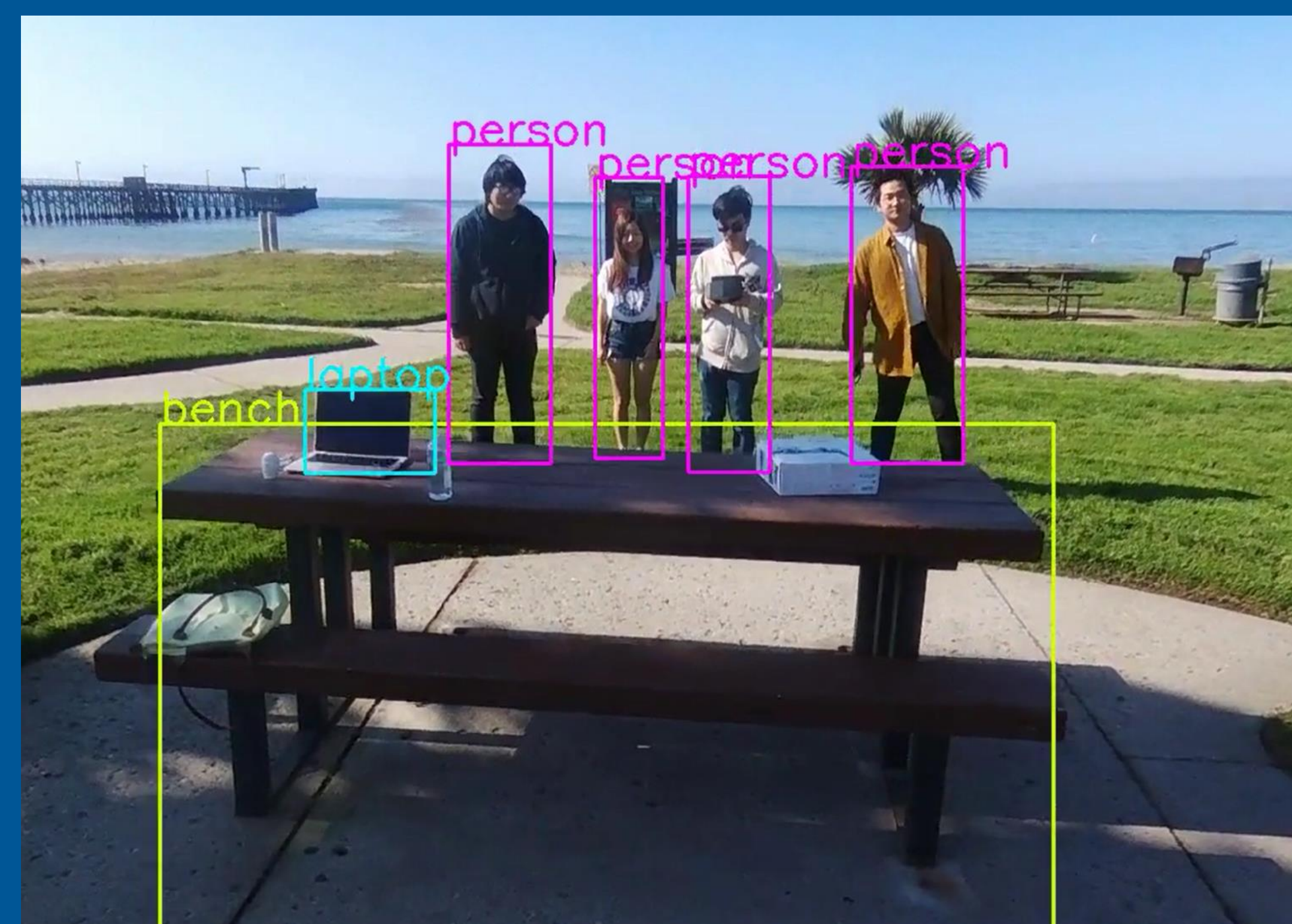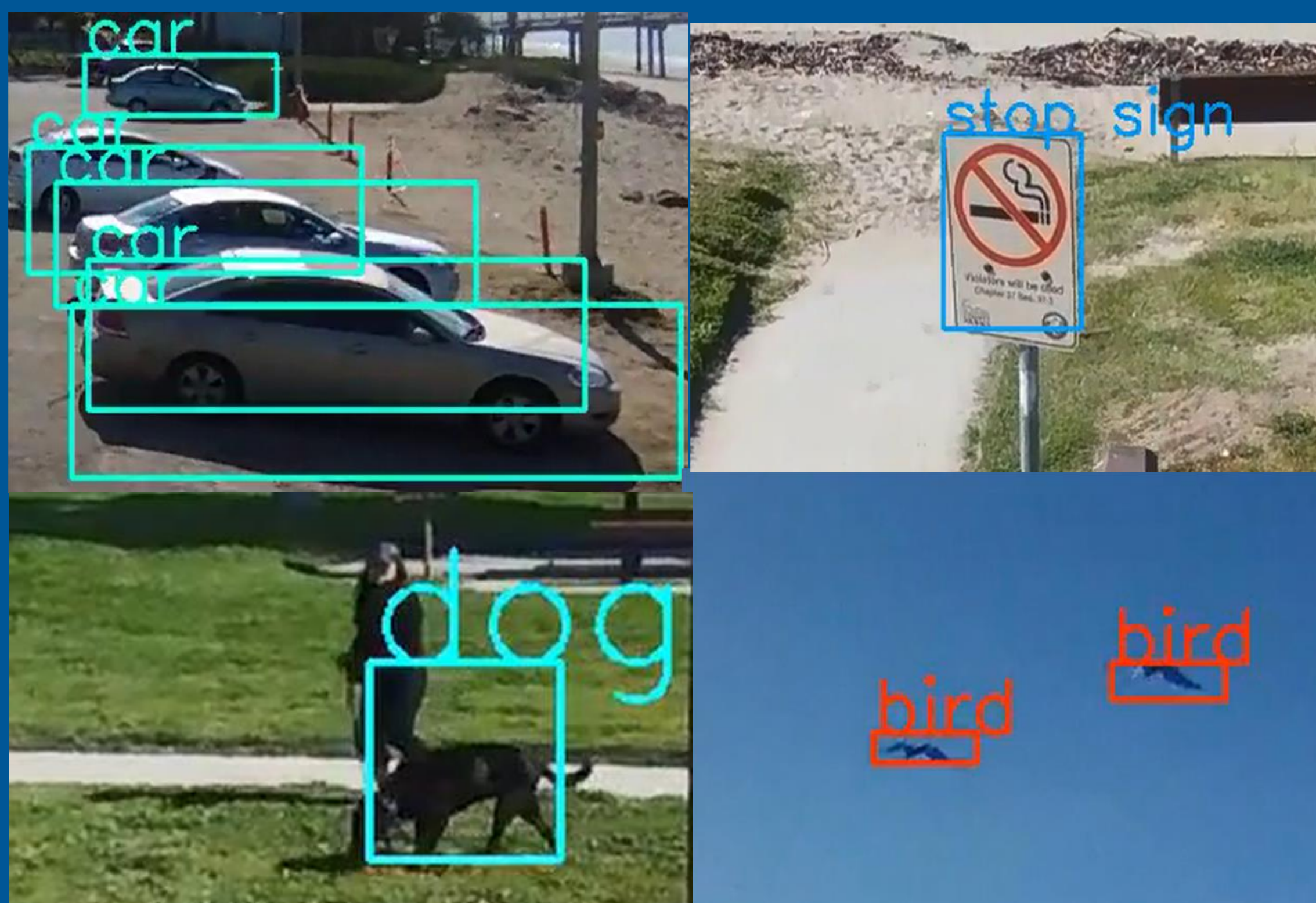
- Real time detection average accuracy: **72%**
- Able to detect common objects such as **people** and **cars**
- 480p 30fps
- Energy usage: **15 Watt**

Scan QR Code for demo video!

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