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Using TENSORFLOW Lite
Object Detection Android for Robotics

1. OVERVIEW

The TensorFlow Lite Object Detection Android Demo is an open-source Android application that uses machine learning models to **detect and classify objects in real-time** using a mobile device's camera. It uses **TensorFlow Lite** (TFLite) models that are lightweight and optimized for mobile devices.

You can use this application to integrate object detection into a **robot's vision system** by running the app on an Android phone mounted on the robot or embedded Android device.

Project Repository

GitHub Link:

https://github.com/tensorflow/examples/tree/master/lite/examples/object_detection/android

2. KEY FEATURES

- Real-time object detection using TFLite models.
- Supports various models trained on COCO dataset:
  - Quantized MobileNet SSD
  - EfficientDet Lite0
  - EfficientDet Lite1
  - EfficientDet Lite2

- Fully functional Android app using CameraX and TensorFlow Lite.
- Models are **downloaded automatically via Gradle**.

3. PREREQUISITES

To run or customize this project:
- Android Studio (Tested with Bumblebee version or higher)
- Physical Android Device (API Level 24+ / Android 7.0 or higher)
- USB debugging enabled (Developer mode on your device)

4. SETUP AND BUILD INSTRUCTIONS

Step-by-step to build and run the app:
- ✓ **Download and Open the Project**
  - Clone the repository:
  - Open Android Studio → Open an existing project
- ✓ **Build Configuration**
- ✓ **Connect Android Device**
- ✓ **Run the App**

5. INTEGRATING IN A ROBOTIC SYSTEM

To use this demo for a robot:

Option A: Mount Android Phone on Robot
1. Run the app on the phone.
2. Use the detected object info (from UI or logs).
3. Create an interface between the phone and robot (via Bluetooth/Wi-Fi/USB).
   - Example: Send detected object names or positions via socket to robot control board.

Option B: Modify App for Robot Control

6. CONCLUSION

This demo provides a robust and optimized solution for real-time object detection on Android. It's suitable for robotics applications by integrating Android-based vision with detection capabilities and external robot controls. You can deploy the model, detect objects, and based on detection results, trigger robotic behavior.