YoloV5 on SBC Report

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INTRODUCTION

In our vision, the AI vehicle detection system needs to run on a single-board computer that can be integrated with the camera system. Until now, we've had success running it on desktops with 9th-generation Intel i9 processors and laptops with 4th-generation Intel i7 processors.

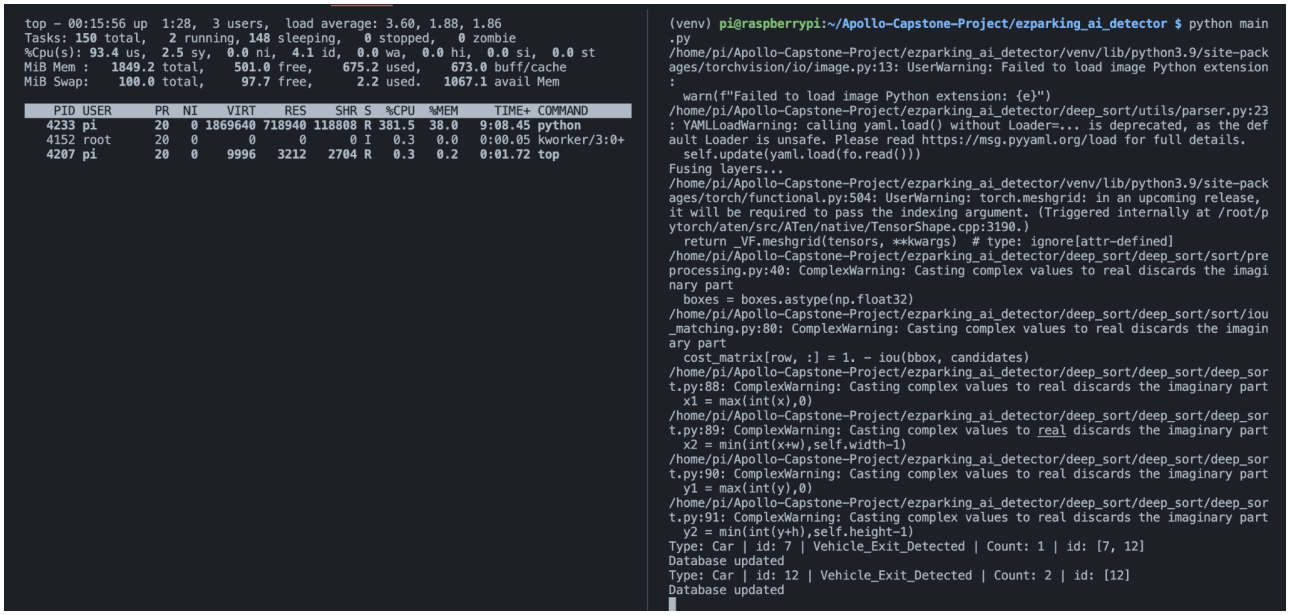
HYPOTHESIS

Since YoloV5 has worked successfully on our local computers, we believe it will work on single-board computers as well. There may be differences in fluency due to performance differences, but what we want to test is whether it can run successfully on the single-board computer.

CONFIGURATION LIST

- Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
- 2GB LPDDR4-3200 SDRAM (depending on model)
- 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE Gigabit Ethernet
- 2 USB 3.0 ports; 2 USB 2.0 ports.
- Raspberry Pi standard 40 pin GPIO header (fully backwards compatible with previous boards)
- 2 × micro-HDMI ports (up to 4kp60 supported)
- 2-lane MIPI DSI display port
- 2-lane MIPI CSI camera port
- 4-pole stereo audio and composite video port
- H.265 (4kp60 decode), H264 (1080p60 decode, 1080p30 encode)
- OpenGL ES 3.1, Vulkan 1.0
- Micro-SD card slot for loading operating system and data storage
- 5V DC via USB-C connector (minimum 3A)
- 5V DC via GPIO header (minimum 3A)
- Power over Ethernet (PoE) enabled (requires separate PoE HAT)
- Operating temperature: 0 – 50 degrees C Ambien

RESULTS



CONCLUSION

Through our testing and debugging, we finally made YOLOv5 run successfully on the SBC without any errors. This was a major breakthrough in our project and it was very helpful for future developments.