TrackerGoturn

Performance Report

2017-10-20

OPEN AI LAB

Revision Record

Date	Rev	Change Description	Author
2017-10-20	0.1.0	Initial version	

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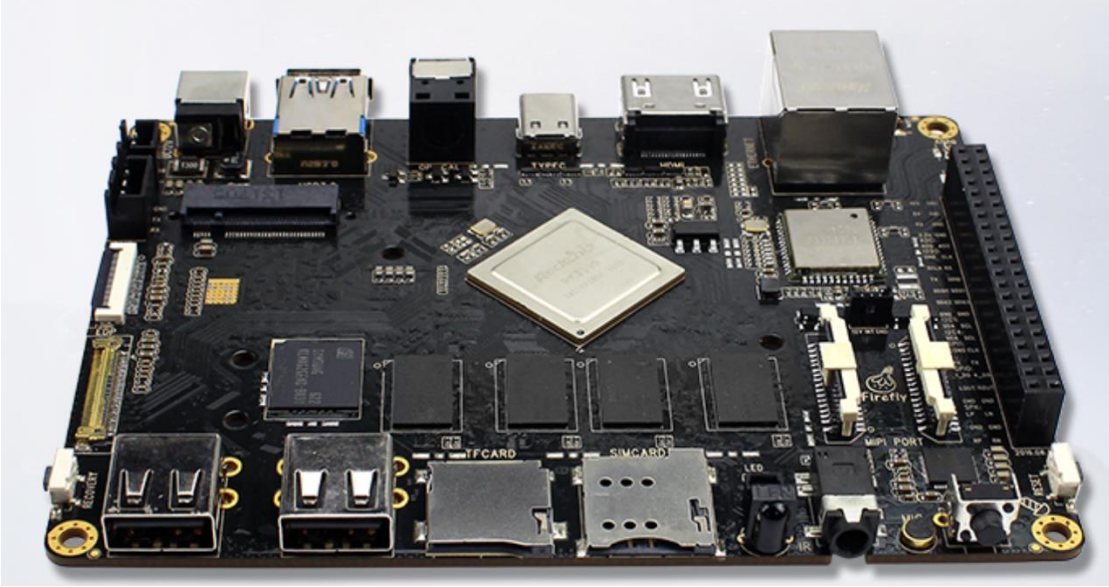
1 Purpose

This Report is tested on RK3399 platform ,the Arm Compute Library is version 17.10 and the CaffeOnACL is version 0.4.0.

2 Test Environment

2.1 Hardware SoC : Rockchip RK3399

- GPU: Mali T864 (800MHz)
- CPU: Dual-core Cortex-A72 up to 2.0GHz (real frequency is 1.8GHz); Quad-core Cortex-A53 up to 1.5GHz (real frequency is 1.4GHz)
- Camera:1080P USB Camera



2.2 Software Environment: Ubuntu 16.04

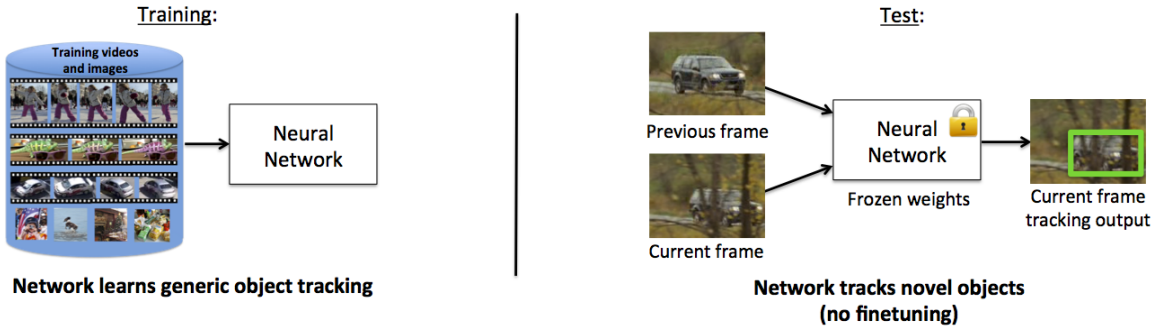
- Operating System : Ubuntu 16.04 SMP
- Arm Compute Library(ACL): 17.10
- CaffeOnACL: 0.4.0
- OpenCV: 3.3.0
- Trax: 1.2.0

3 Principle of TrackerGoturn

TrackerGoturn is a tracker using SqueezeNet based GOTURN: Generic Object Tracking Using Regression Networks. GOTURN appeared in “Learning to Track at 100 FPS with Deep Regression Networks, David Held, Sebastian Thrun, Silvio Savarese”, release on European Conference on Computer Vision (ECCV 2106).

GOTURN addresses the problem of single target tracking: given a bounding box label of an object in the first frame of the video, we track that object through the rest of the video.

Note that our current method does not handle occlusions; however, it is fairly robust to viewpoint changes, lighting changes, and deformations. Here is a brief overview of how our system works:



Using a collection of videos and images with bounding box labels (but no class information), we train a neural network to track generic objects. At test time, the network is able to track novel objects without any fine-tuning. By avoiding fine-tuning, our network is able to track at 100 fps(GPU).

4 Download and Compile

TrackerGoturn source code: https://github.com/OAID/TrackerGoturn

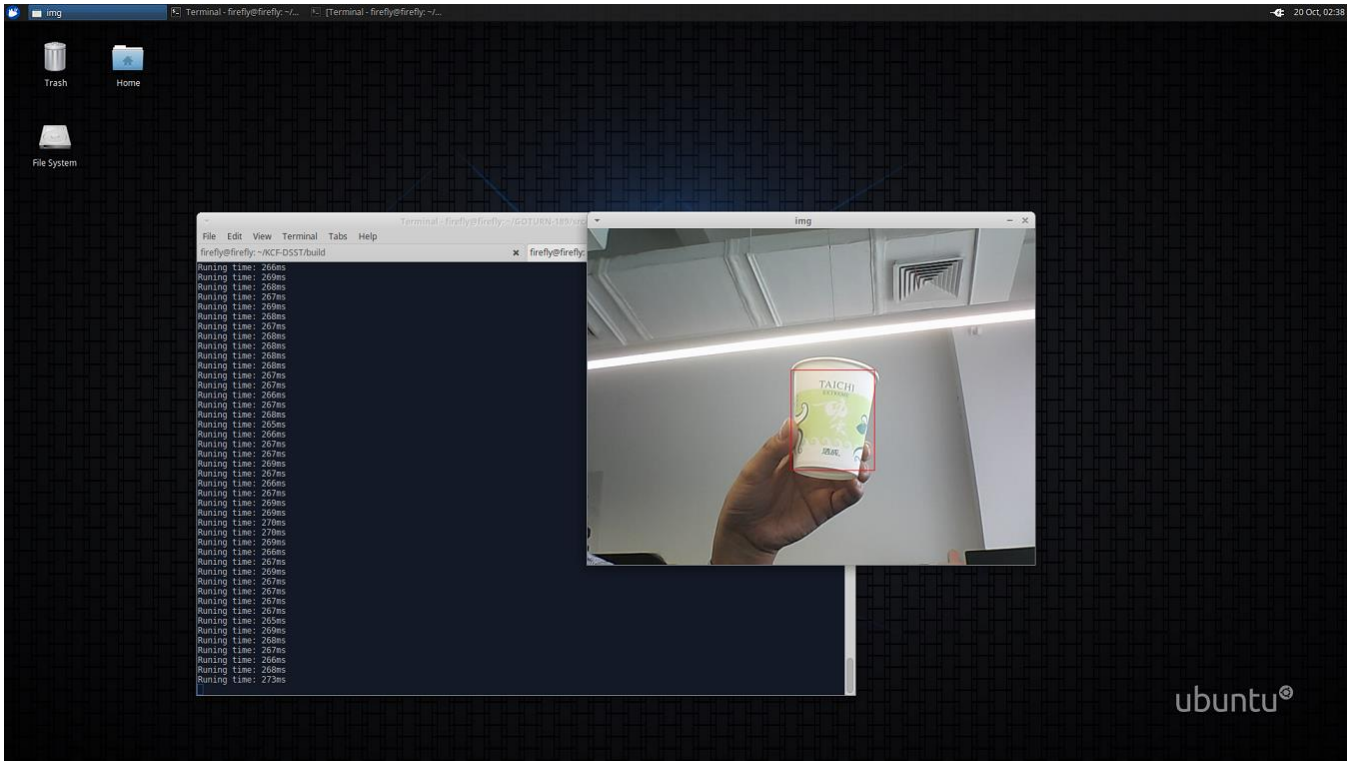
Enter “git https://github.com/OAID/TrackerGoturn” command to clone the source code on RK3399 Linux Terminal.

Installation Guide is here:

https://github.com/OAID/TrackerGoturn/blob/master/TrackerGoturnDemo/INSTALL.md

5 Performance

The result of TrakerGoturn running on RK3399 as following picture:

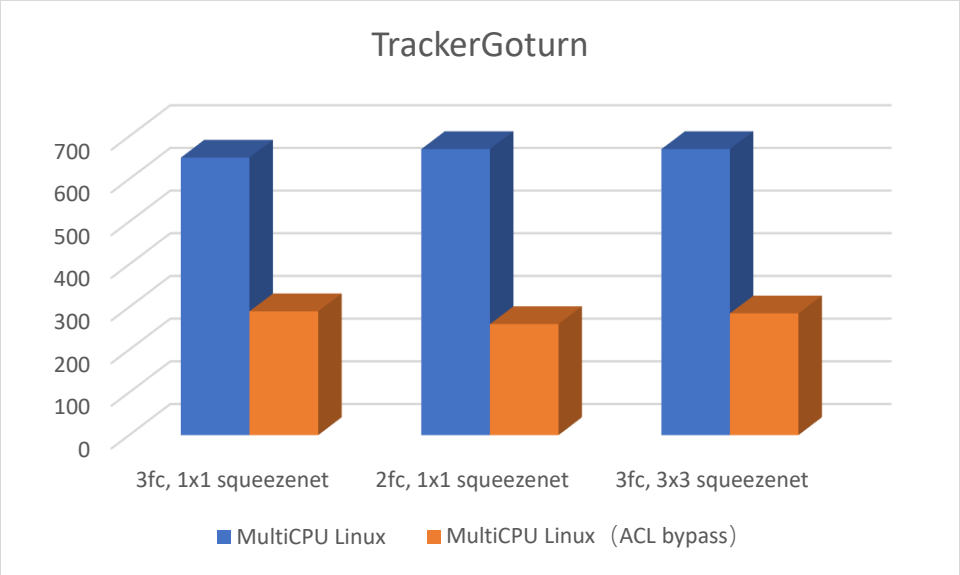


5.1 Multi-CPU performance

Multi-CPU scheduled by Linux kernel without any CPU binding. The input video is 480P(640x480), format is YUYV(YUV422).

The SqueezeNet convolutional kernel can be 1x1 and 3x3 sizes, and the end of SqueezeNet can be 3 full connection layers or 2 full connection layers, the CPU performance as following table.

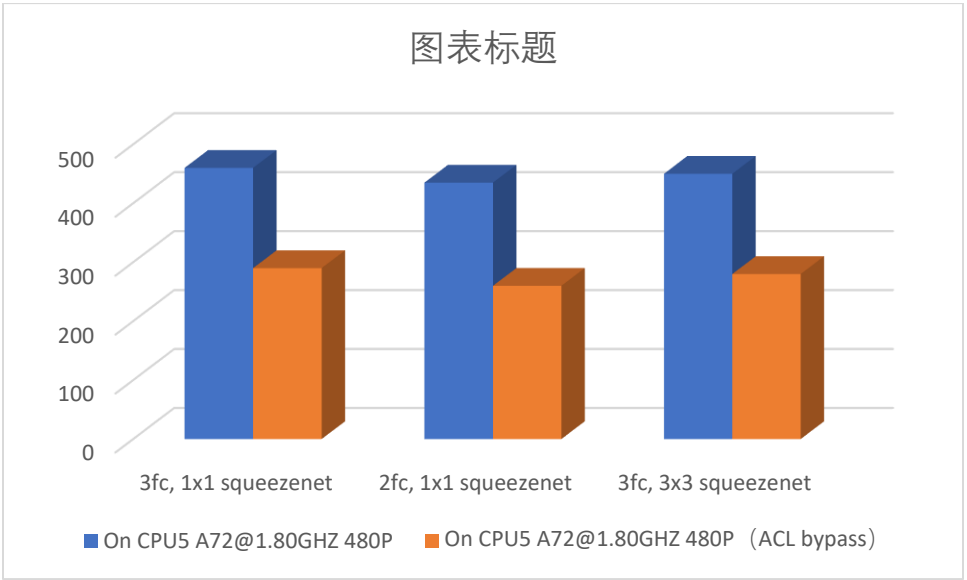
	3fc, 1x1 squeezenet	2fc, 1x1 squeezenet	3fc, 3x3 squeezenet
MultiCPU Linux	650ms/frame	670ms/frame	670ms/frame
MultiCPU Linux（ACL bypass）	290ms/frame	260ms/frame	285ms/frame



5.2 Single CPU performance

5.2.1 Single A72 CPU performance

	3fc, 1x1 squeezenet	2fc, 1x1 squeezenet	3fc, 3x3 squeezenet
On CPU5 A72@1.80GHZ 480P	460ms/frame	435ms/frame	450ms/frame
On CPU5 A72@1.80GHZ 480P（ACL bypass）	290ms/frame	260ms/frame	280ms/frame



5.2.2 Single A53 CPU performance

	3fc, 1x1 squeezenet	2fc, 1x1 squeezenet	3fc, 3x3 squeezenet
On CPU1 A53@1.42GHz 480P	1090ms/frame	1010ms/frame	1030ms/frame
On CPU1 A53@1.42GHz 480P （ACL bypass）	670ms/frame	630ms/frame	660ms/frame