

RZ/V2L, RZ/V2M, RZ/V2MA DRP-AI ACCURACY REPORT

REV.7.20
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This document describes DRP-AI accuracy report for RZ/V2L, RZ/V2M, RZ/V2MA.
In this report, RZ/V2L, RZ/V2M, and RZ/V2MA are referred to as RZ/V2x.

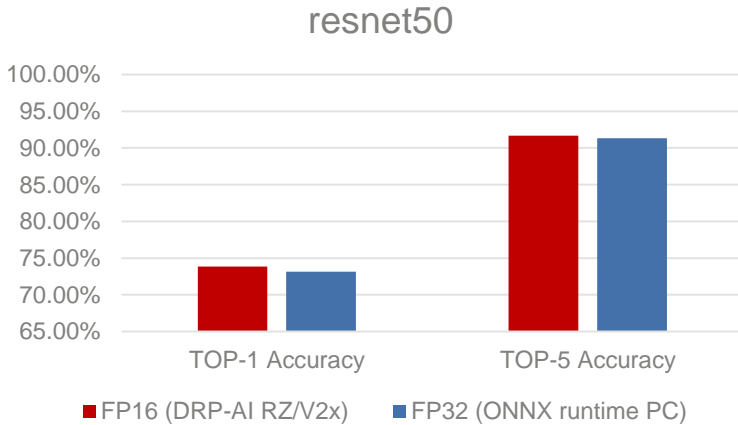
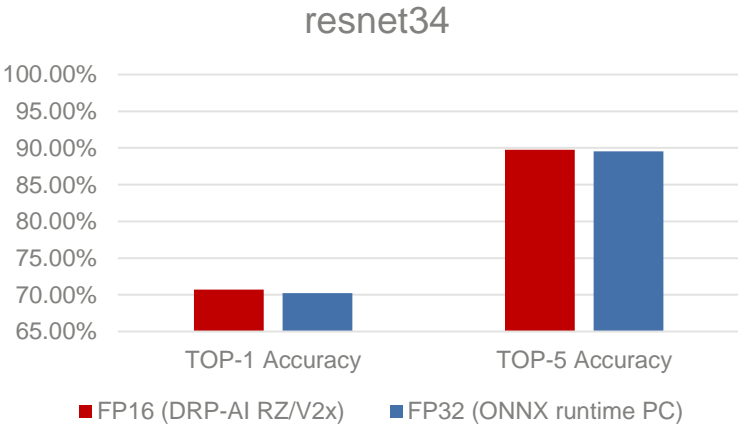
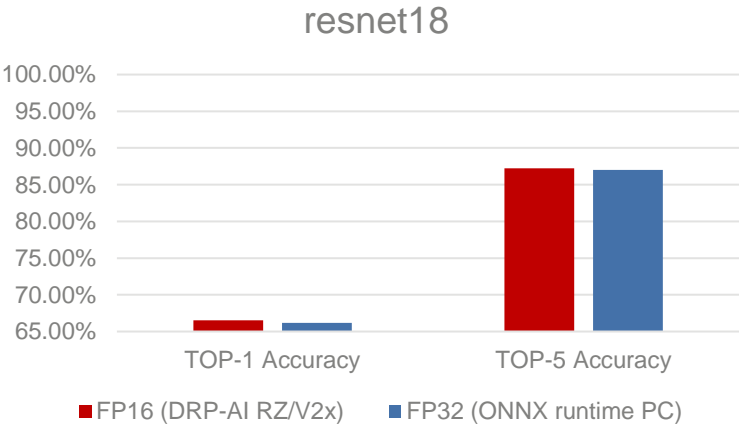
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ResNet ACCURACY

$$rate(\%) = \left(1 - \frac{\text{Number of true positive images}}{\text{Number of all images}}\right) \times 100$$

The accuracy for ResNet models using DRP-AI (FP16) are listed below.
It is a comparison of the accuracy with the ONNX runtime (FP32).

Model structure	DRP-AI (FP16)		ONNX runtime (FP32)	
	TOP-1	TOP-5	TOP-1	TOP-5
resnet18	66.54%	87.22%	66.20%	87.00%
resnet34	70.72%	89.74%	70.22%	89.55%
resnet50	73.87%	91.68%	73.17%	91.31%



ResNet MEASUREMENT CONDITION

- Pre-trained model
torchvision0.7.0
https://pytorch.org/hub/pytorch_vision_resnet/
- Validation data
RENESAS original data set (50,000 images)
Jpeg files 256 x 256
- DRP-AI Translator v1.12
- ONNX runtime 1.3.0
- Processing
Pre-processing is resizing without cropping, and normalizing with mean=[0.485, 0.456, 0.406] and std=[0.229, 0.224, 0.225].
DRP-AI includes 'cast to fp16' in the pre-processing.

* See the processing block on the right.

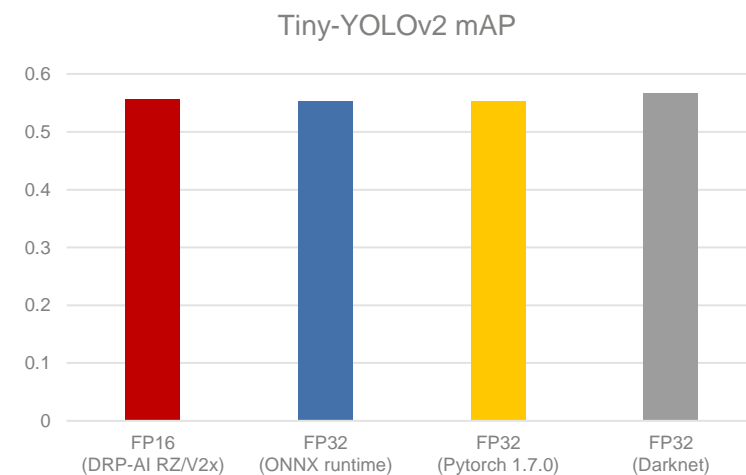
DRP-AI	ONNX runtime
Resize	Resize
Cast to FP16	
Normalize	Normalize
Inference (ResNet)	Inference (ResNet)
Softmax	Softmax

Tiny-YOLOv2 mAP (Mean Average Precision)

The mAP for Tiny-YOLOv2 model using DRP-AI (FP16) are listed below.

It is a comparison of the mAP and the AP for each class with ONNX runtime (FP32) , PyTorch 1.7.0 (FP32) and Darknet (FP32).

	DRP-AI (FP16)	ONNX runtime (FP32)	PyTorch 1.7.0 (FP32)	Darknet (FP32)
mAP	0.5563	0.5531	0.5531	0.567
aeroplane	0.615	0.604	0.604	0.616
bicycle	0.72	0.717	0.717	0.727
bird	0.498	0.49	0.49	0.497
boat	0.414	0.391	0.391	0.433
bottle	0.215	0.191	0.191	0.224
bus	0.672	0.671	0.671	0.683
car	0.669	0.665	0.665	0.672
cat	0.666	0.66	0.66	0.691
chair	0.355	0.347	0.347	0.356
cow	0.519	0.532	0.532	0.545
diningtable	0.54	0.57	0.57	0.584
dog	0.611	0.603	0.603	0.622
horse	0.714	0.699	0.699	0.71
motorbike	0.69	0.693	0.693	0.704
person	0.593	0.595	0.595	0.607
pottedplant	0.265	0.281	0.281	0.268
sheep	0.555	0.558	0.558	0.562
sofa	0.53	0.515	0.515	0.534
train	0.683	0.691	0.691	0.71
tvmonitor	0.602	0.59	0.59	0.597



Please refer to the URL for the calculation of mAP.
<https://github.com/AlexeyAB/darknet#when-should-i-stop-training>

Tiny-YOLOv2 MEASUREMENT CONDITION

- Pre-trained model
Darknet Tiny- YOLOv2 (Trained by Pascal VOC 2007+2012)
<https://pjreddie.com/darknet/yolov2/>
- Validation data
Pascal VOC 2007 Test Data With Annotations (Without “difficult” flag is 1)
<https://pjreddie.com/projects/pascal-voc-dataset-mirror/>
* At the time of measurement, all test images were converted to 640x480 size in advance.
- DRP-AI Translator v1.20
- ONNX runtime 1.3.0
- PyTorch 1.7.0
- Processing
Pre-processing is resizing 640x480 to 416x416, and normalizing with mean=[0, 0, 0] and std=[1, 1, 1].
DRP-AI includes ‘cast to fp16’ in the pre-processing.
* See the processing block on the right.
- Thresholds
Object Score = 0.001
nms = 0.45
IoU = 0.5

DRP-AI	ONNX runtime	PyTorch	Darknet
Resize	Resize	Resize	Resize
Cast to FP16			
Normalize	Normalize	Normalize	
Inference (Tiny-YOLOv2)	Inference (Tiny-YOLOv2)	Inference (Tiny-YOLOv2)	Inference (Tiny-YOLOv2)
HWC to CHW			

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