

# Generic Multi-object Detection



## MODEL DETAILS

The model is trained on the full 80-class COCO dataset and serves as a generic multi-object detector. It can be fine-tuned to achieve improved performance on specific tasks. In addition to predicting bounding boxes, the architecture is optimized for efficient deployment on embedded systems.



## MODEL SPECIFICATIONS

### Inputs

- 384×288×3 RGB image

### Outputs

- Object bounding boxes
- Predicted classes

### Architecture

- The model uses a YOLO-like anchor-free architecture
- There are three detection scales
- Classes and bounding boxes are separated in the outputs

### Parameters

- 3,025,072 (3,014,672 trainable, 10,400 non-trainable)

Figure 1: Generic Multi-object Detection Model Output.

AUTHORS	Lattice Semiconductor	SOURCE CODE	<a href="#">Training Source Code</a>
VERSION	gmod-cpnx-8.1.0	TOOLCHAIN	<a href="#">LATTE</a>
RELEASE	2025-12-18		<a href="#">LSCQuant</a>

# PERFORMANCE EVALUATION

## Live Evaluation

This model has not been tested or validated on FPGA hardware.

## Offline Evaluation

Because the model has not been integrated into an FPGA pipeline, it has been evaluated exclusively offline on the following datasets:

- COCO Validation Full 80 classes: 4,952 images with 36,335 annotated bounding boxes.
- COCO Validation 8 Automotive classes: Includes only images containing at least one of the following classes: person, bicycle, car, motorcycle, bus, truck, traffic light, and stop sign. This subset is used to compare results between the generic multi-object detector and the fine-tuned model. Size: 3,028 images with 14,782 annotated bounding boxes.

The KPIs for the evaluation data are reported in Table 1. Figure 2 illustrates the AP@0.5 performance comparison across models.

Table 1: Model performance across datasets.

Dataset	Metric	Value	Notes
COCO Validation 2017	mAP@50	0.39	Full validation dataset, i.e., 80 classes
COCO Validation 8 Automotive Classes	mAP@50	0.441	COCO validation subset with 8 Automotive classes

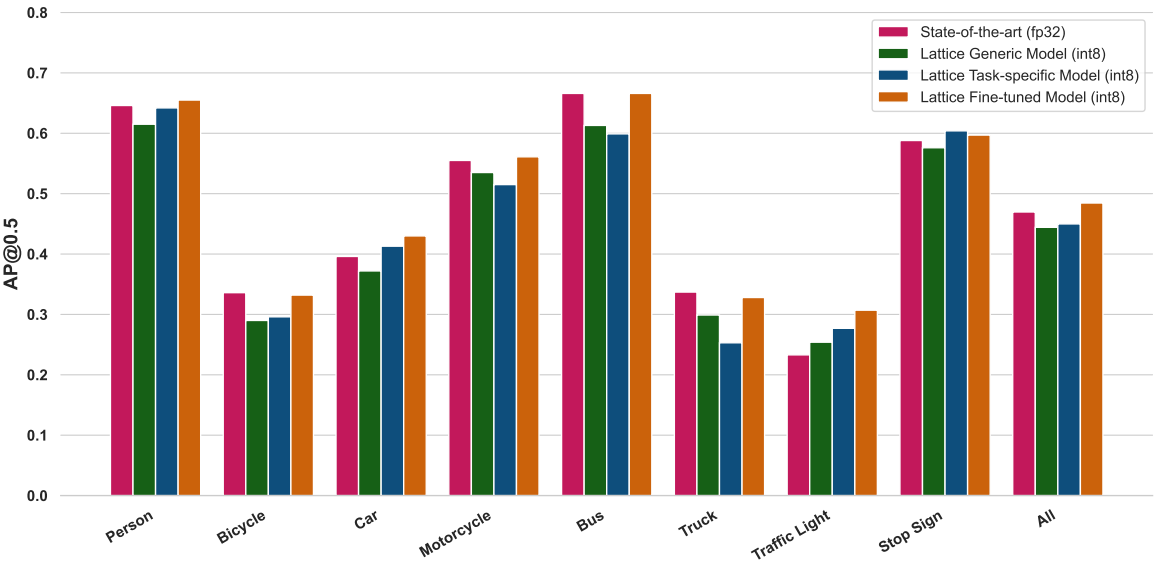


Figure 2: Performance comparison across models on COCO2017 automotive classes. State-of-the-art and Lattice generic models have been trained on the whole COCO2017 dataset without pre-training. The task-specific model has been trained only using COCO2017 automotive classes. The last model fine-tuned Lattice generic model on COCO2017 automotive classes.