

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.



Figure 1: Generic Multi-object Detection Model Output.

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)

AUTHORS	Lattice Semiconductor
VERSION	gmod-cpxn-8.1.0
RELEASE	2025-12-18

SOURCE CODE	Training Source Code
TOOLCHAIN	LATTE
	LSCQuant

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

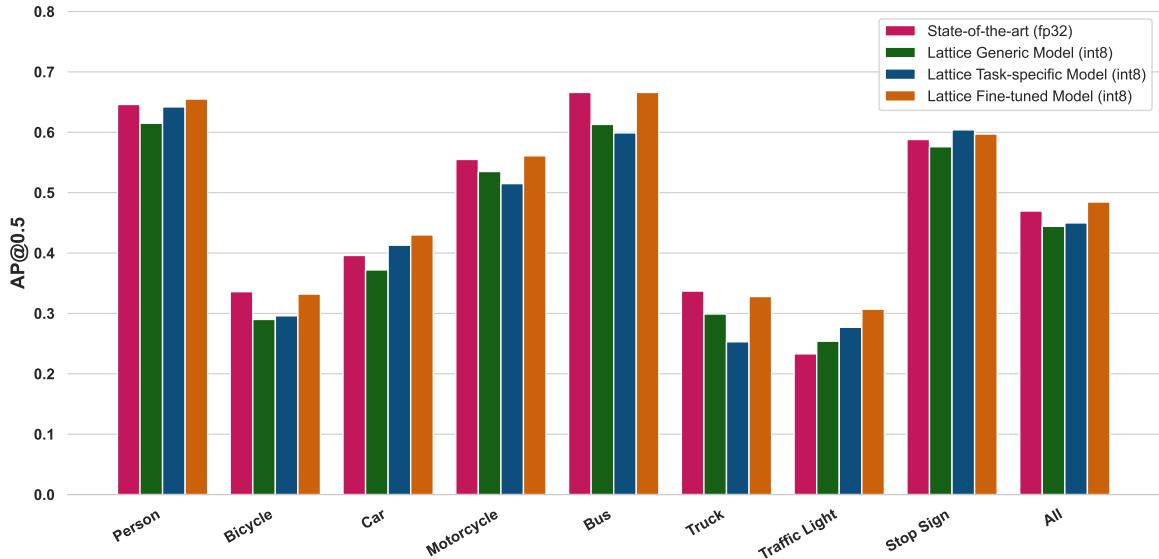


Figure 2: Performance comparison across models on COCO2017 automotive classes. State-of-the-art and Lattice generic models have been trained on the whole COCO2017 dataset without pre-training. The task-specific model has been trained only using COCO2017 automotive classes. The last model fine-tuned Lattice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