MULTIVERSE COMPUTING

Stratospheric Object Detection with Compressed YOLOv8n

A defense-focused research initiative aimed to detect vessels using aerial images captured from stratospheric balloons. The primary constraint: run on low-energy, low-memory FPGA platforms.

Our solution

We combined Singularity deep learning with compression and quantization techniques to fit modern YOLO architectures into constrained memory (DPU) environments, using the ShipRSImageNet dataset.

Results

- ✓ Achieved up to 30% model compression
- ✓ Model size reduced from 6.3 MB to 4.2 MB
- ✓ Detection accuracy remained stable across different levels of image degradation (mAP@IoU > 0.67)