DATA AUGMENTATION TECHNIQUES FOR AIRBUS SHIP DETECTION

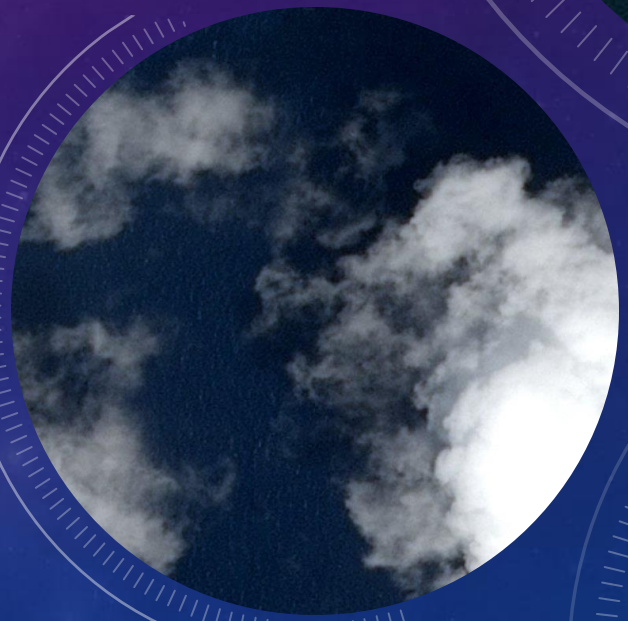
A COMPARATIVE STUDY ON THE EFFECTS OF DIFFERENT METHODS ON THE ACCURACY AND ROBUSTNESS OF THE TRAINED MODELS

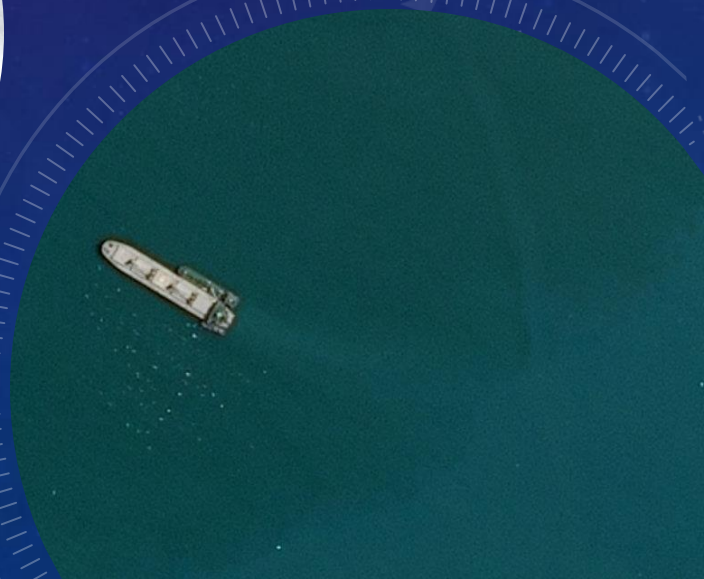
Simone Carena
Francesco Paolo Carmone
Ludovica Mazzucco

THE ORIGINAL PURPOSE AND THE DATASET

Given an image representing an aerial view of ocean areas, detect if there are any ships and where they are.

"help to support the maritime industry to increase knowledge, anticipate threats, trigger alerts, and improve efficiency at sea."

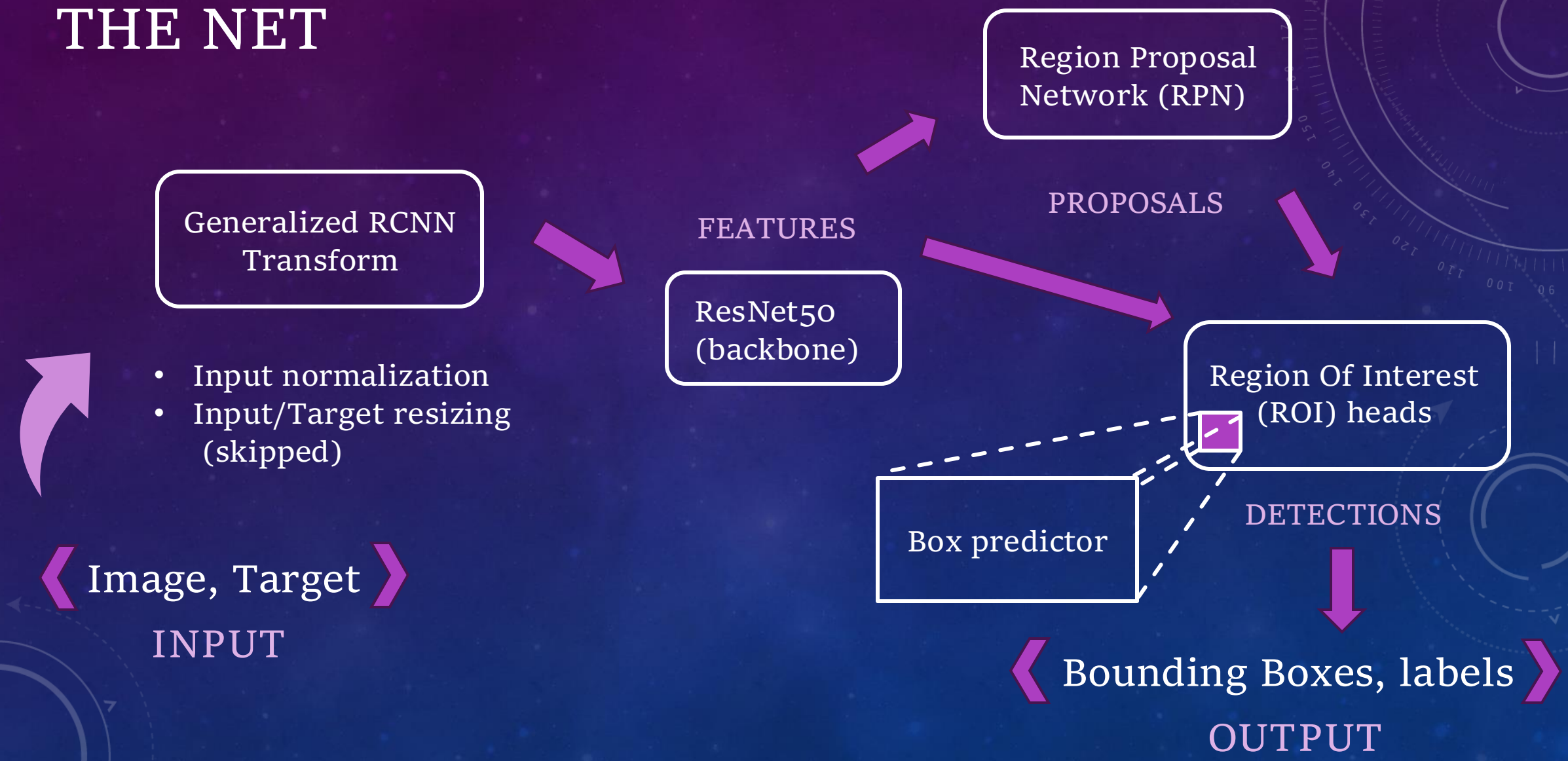




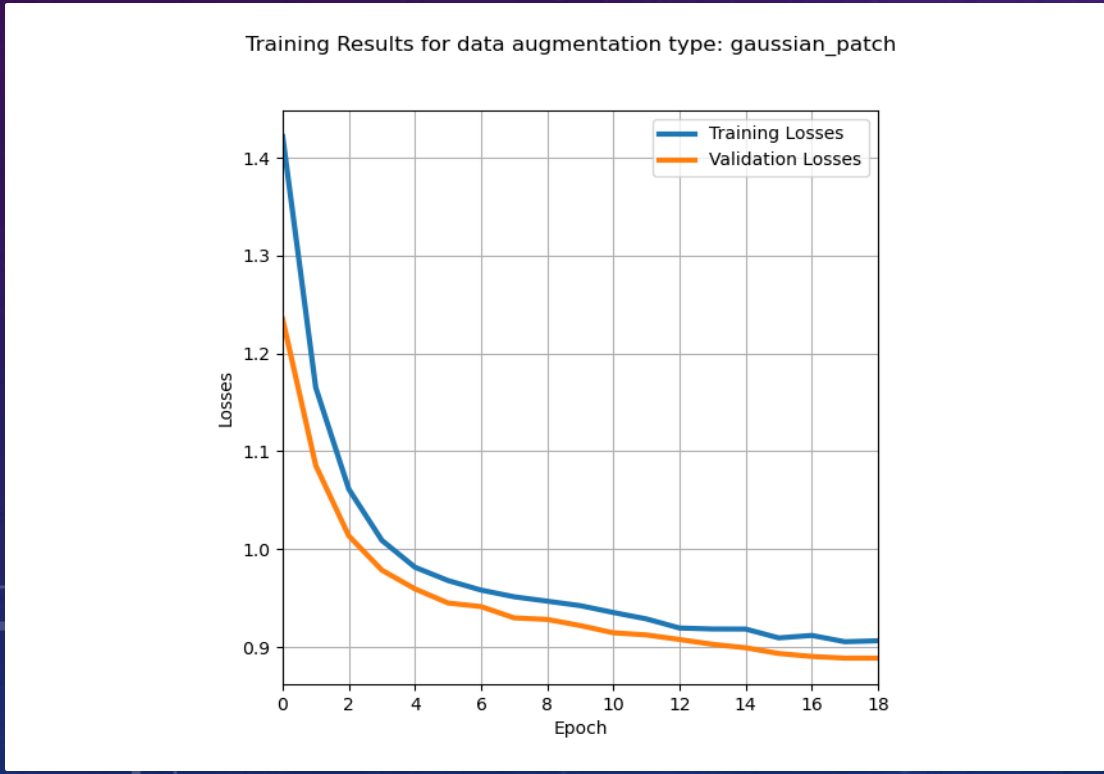
OUR ADDITIONAL CONTRIBUTION

Study how the performance of models trained with different transforms changes with respect to test images corrupted by different types of noise.
Ensure the network remains robust to real-world distorsions,
while maintaining a high accuracy

THE NET


Region Proposal Network (RPN)
Generalized RCNN Transform
FEATURES
PROPOSALS
ResNet50 (backbone)
Region Of Interest (ROI) heads
• Input normalization
• Input/Target resizing (skipped)
Box predictor
DETECTIONS
Image, Target
INPUT
Bounding Boxes, labels
OUTPUT

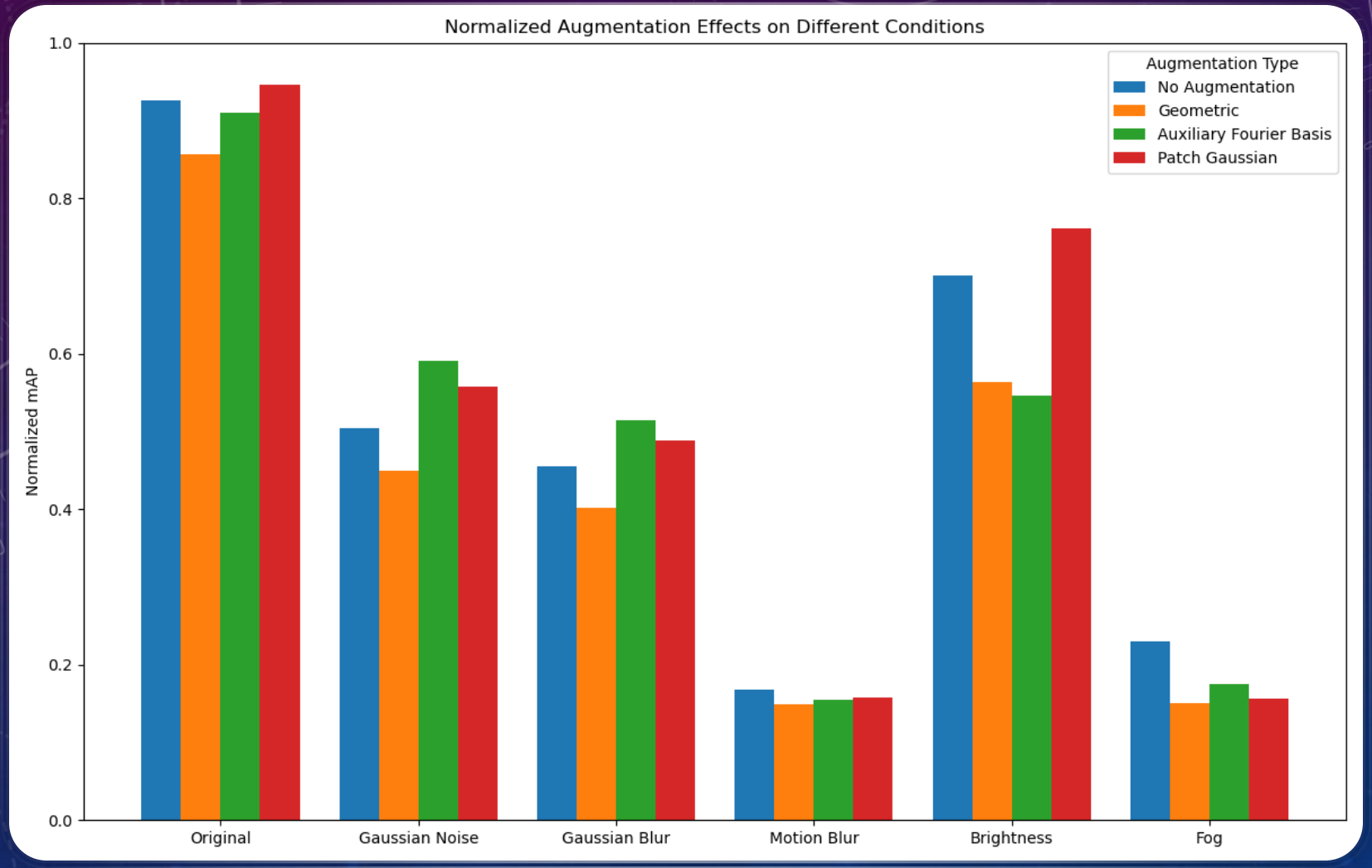
	Training	Fine-tuning
Learning Rate	StepLR from 1e-4 to 1e-6	1e-6 (constant)
Batch size	32	32
Num Epochs	18	5



THE METHOD

1. Formatting dataset targets
2. Defining different compositions of transforms to train different models
3. Train and validate models with backbone layers frozen
4. Fine-tune models activating all gradients
5. Test models and evaluate through Mean Average Precision metric

THE RESULTS


Normalized Augmentation Effects on Different Conditions
Normalized mAP
1.0
0.8
0.6
0.4
0.2
0.0
Augmentation Type
No Augmentation
Geometric
Auxiliary Fourier Basis
Patch Gaussian
Original
Gaussian Noise
Gaussian Blur
Motion Blur
Brightness
Fog