

Introduction

Knowing the locations of crosswalks is important for prioritizing measures to enhance pedestrian safety and accessibility. This research aims to

- Develop an artificial intelligence (AI) framework to detect crosswalk locations across Massachusetts.
- Categorize crosswalks by type and location to better inform safety interventions.



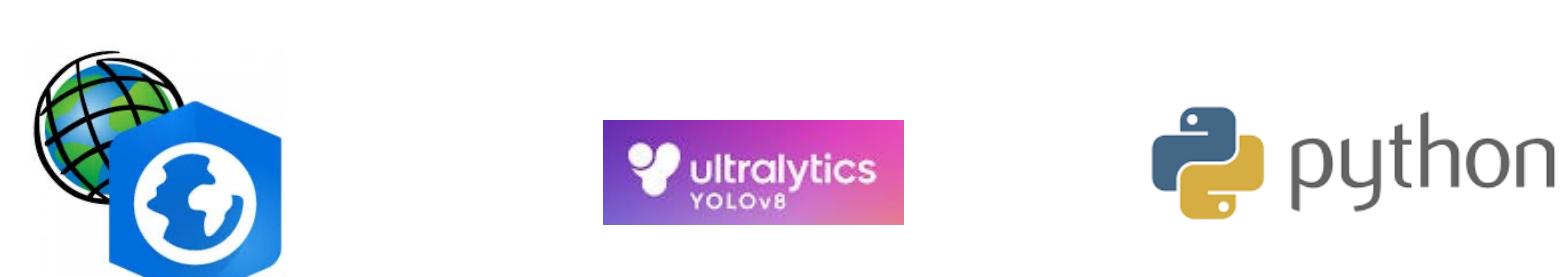
Tools and Models

Tools

- ArcGIS Pro
- Python
- Anaconda
- JupyterLab
- PyCharm

Models

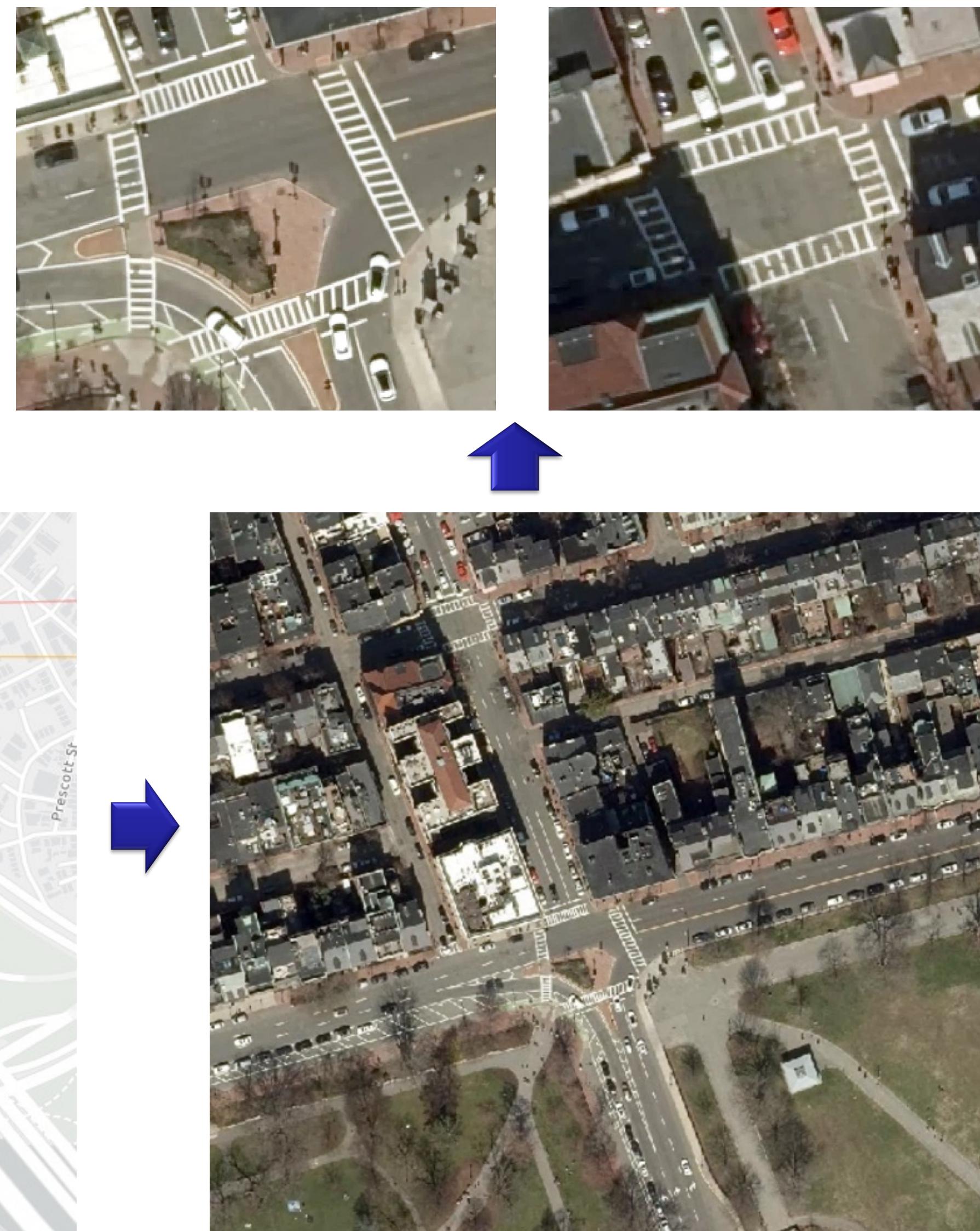
- Detection (Mask RCNN, Faster RCNN)
- Segmentation (**DeepLab V3 +**, U-Net, **YOLOv8**)



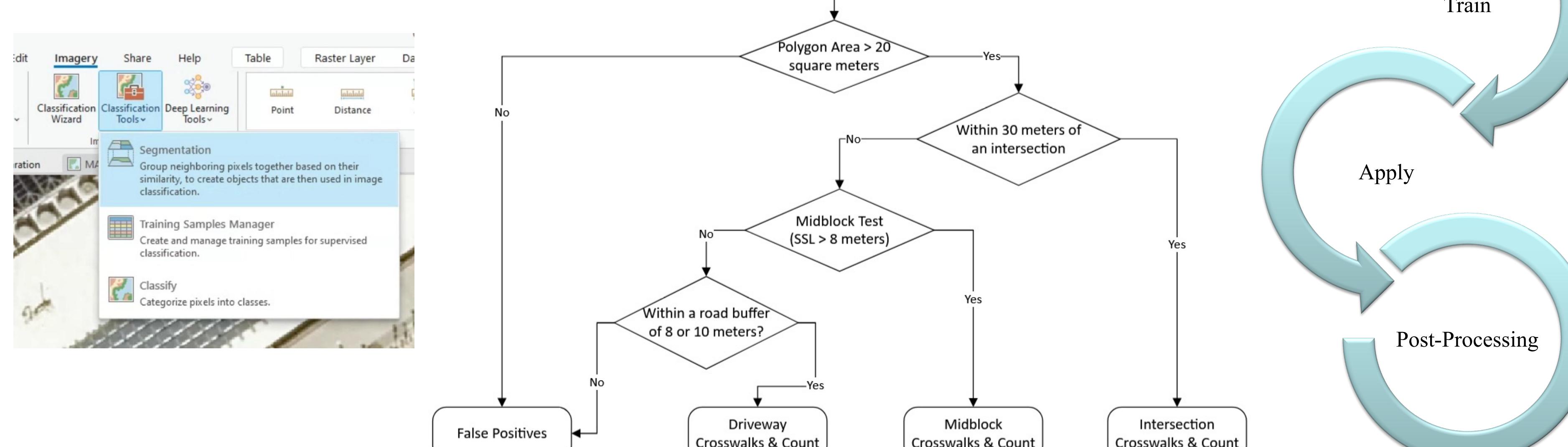
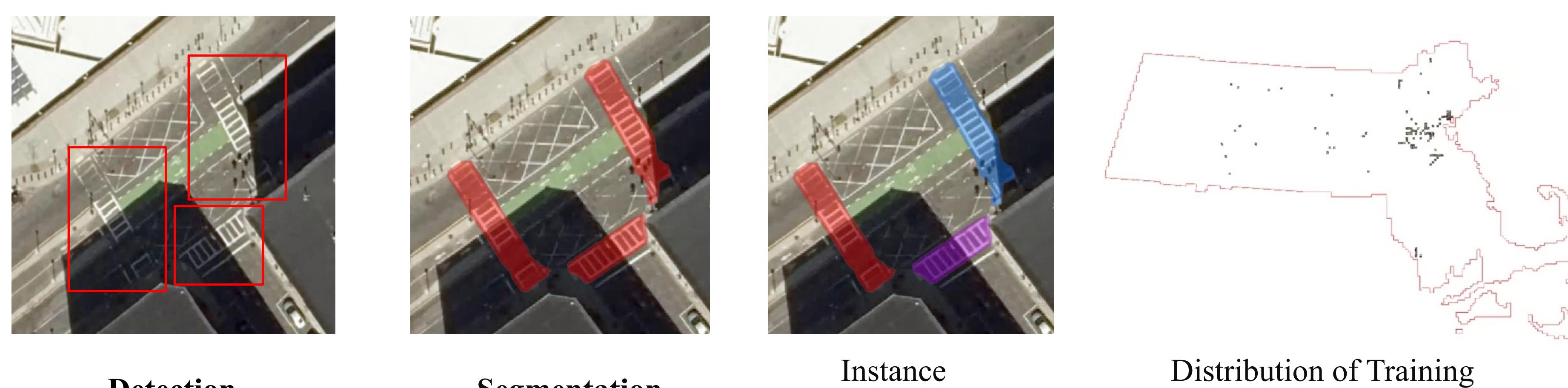
Data

MassGIS (Bureau of Geographic Information) Aerial Imagery:

- 2021 (188 GB, 10,211 tiles)
- 2019 (125 GB, 10,218 tiles)



Modeling Process



Results and Comparison

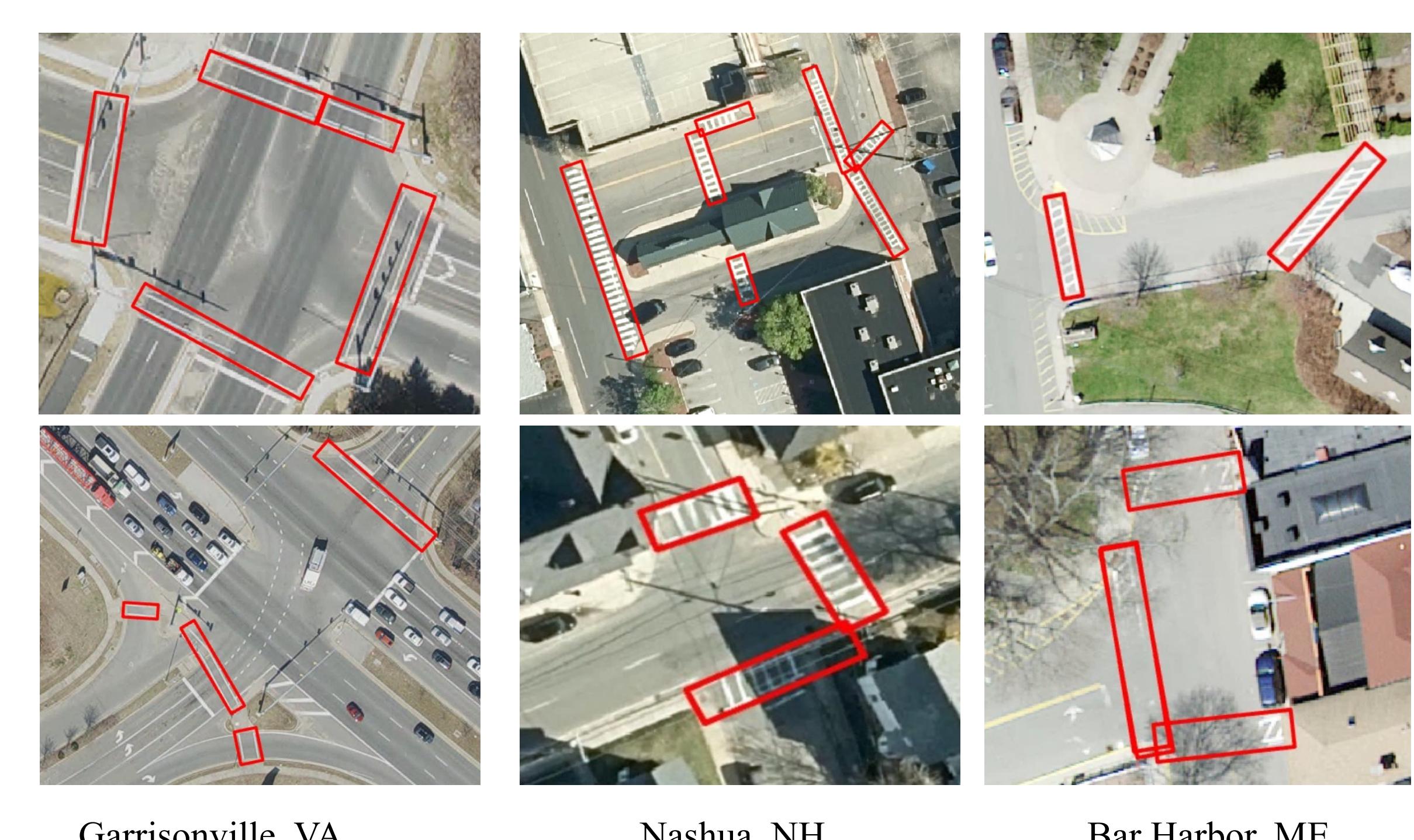
Segmentation Results from **DeepLab V3 +**



Comparison with the Detection Results from **YOLOv8 with Oriented Bounding Boxes (OBB)**.



Model Generalization Ability



Conclusions and Next Steps

- The YOLOv8 OBB model is highly efficient and accurate, particularly for zebra and parallel line crosswalks.
- Quality check is still needed. However, the AI approach can save a substantial amount of time compared to manual detection.
- Crosswalk markings should be standardized.
- Assessing the conditions of crosswalk markings is also important and will be our next step.

Acknowledgments

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