

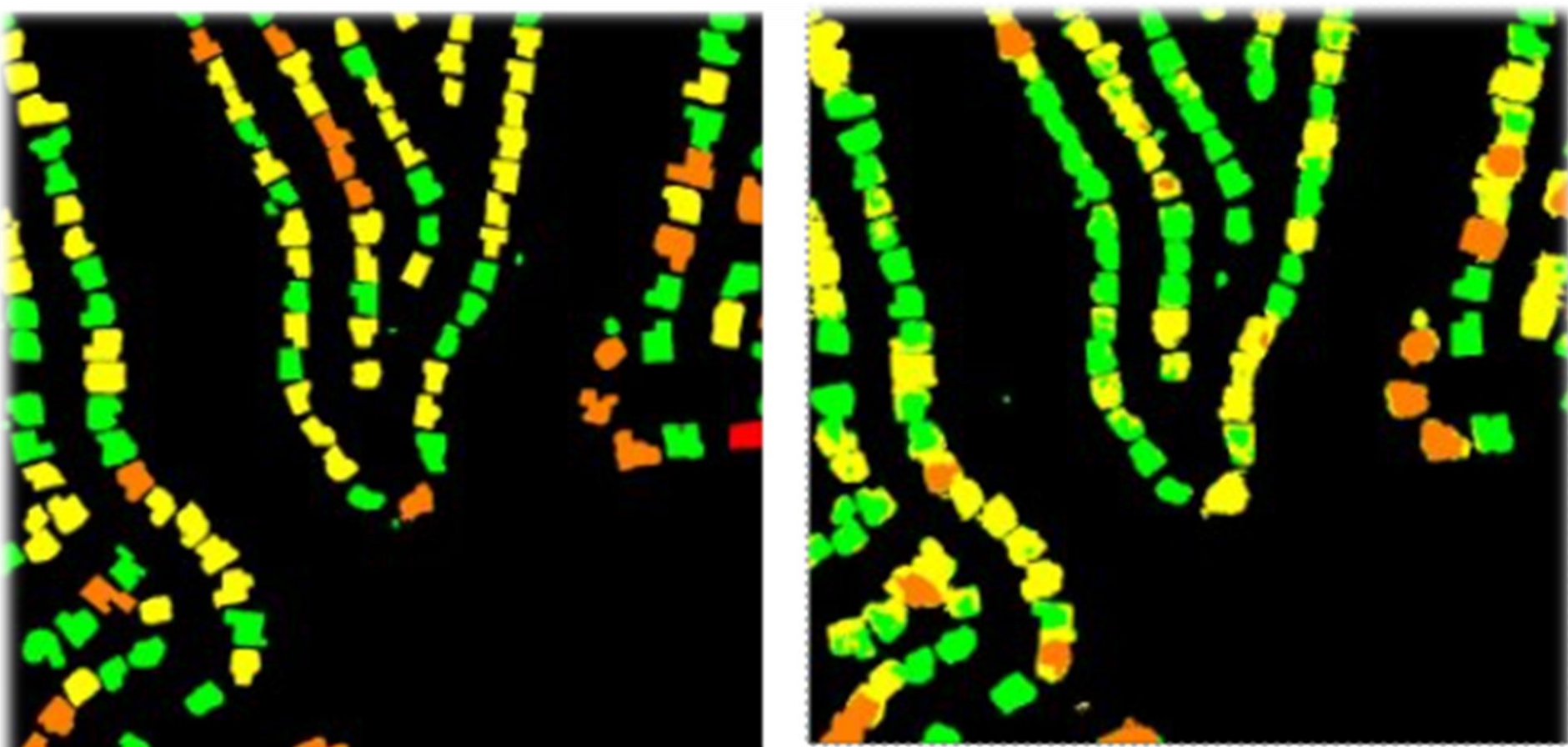
Building Damage Assessment Using Satellite Imagery

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1. Introduction

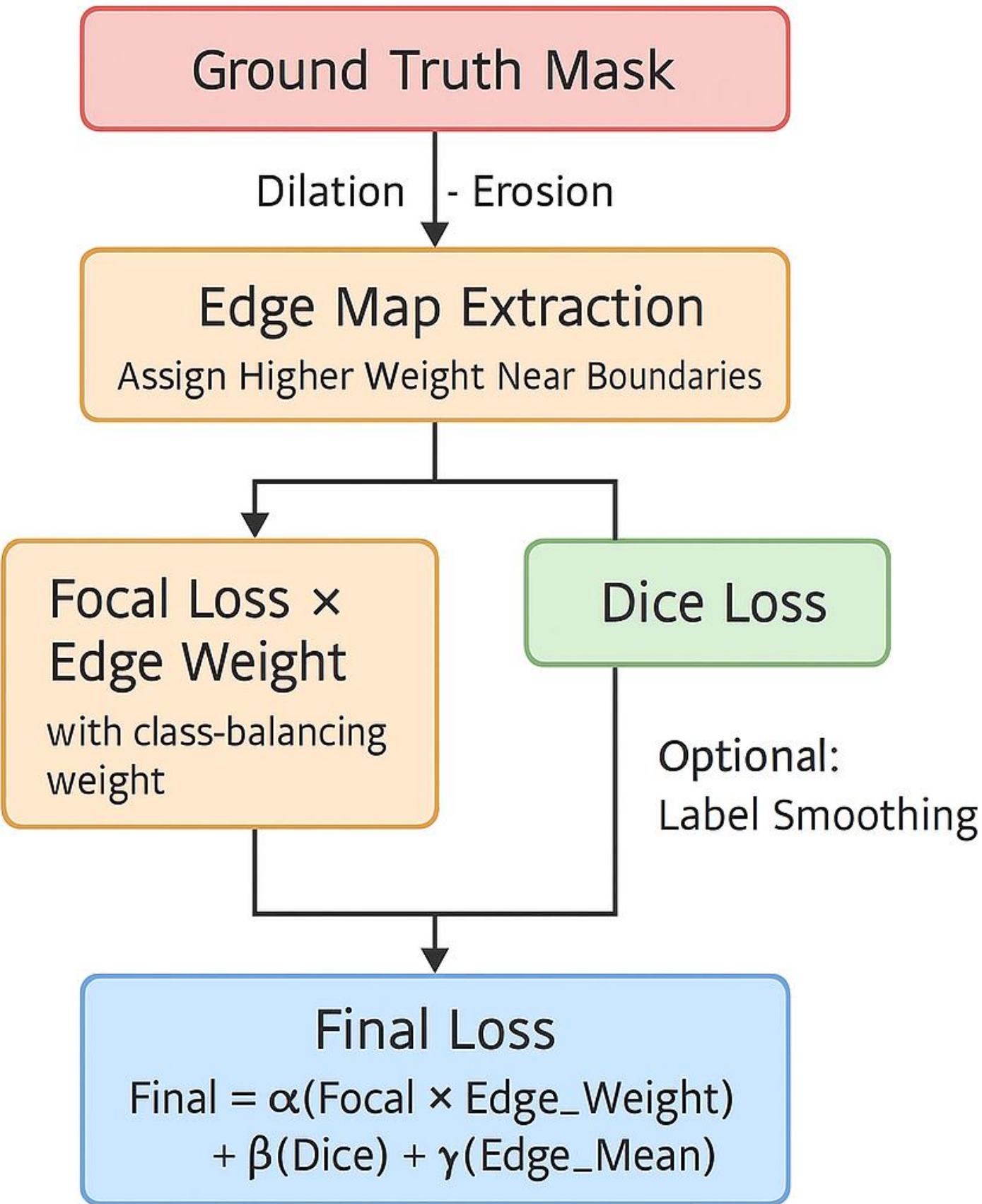
- Task:** Enhance DAHiTrA to better separate adjacent buildings
- Motivation:** Improve damage assessment accuracy in post-disaster satellite imagery
- Key insight:** Use Edge-Aware Loss or SAM2 to preserve fine-grained building boundaries
- Contribution:** Extend DAHiTrA with prompt-based segmentation and edge-sensitive loss functions

2. Problem Statement

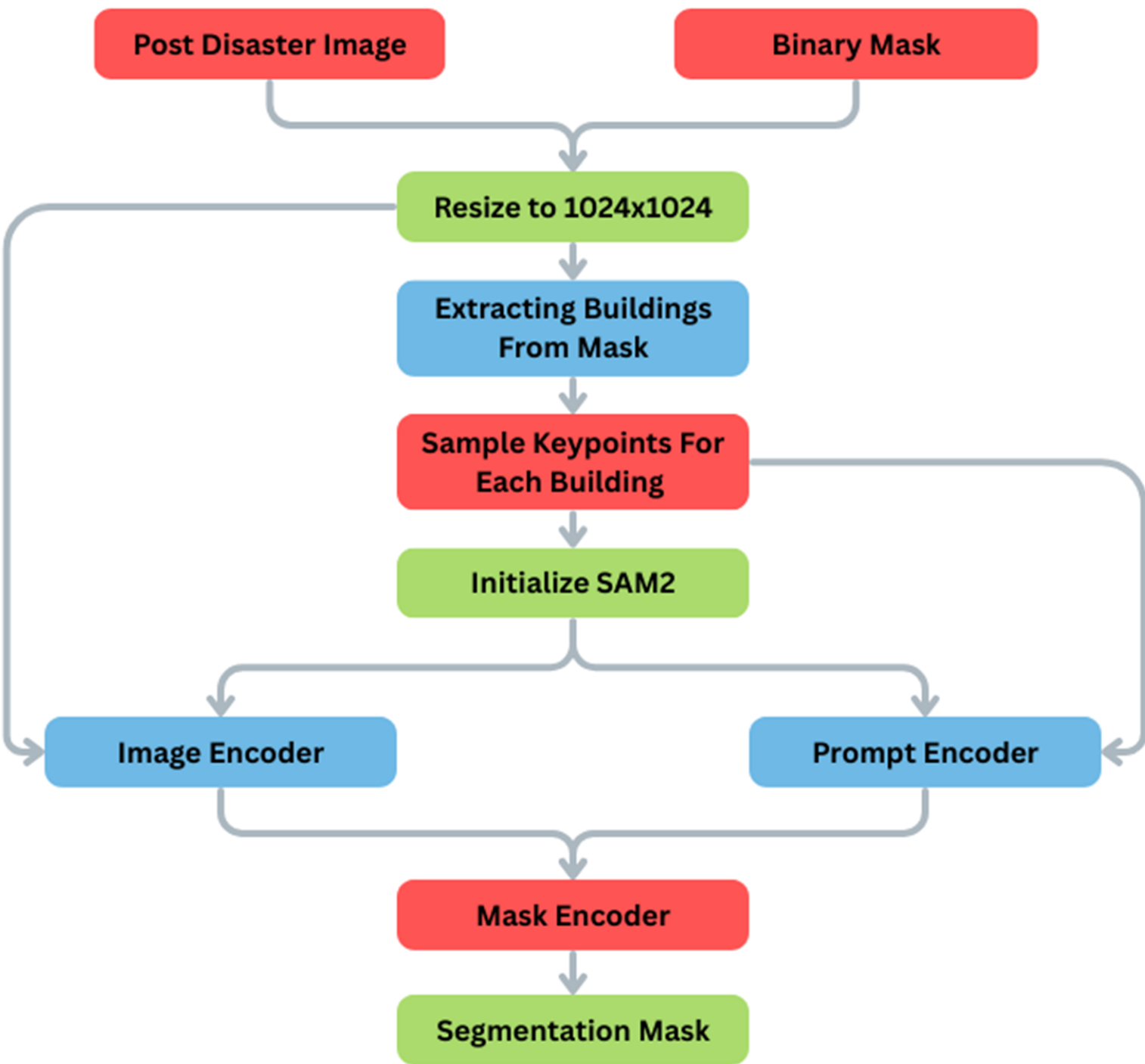


- Problem
- Existing models like DAHiTrA merge closely located buildings in post-disaster imagery
 - Small structures are often missed entirely
 - Limits usability in high-stakes, real-world disaster response
- Solution
- Introduced an Edge-Aware Loss Function
 - Integrated SAM2 to enhance segmentation

3. Methodology

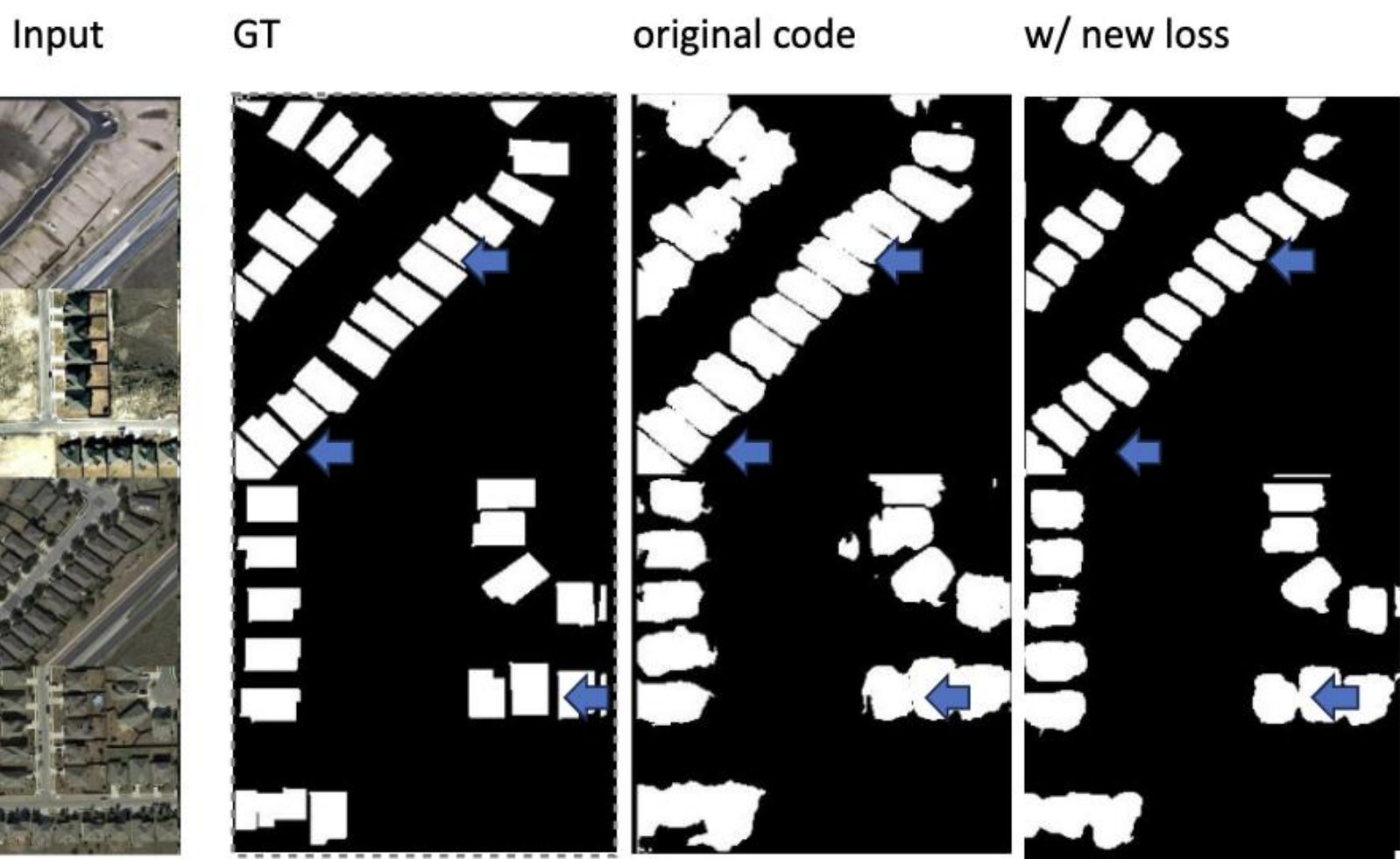


SAM2 Implementation



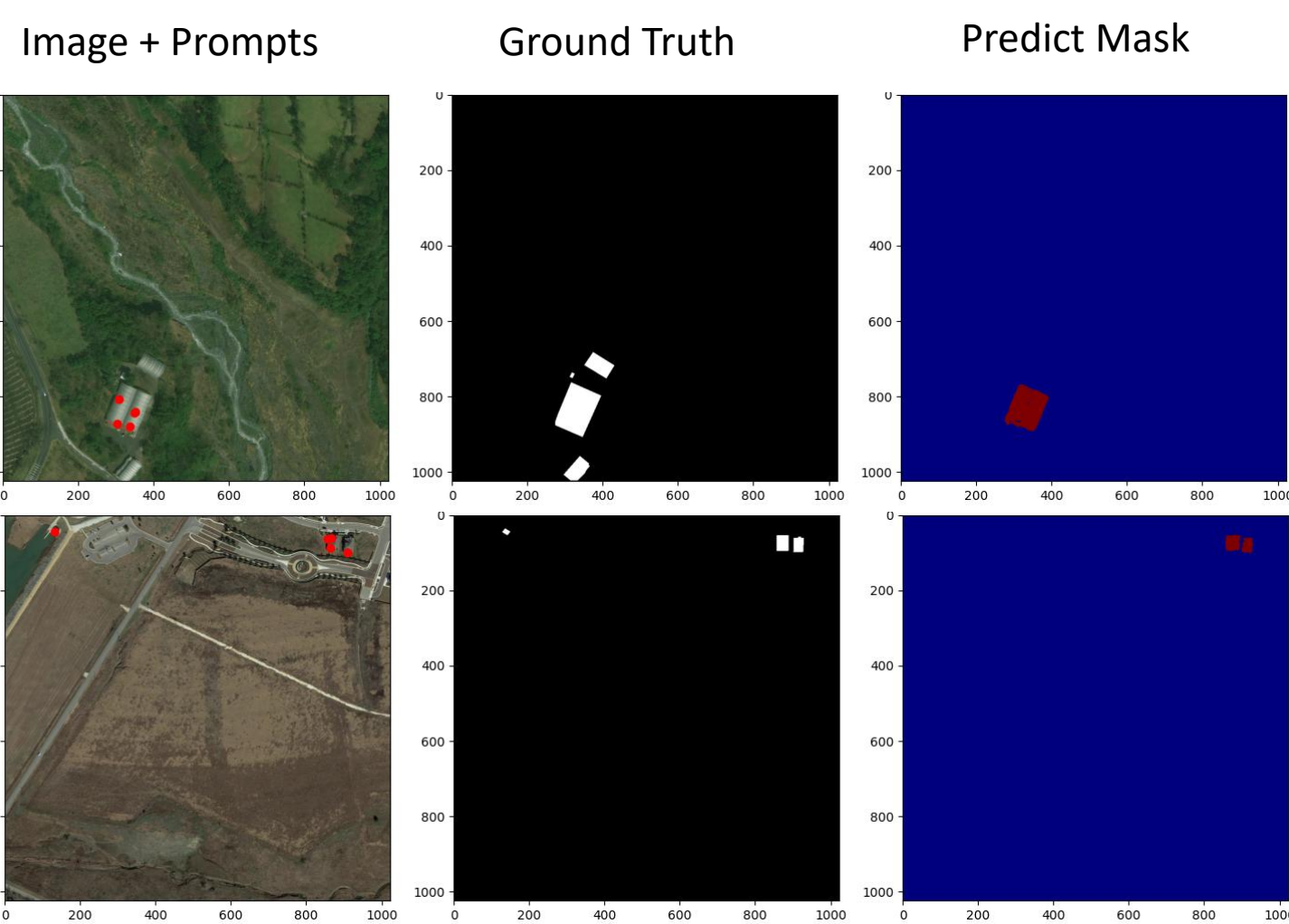
We combine SAM2-based segmentation with an edge-aware loss that emphasizes boundary regions using weighted supervision.

4. Results



Model	IoU	F1-Score	0 class	1 class
DAHiTrA	0.842	0.908	0.991	0.825
Our result	0.834	0.903	0.990	0.817

- Edge-aware loss improved boundary segmentation quality.
- SAM2 was trained on LEVIR-CD andxBD for better masks.
- DAHiTrA was re-trained to ensure fair comparison.
- SAM2 faced GPU limits and struggled with small objects.



- GPU Memory Constraints
- Limited Sensitivity to Small Objects
- Reduced Performance on Dense or Dispersed Targets