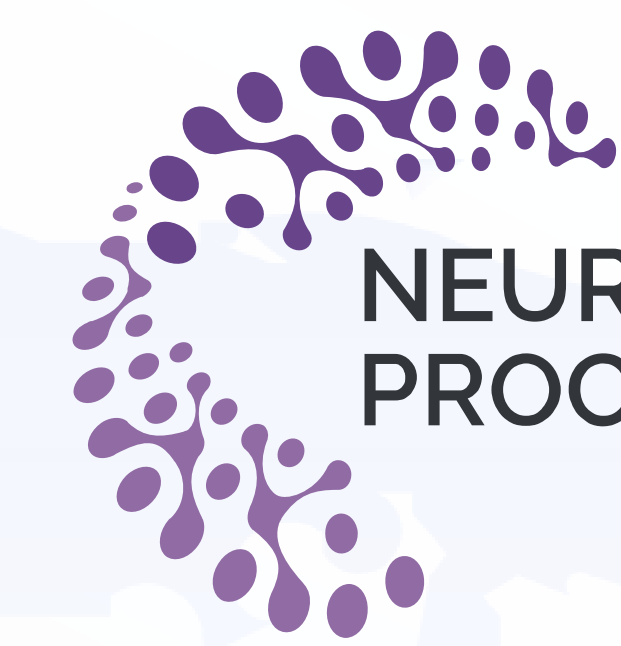




# CAGE: Continuity-Aware edGE Network Unlocks Robust Floorplan Reconstruction

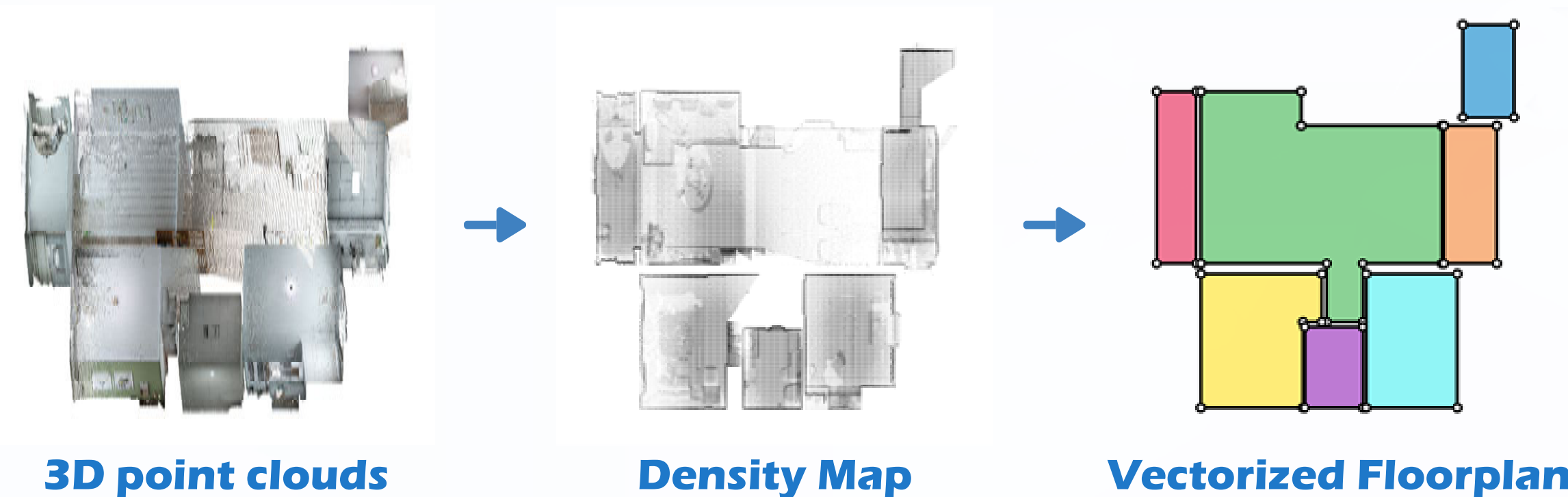
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NEURAL INFORMATION  
PROCESSING SYSTEMS

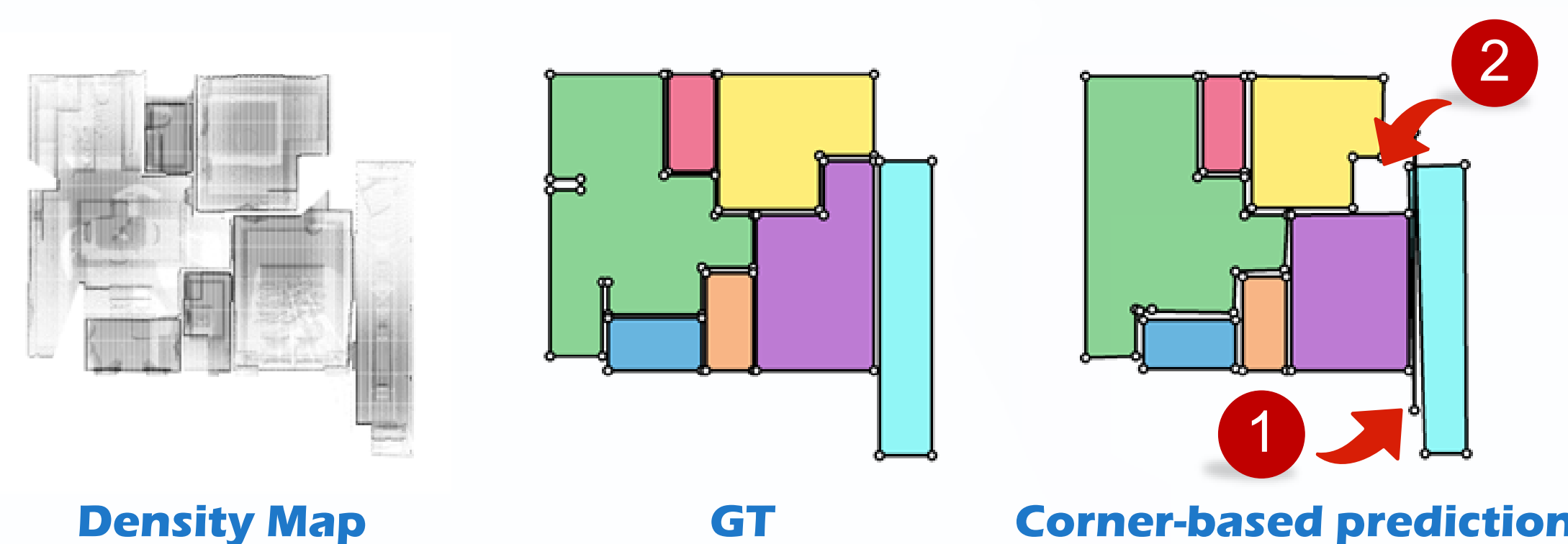
## Background



## Motivations

Humans naturally perceive indoor spaces through continuous walls rather than discrete corners.

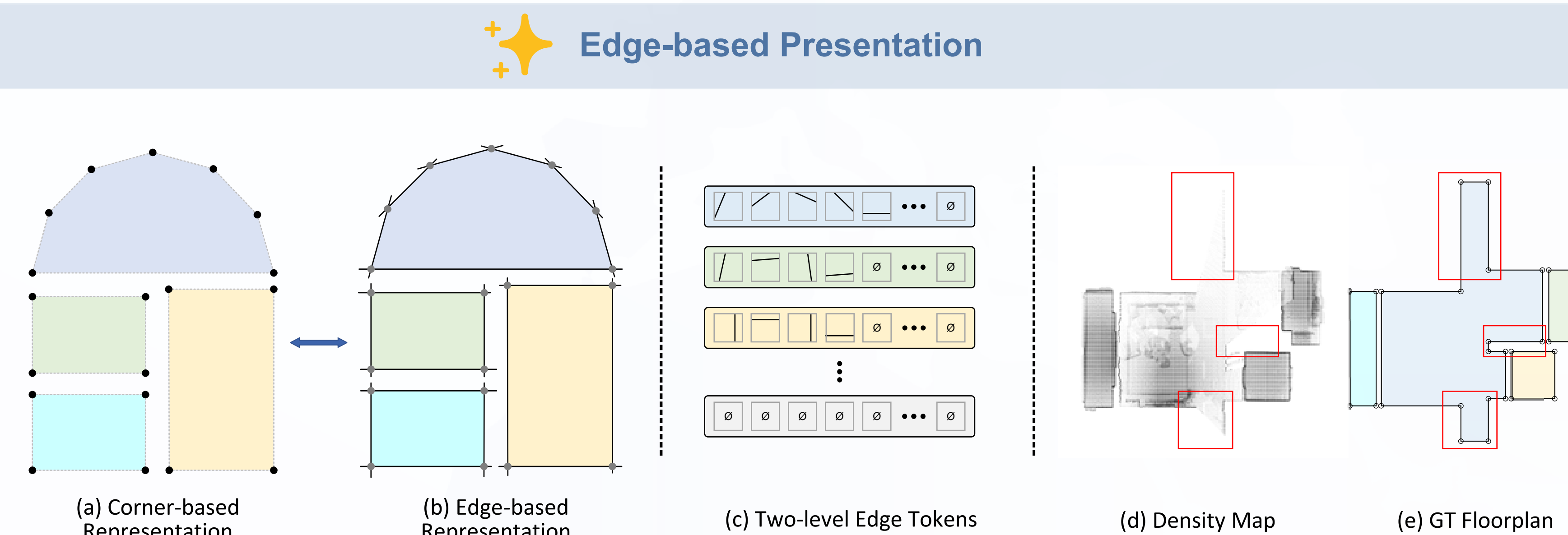
Corner-based polygon representation may lead to several kinds of geometric and topological inconsistencies such as:  
(1) self-intersections  
(2) sensitivity to missing or noisy corners



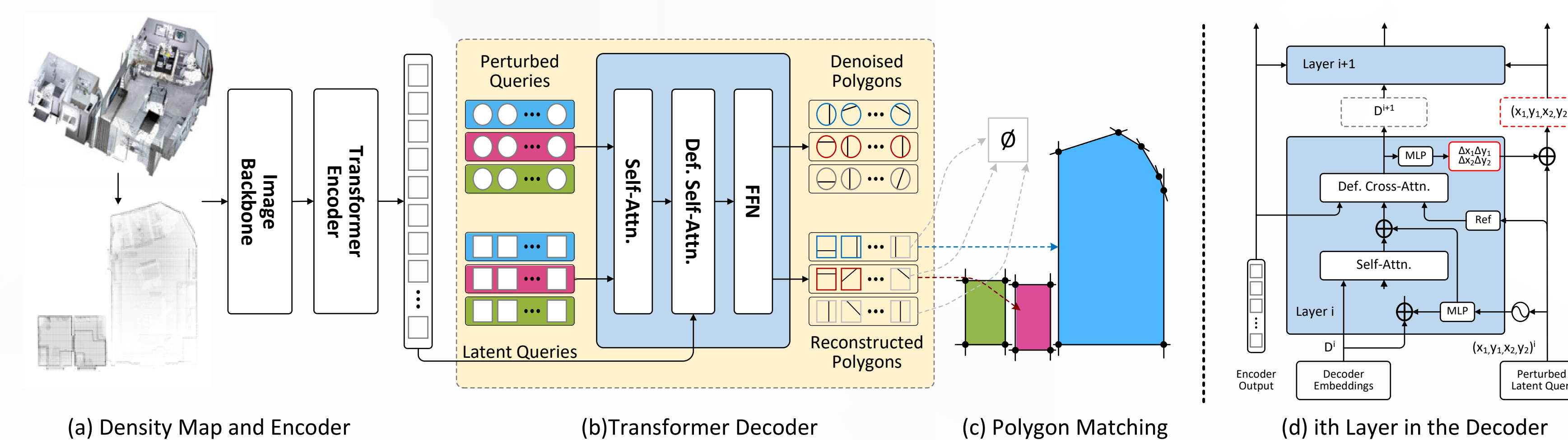
## Contributions

- ★ **Continuity-Aware Edge Representation:** We introduce an edge-based polygon formulation that enhances robustness to incomplete and noisy data, while preserving directional and structural consistency.
- ★ **Dual-Query Transformer Decoder:** Our approach leverages perturbed and latent queries within a denoising framework to stabilize training, refine predictions, and accelerate convergence.
- ★ **Strong Performance and Generalization:** We achieve state-of-the-art performance on multiple benchmarks and generalize effectively across datasets, validating the effectiveness of our continuity-aware edge-based formulation.

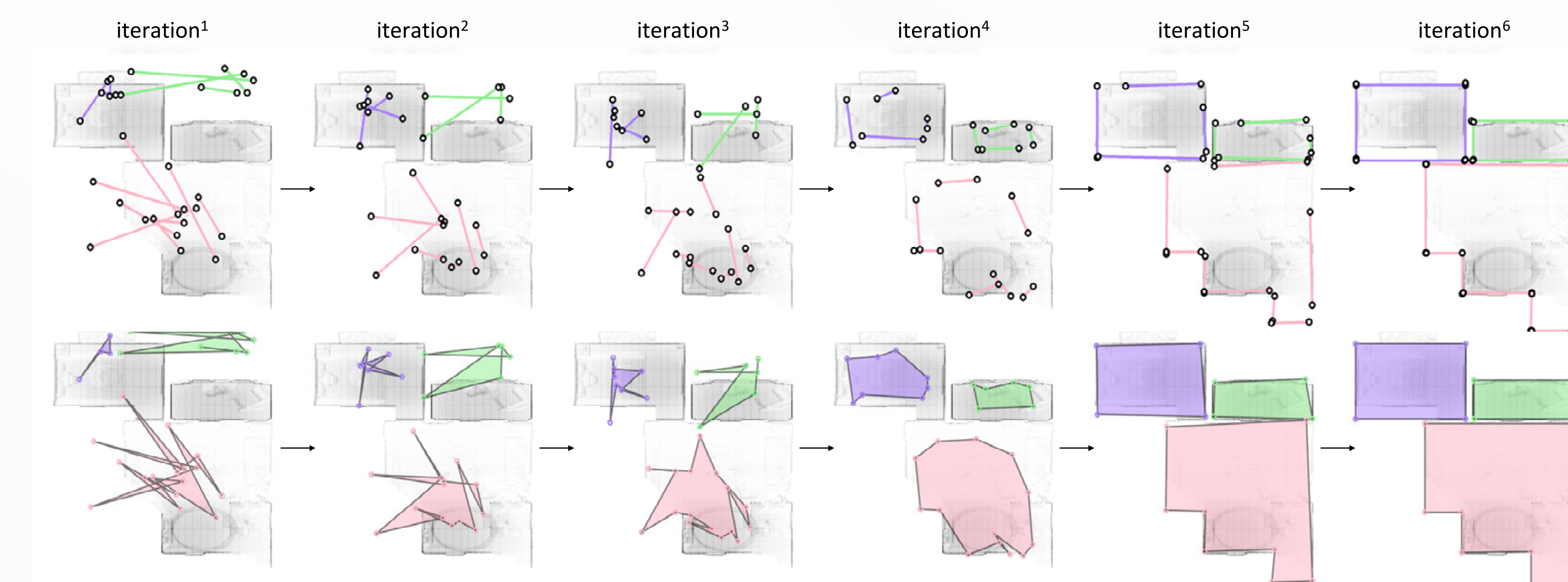
## Method



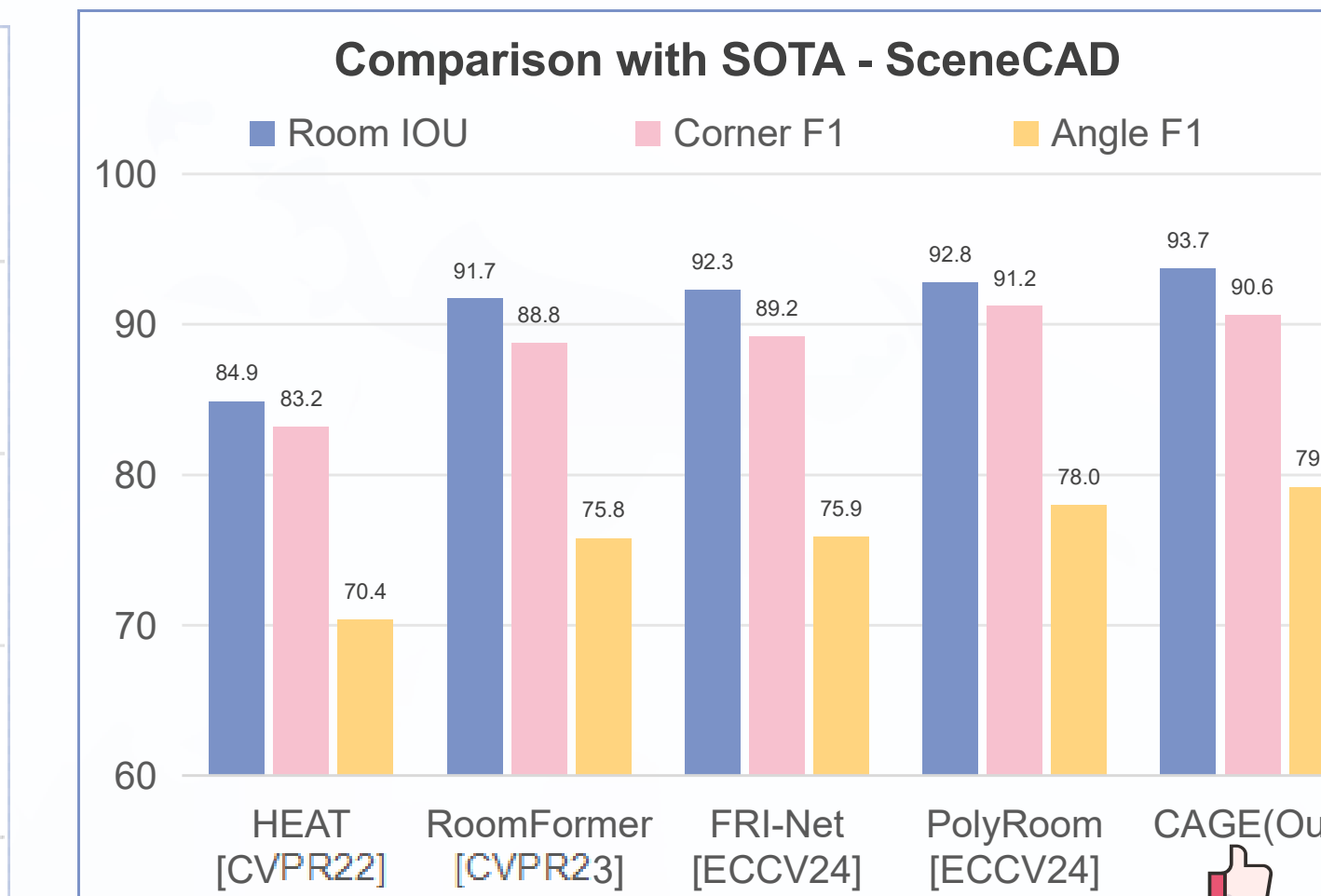
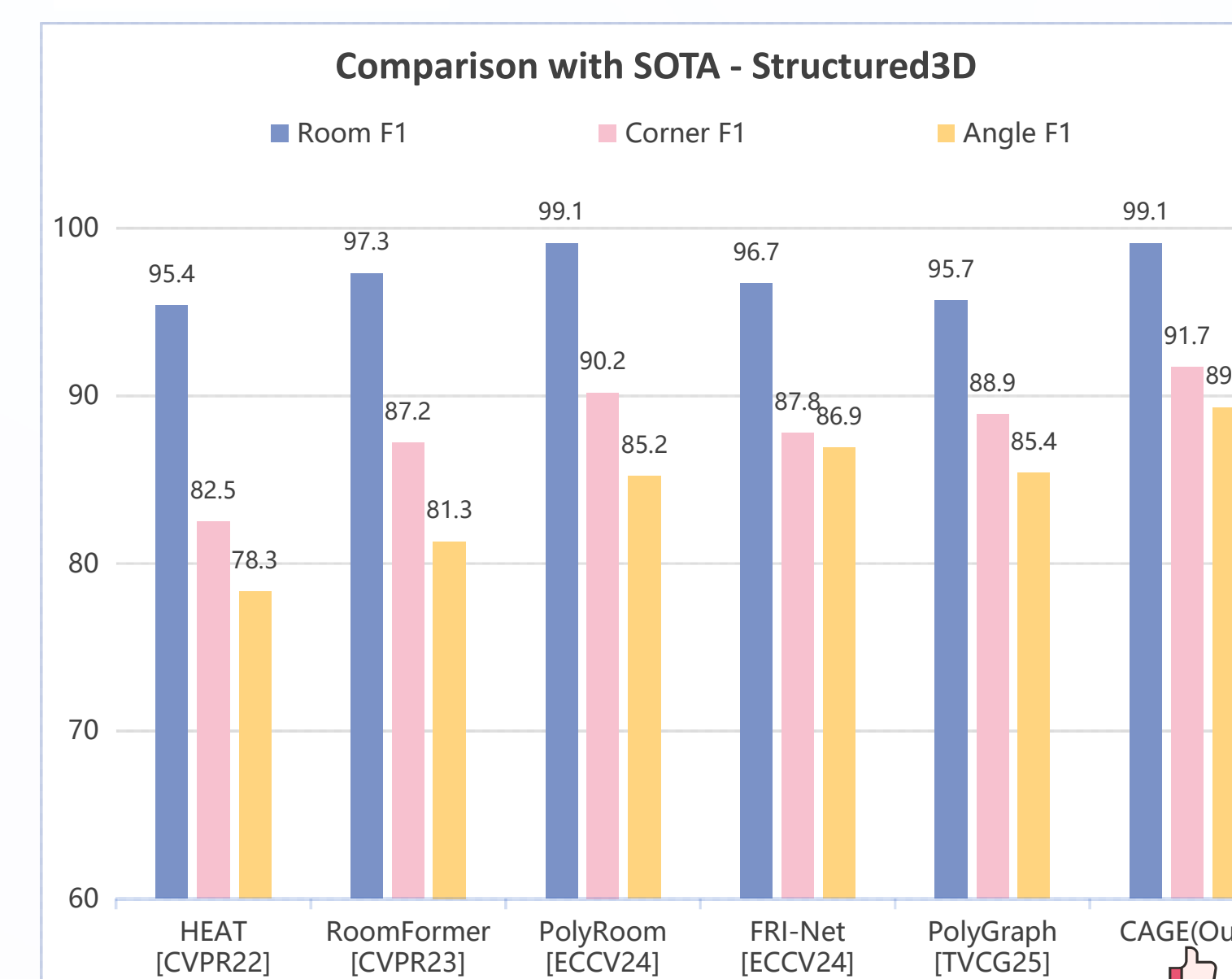
## Overall Architecture



## Polygon evolution



## Results

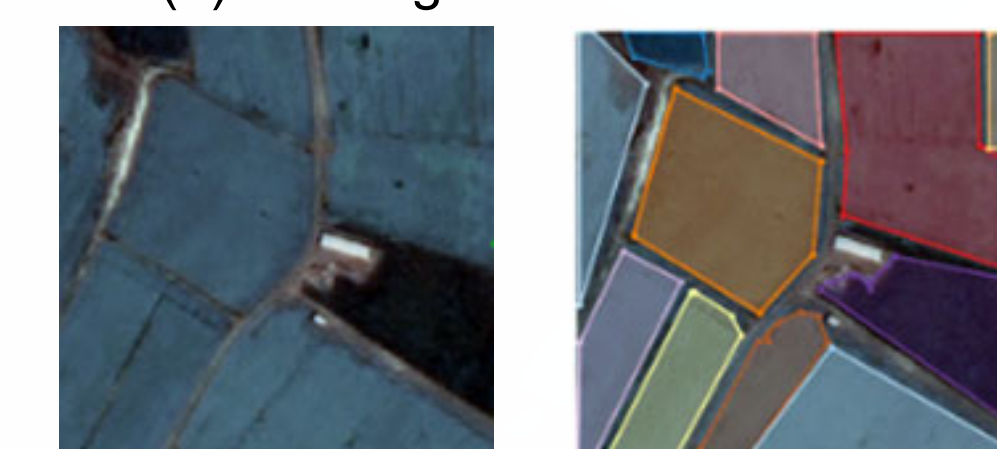


## Future

More applications on:



(a) Building Outline Extraction



(b) Agricultural Parcels Vectorization