

Built-in

A GenAI-Based System for Verifying Compliance
Between Floorplans Versions

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Project Review



MOTIVATION:

Comparing different versions of the same floorplan is difficult for buyers and may lead to financial and legal risks.



TASK:

detect meaningful content changes between two versions of the same floorplan image (before / after).



CHANGES SINCE PROPOSAL:

No changes were made to the original project idea or scope.



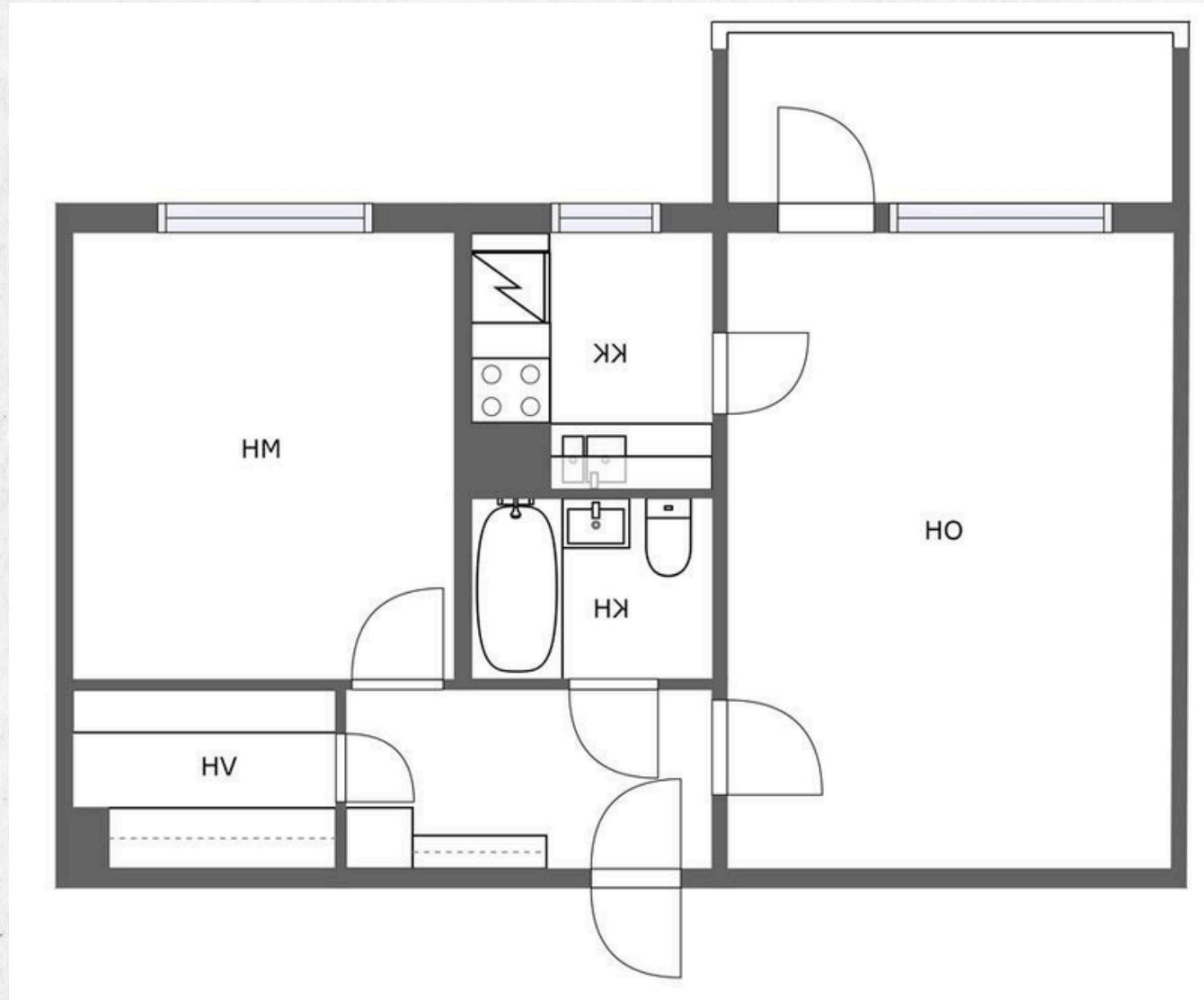
NOVELTY & CONTRIBUTION:

- Buyer-oriented floorplan comparison
- Use of computer vision and generative AI
- Synthetic data generation for change detection

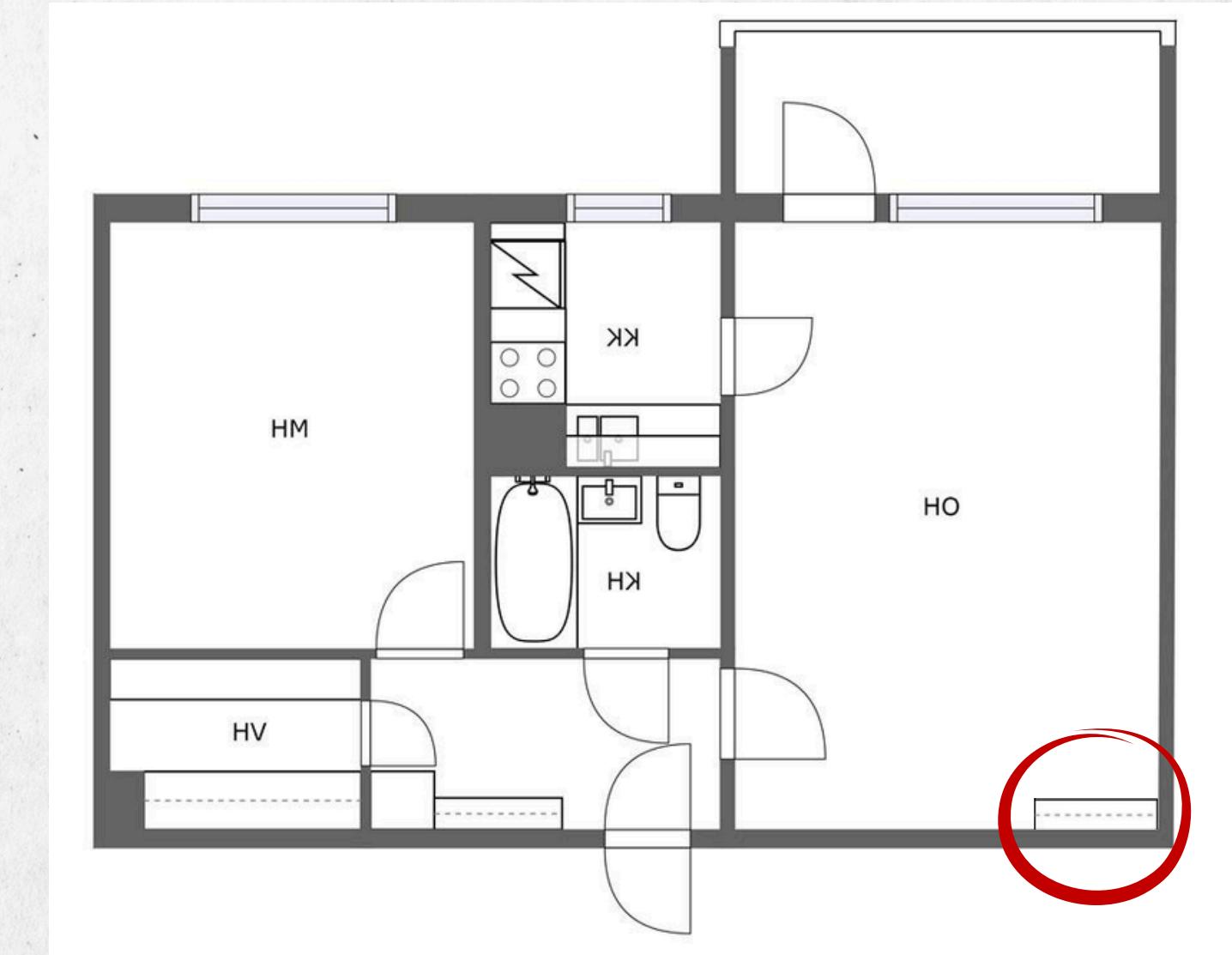


Example 1

BEFORE:



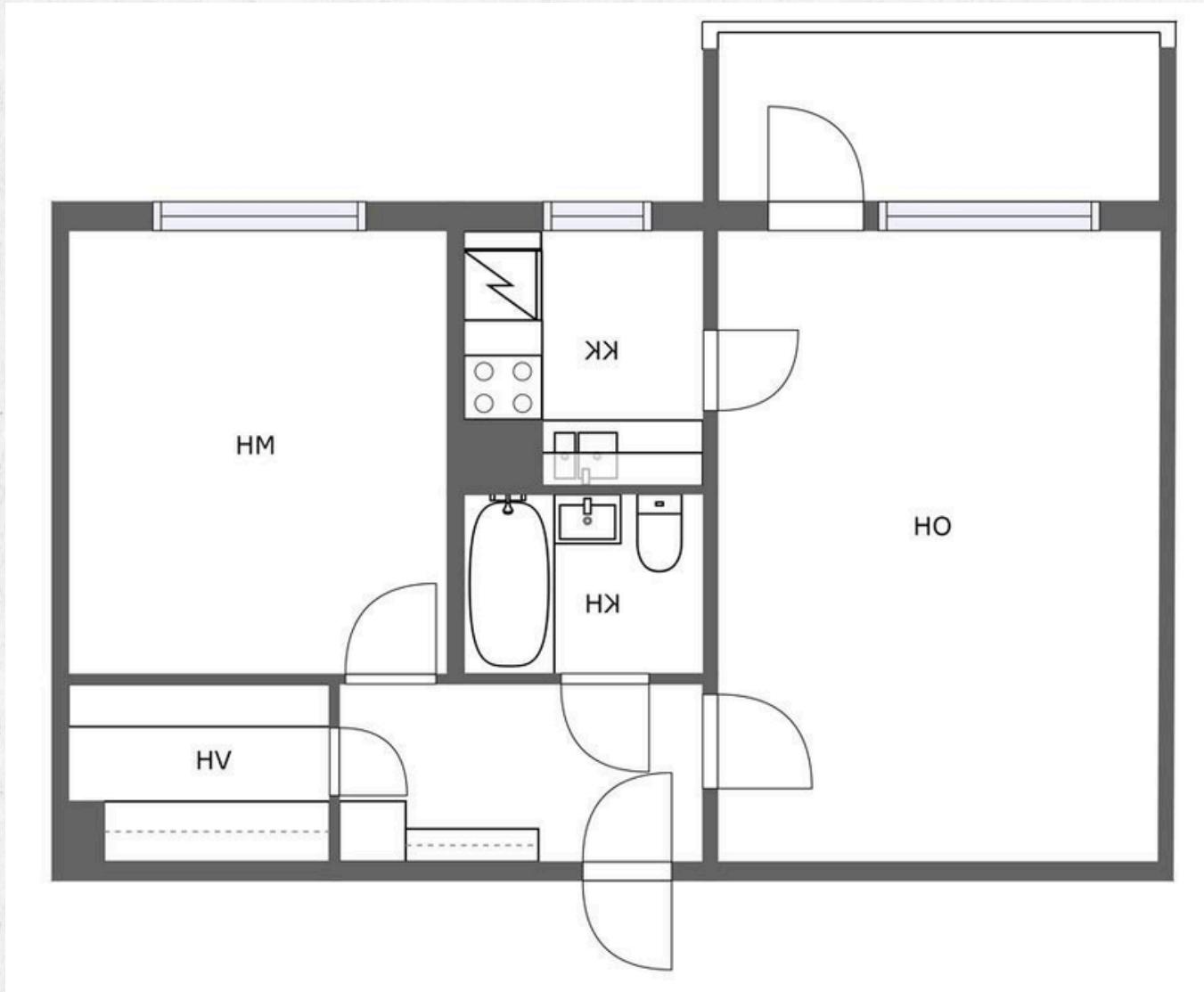
AFTER:



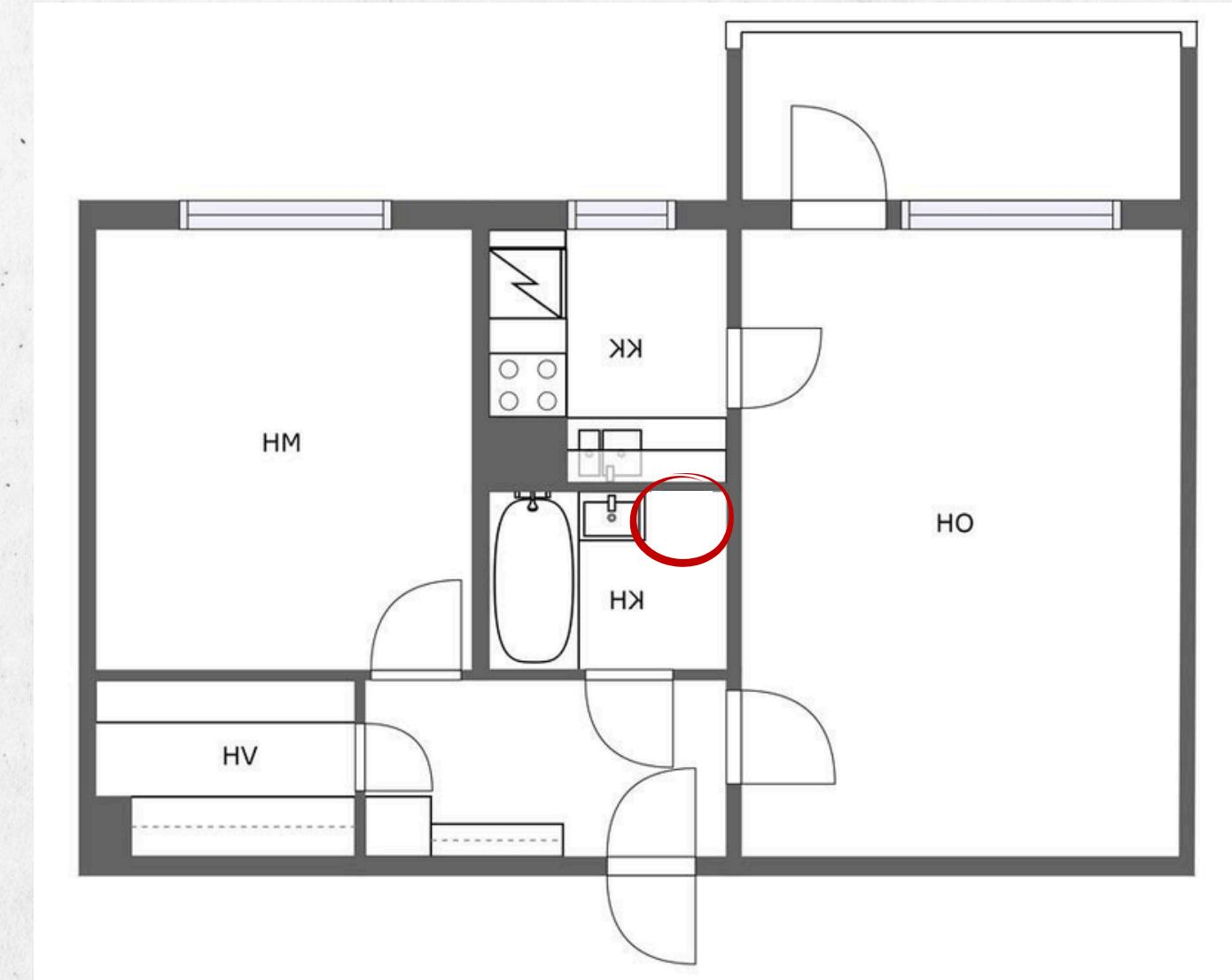
output: 0 – No substantial modification

Example 2

BEFORE:



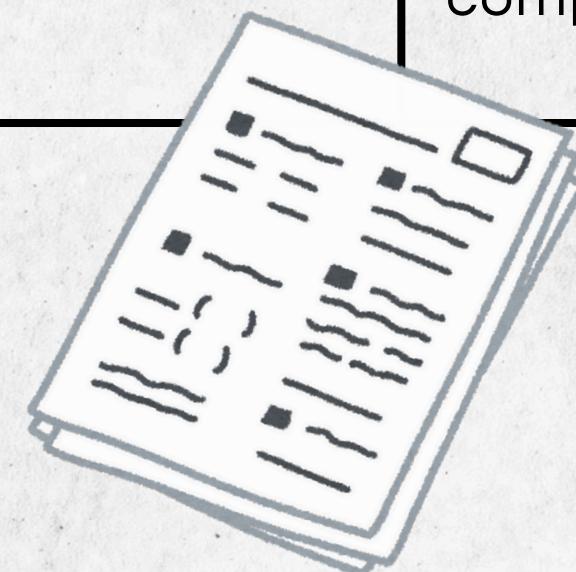
AFTER:



output: 1 – substantial modification

Previous Work

Title	Date	Task	Methods	Data	Results	Relation to project
<u>Segmentation of Architectural Floor Plans for Room Function Analysis using RF DETR</u>	Dec 2025	Detect and classify rooms in floor plans.	RF-DETR for room detection and segmentation.	Annotated floor plan images.	High accuracy in room detection and classification.	Provides room-level understanding for floor plan comparison.



Title	Date	Task	Methods	Data	Results	Relation to project
<u>Few-shot learning with large foundation models for automated segmentation and accessibility analysis in architectural floor plans</u>	June 2025	Floor plan segmentation and accessibility analysis	Few-shot learning with vision foundation models	Limited annotated floor plan images	High accuracy using very few training samples	Supports floor plan analysis using large pre-trained models
<u>Fine-Tuning Stable Diffusion for Generating 2D Floor Plans Using Prompt Templates</u>	Sep 2025	Generate 2D floor plans from structured text prompts	Fine-tuning Stable Diffusion v1.5 using LoRA + structured prompt templates + prompt engineering	~300 cleaned 2D floor plan images (256×256)	Higher structural accuracy than base model (SSIM improved)	uses Stable Diffusion for floor plan generation with prompt control

EXPLORATORY DATA ANALYSIS (EDA):

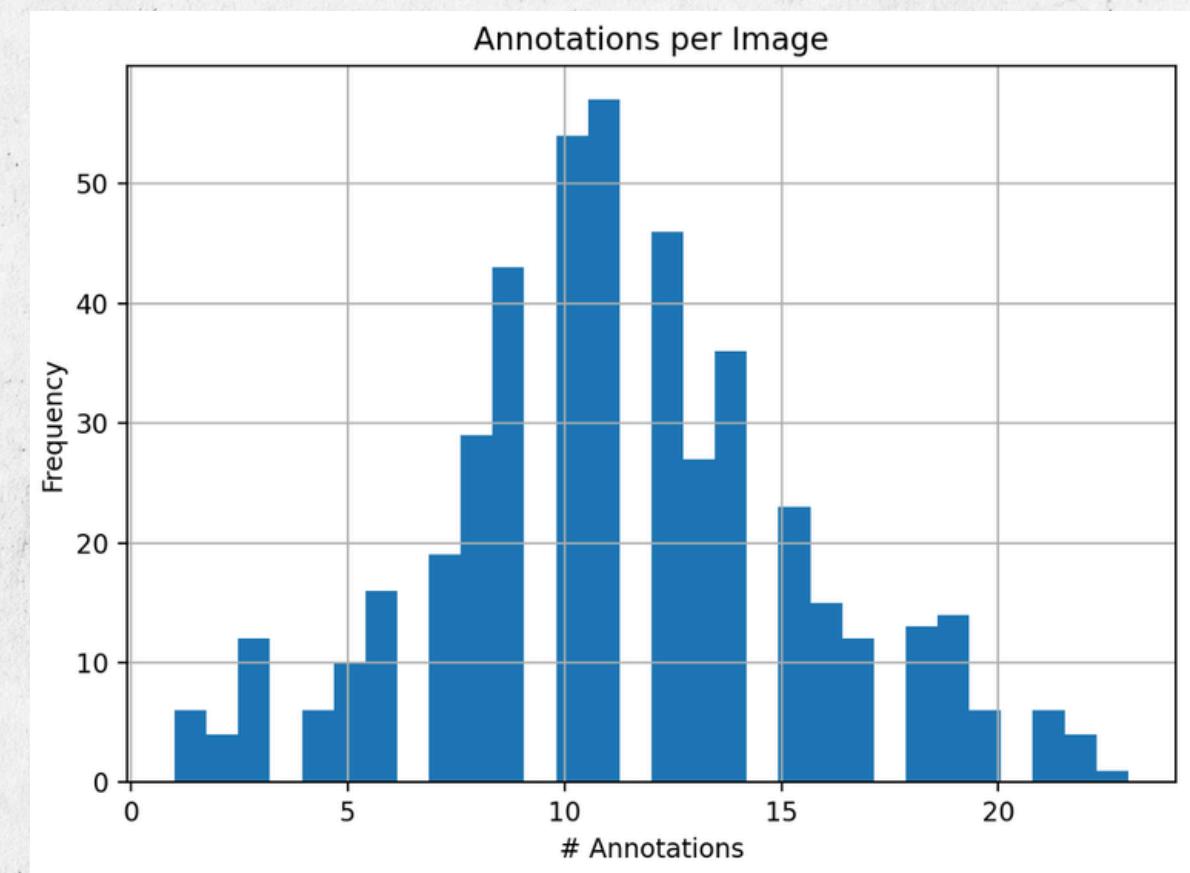
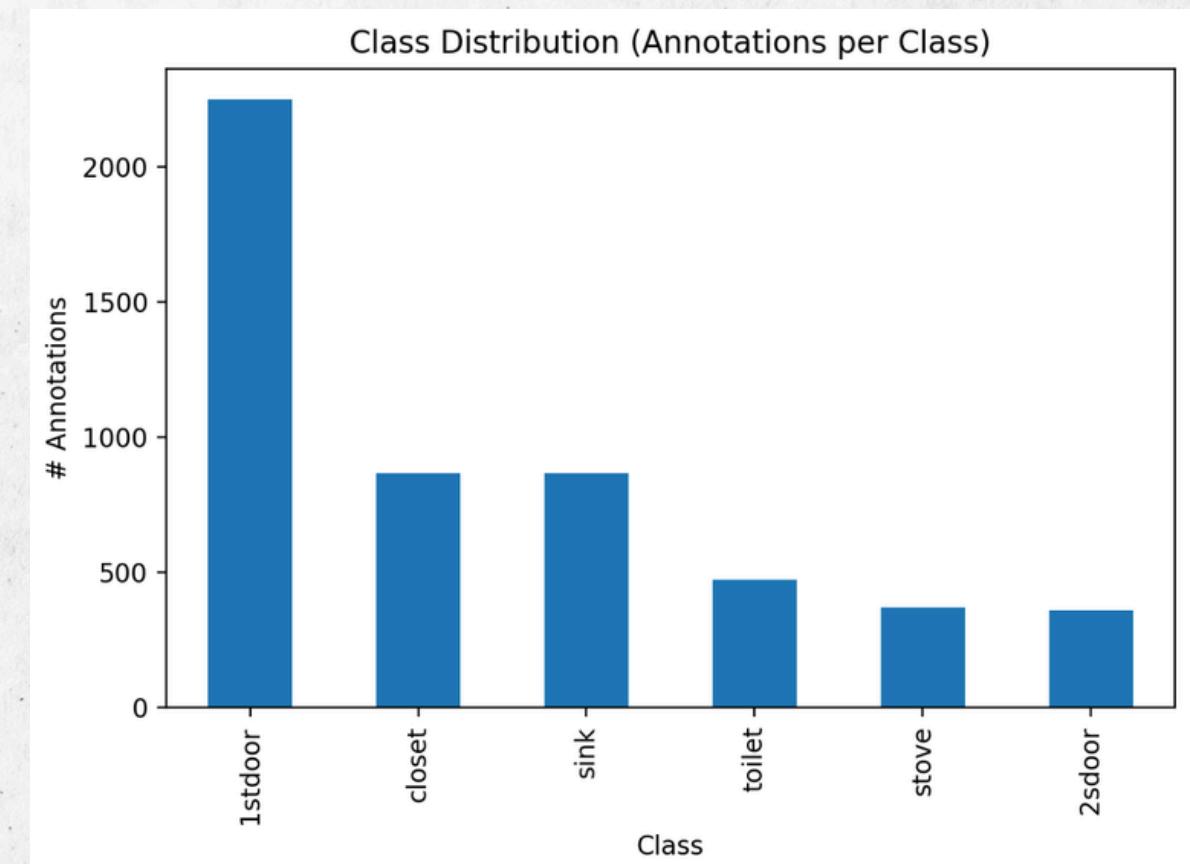
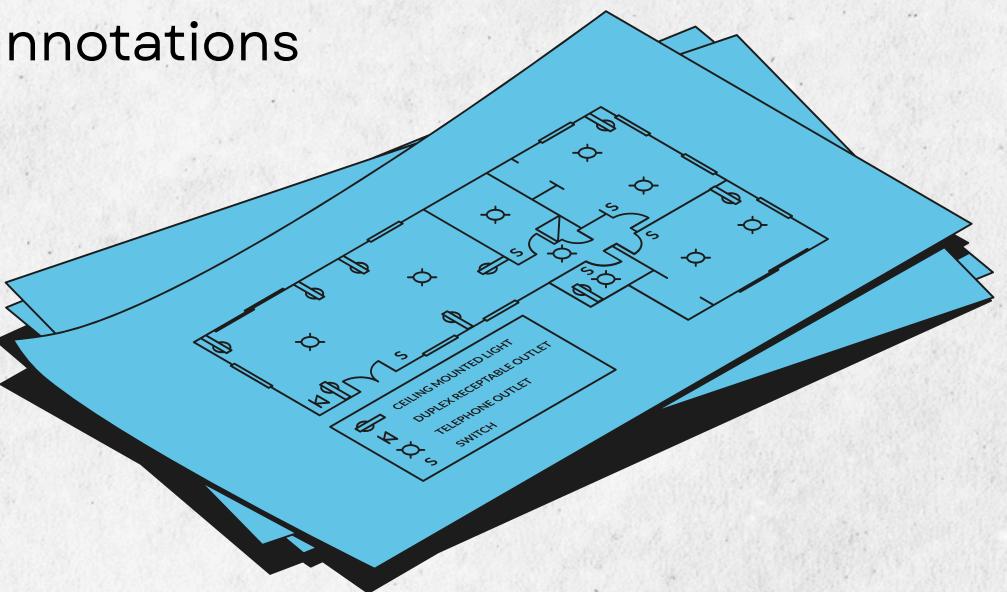
Dataset

DATASET CREATION & LABELING:

- Source: [FloorPlansV2](#) (HuggingFace)
- Data cleaning: removal of duplicates and noisy floorplans
- Manual object annotation using CVAT (COCO format)

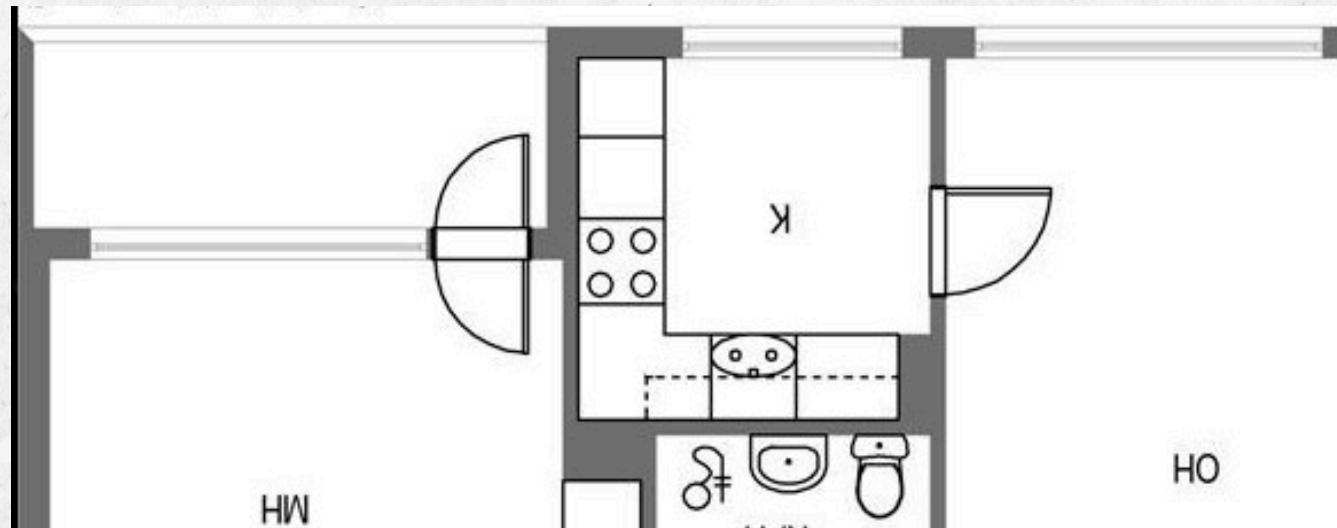
SYNTHETIC DATASET GENERATION PIPELINE:

- finetuned DETR-based object detection model
- Trained on manually labeled COCO annotations
- mask generation using sam
- stable diffusion v1.5 inpainting

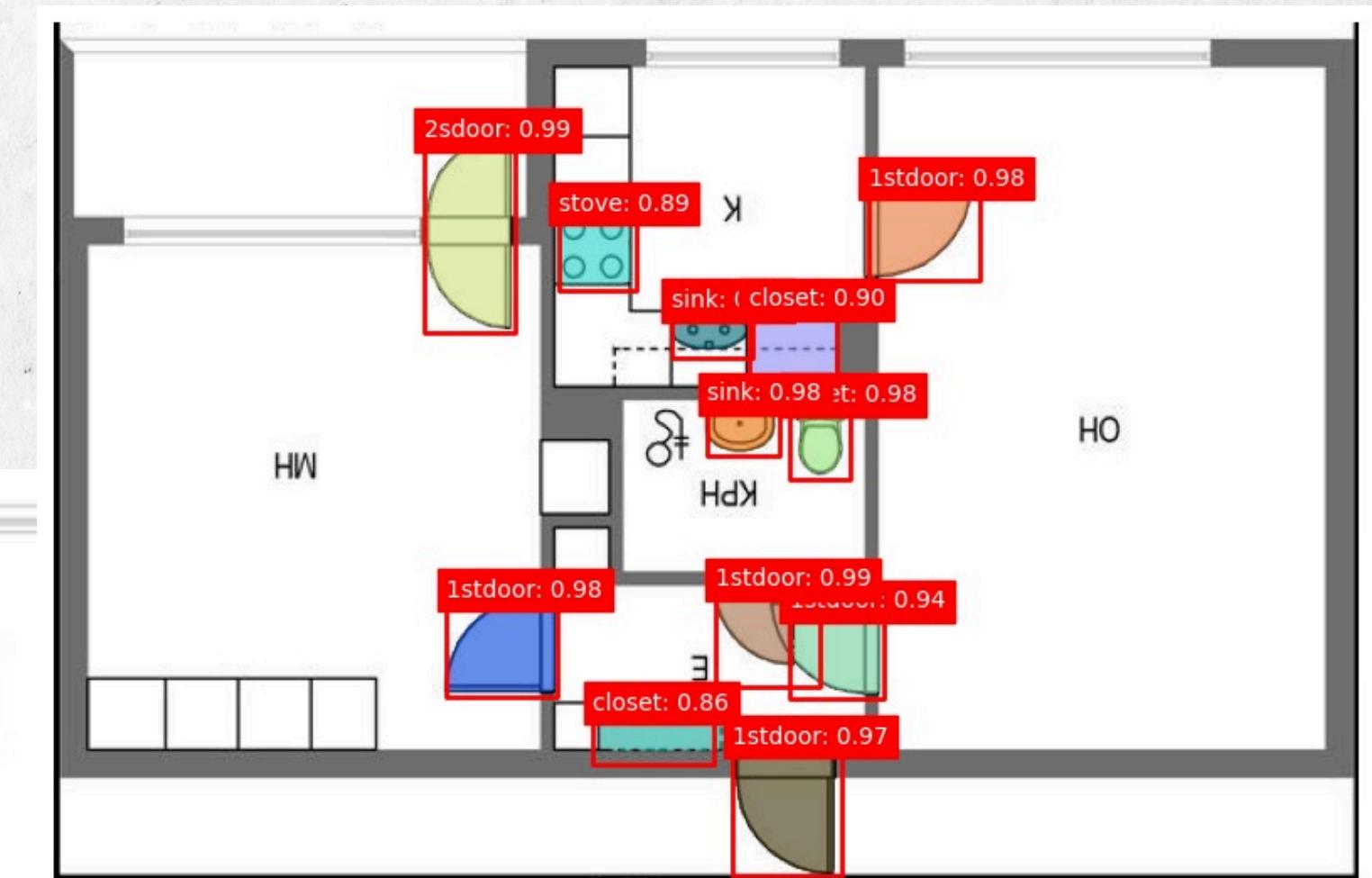


Mask Generation Pipeline

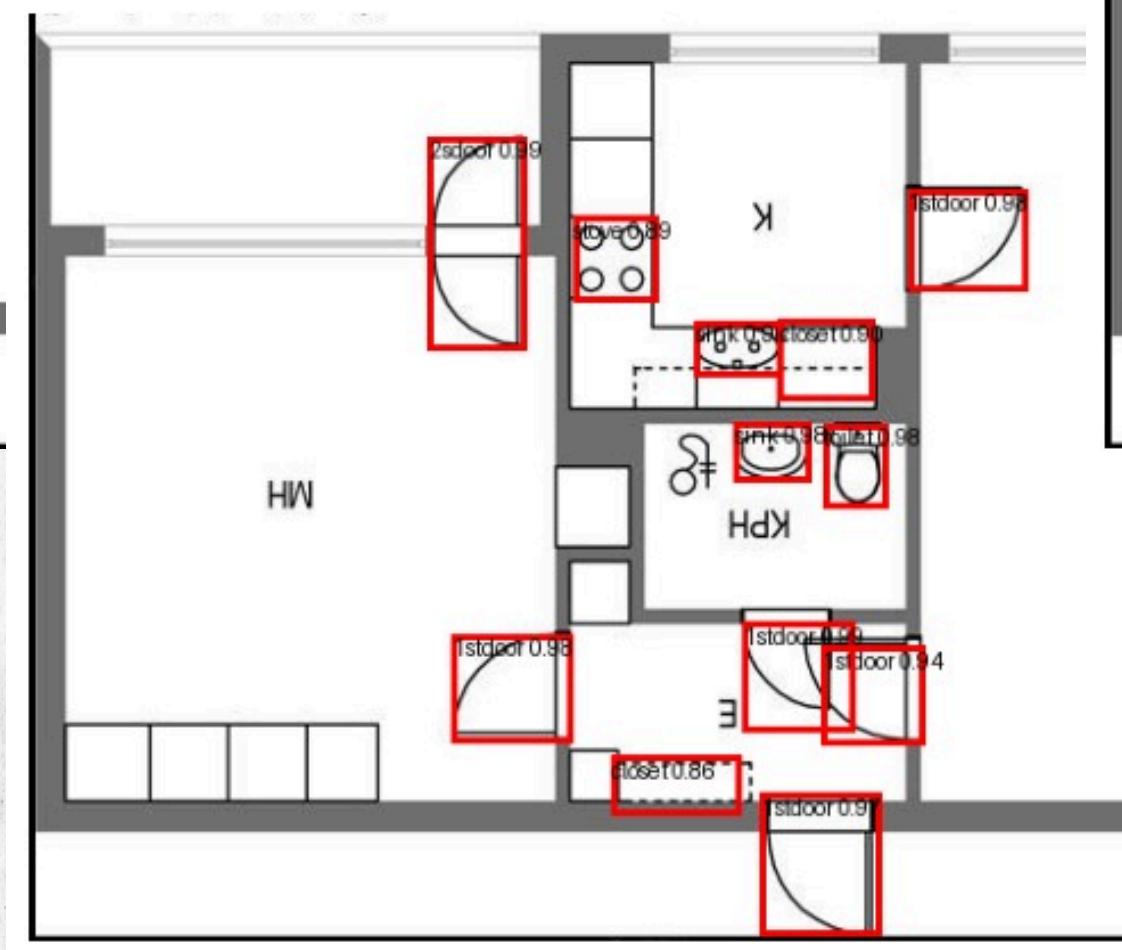
ORIGINAL:



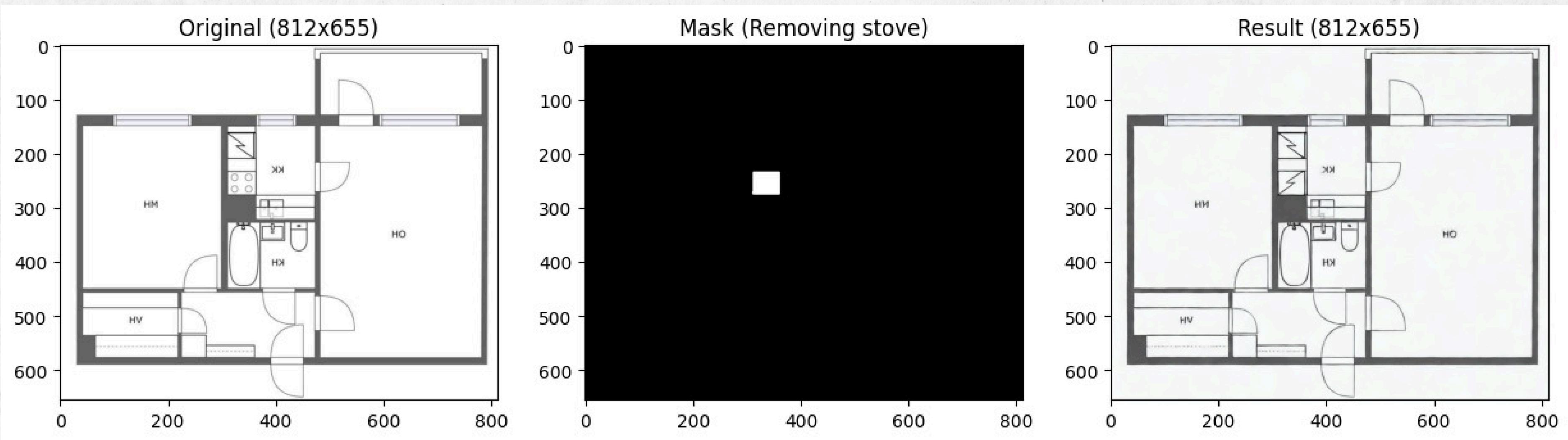
MASKS:



DETECTION:



Inpainting Result



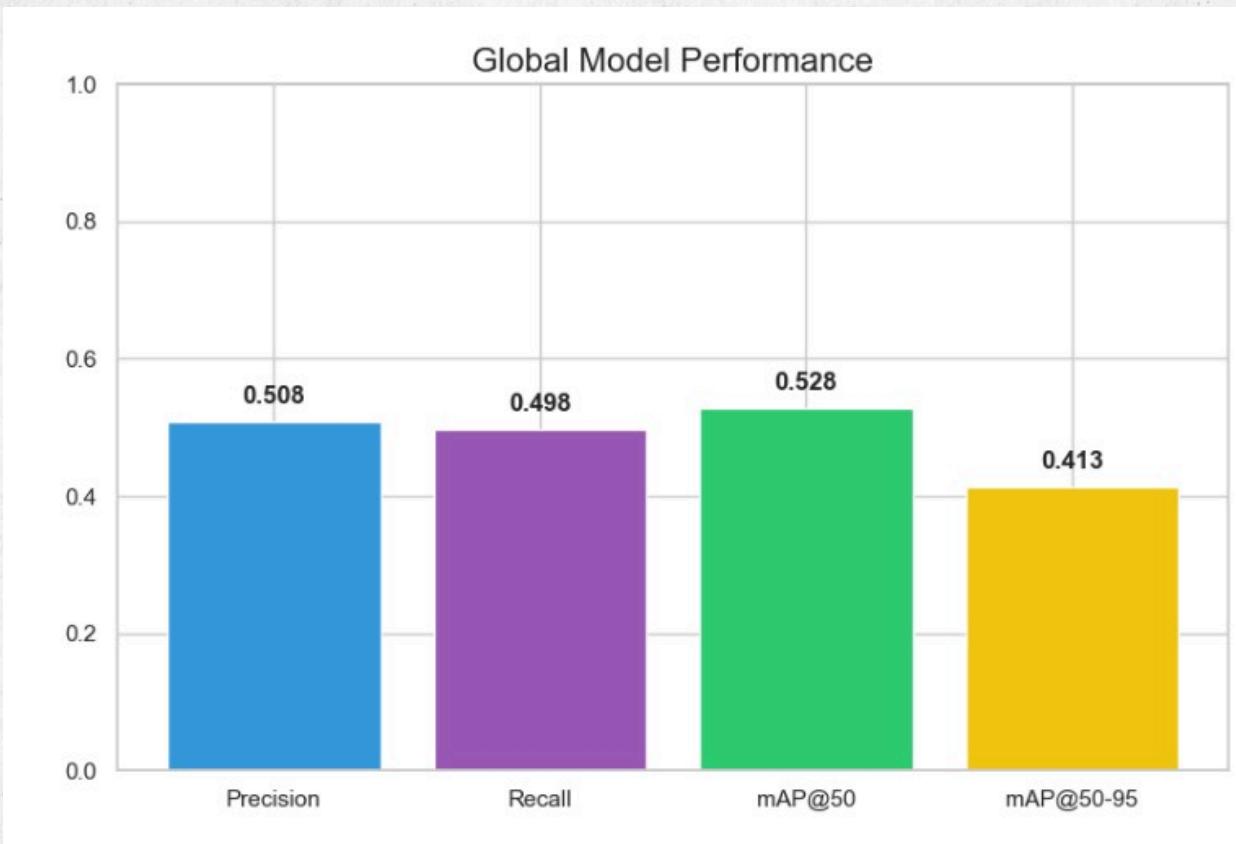
Baseline Solution & Results



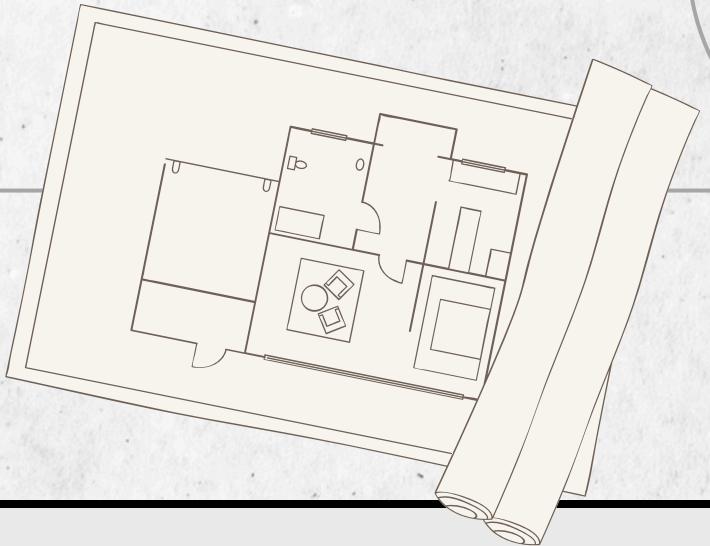
🏡 BASLINE SOLUTION :

- used yolov8 (pre trained and finetuned)
- input: floor-plan photo
- output: bounding boxes (didn't fit for our purpose)

🏡 RESULTS :



Plan



Step	Scope	Due Date	Expected Outcomes
1. Define substantial vs. non-substantial changes	Explore and refine criteria for <i>substantial</i> vs. <i>non-substantial</i> changes.	Now – 27.12	Defined change categories and labels
2. Synthetic Data Creation	Generate <i>before/after</i> floorplan pairs using controlled object-level modifications. <i>Models: DETR+SAM+stable diffusion</i>	27.12 – 07.01	Synthetic dataset of paired floorplans
3. Binary Change Classification	Develop a binary model to classify changes as substantial or non-substantial. <i>Models: DETR outputs → compare → MLP classifier</i>	07.01 – 14.01	Trained change classification model
4. Results & Presentation Preparation	Analyze results and prepare final presentation.	14.01 – 21.01	Final presentation ready