

# Built-in

A GenAI-Based System for Verifying Compliance  
Between Floorplans Versions

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# Motivating Use Case



## BACKGROUND:

DIFFERENT FLOORPLAN VERSIONS CAUSE INCONSISTENCIES THAT BUYERS CANNOT EASILY VERIFY.



## IMPORTANCE:

UNDETECTED CHANGES CREATE FINANCIAL RISKS FOR BUYERS AND LEGAL EXPOSURE FOR CONTRACTORS.



## THE CHALLENGE:

FLOORPLAN COMPARISON IS COMPLEX, AND THE LACK OF DOMAIN-SPECIFIC DATA REQUIRES CUSTOM DATASET GENERATION.



## CURRENT SOLUTIONS:

NO EXISTING TOOLS FROM THE BUYER'S PERSPECTIVE.

# Project task description



## FORMAL PROBLEM STATEMENT

AUTOMATICALLY DETECT AND REPORT DIFFERENCES  
BETWEEN TWO VERSIONS OF THE SAME FLOORPLAN (1-  
2 BEDROOM APARTMENTS).



## PROJECT NOVELTY

FIRST BUYER-ORIENTED FLOORPLAN COMPARISON  
USING CV + GENERATIVE AI AND SYNTHETIC DATA.



## INPUTS & OUTPUTS

### INPUT:

2 FLOORPLANS VERSIONS (IMAGE)

### OUTPUT:

- 0 – NO MEANINGFUL CHANGE
- 1 – CONTENT CHANGE

# Models and methods

## PIPELINE

### STAGE 1:

- INPUT
- PREPROCESSING: INPAINTING & FINE-TUNING

### STAGE 2:

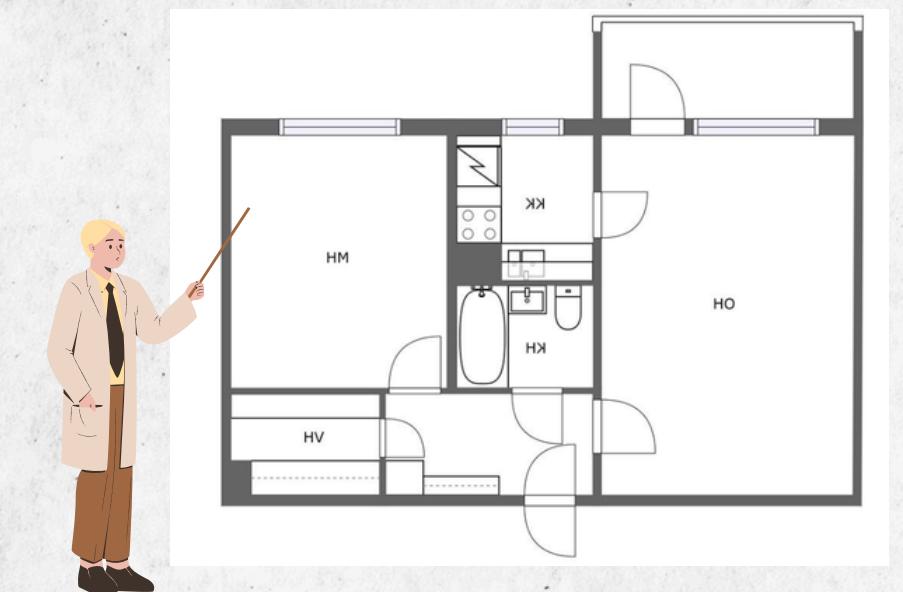
- SYNTHETIC DATA
- FEATURE EXTRACTION: CNN / VIT
- COMPARISON: BETWEEN EMBEDDINGS & BINARY CLASSIFIER
- OUTPUT

## TECHNIQUES

- INPAINTING: DIFFUSION MODEL + PROMPT ENGINEERING
- ENCODERS: CNN / VIT
- CLASSIFIER

## ADJUSTMENTS / FINE-TUNING

- LIGHT LORA FINE-TUNING
- THRESHOLD CALIBRATION



# Data Specification & Generation



## TRAINING & EVALUATION REQUIREMENTS

- FLOORPLANS - 1-2 ROOMS
- UNIFIED IMAGE FORMAT
- PAIRED SAMPLES



## SYNTHETIC DATA GENERATION

- GENERATE PLAN VARIATIONS
- CREATE:
  - 1.NO CHANGE PAIRS
  - 2.CHANGED PAIRS



## DATASET USED:

- FLOORPLANSV2 (HUGGINGFACE) - FILTERED.



## LABELING

### PAIR LABELING:

- 0 – STYLISTIC DIFFERENCES ONLY
- 1 – STRUCTURAL MODIFICATION

# Metrics and KPIs

## HOW WE MEASURE RESULTS:

- COMPARE MODEL PREDICTIONS
- EVALUATE ABILITY TO DETECT SMALL, LOCAL CHANGES.

## QUALITY PER STEP:

- INPAINTING
- EMBEDDINGS
- CLASSIFIER

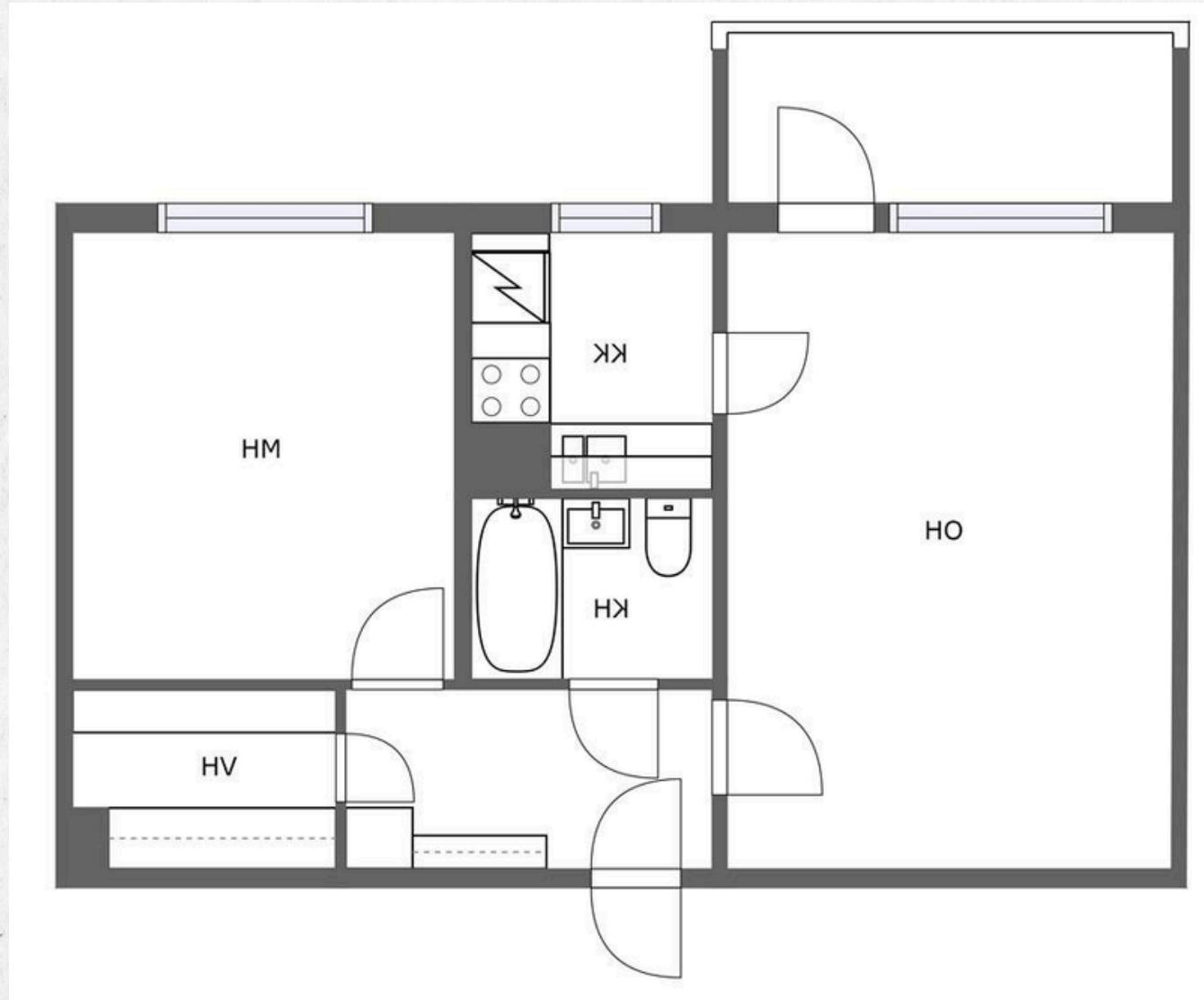
## METRICS & PROTOCOLS:

- TRAIN/TEST SPLIT + CROSS-VALIDATION.
- PAIRED FLOOR PLANS WITH BEFORE/AFTER LABELS.
- KPIs

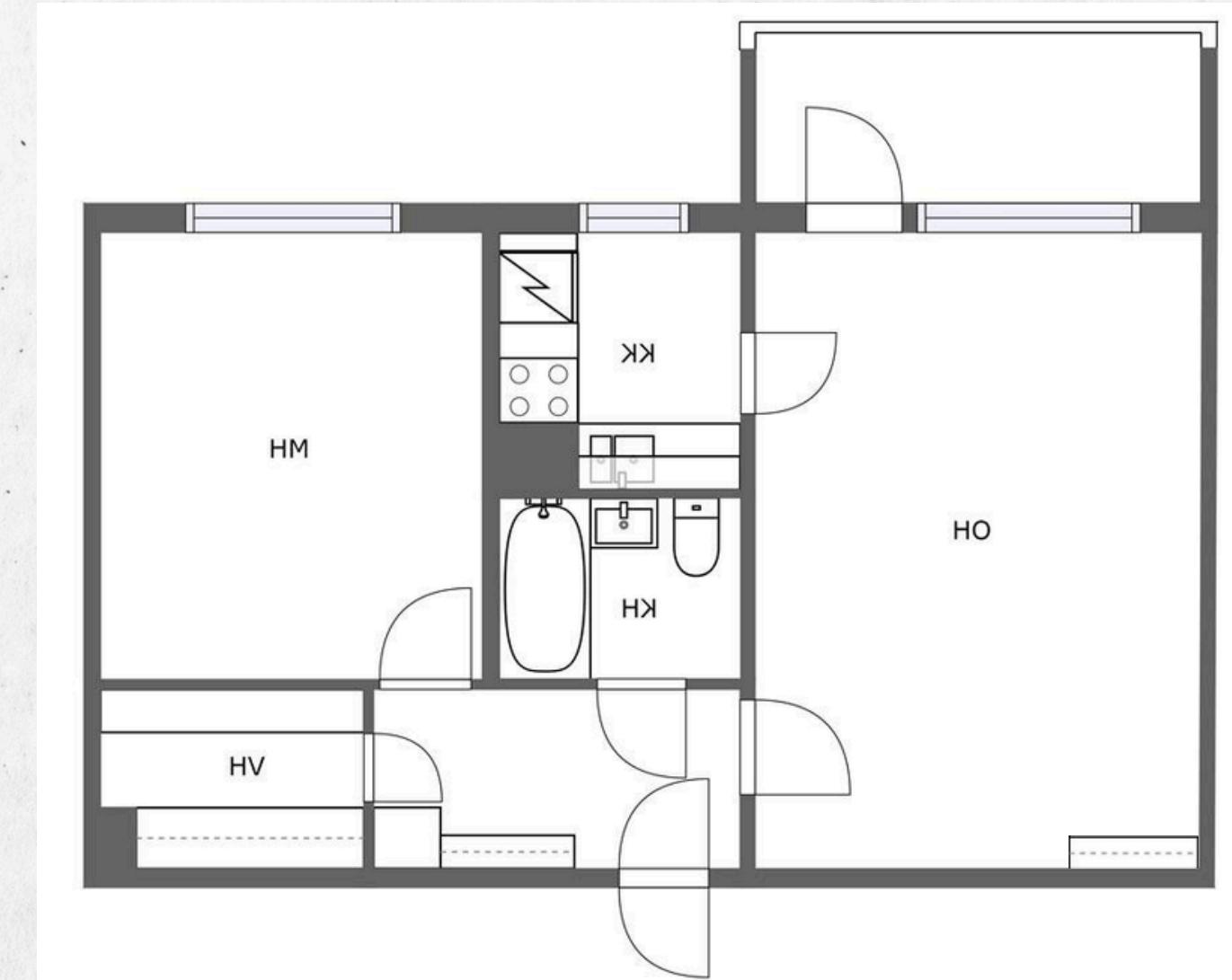
THESE METHODS MAY CHANGE DURING THE PRODUCTION

# Example 1

BEFORE:



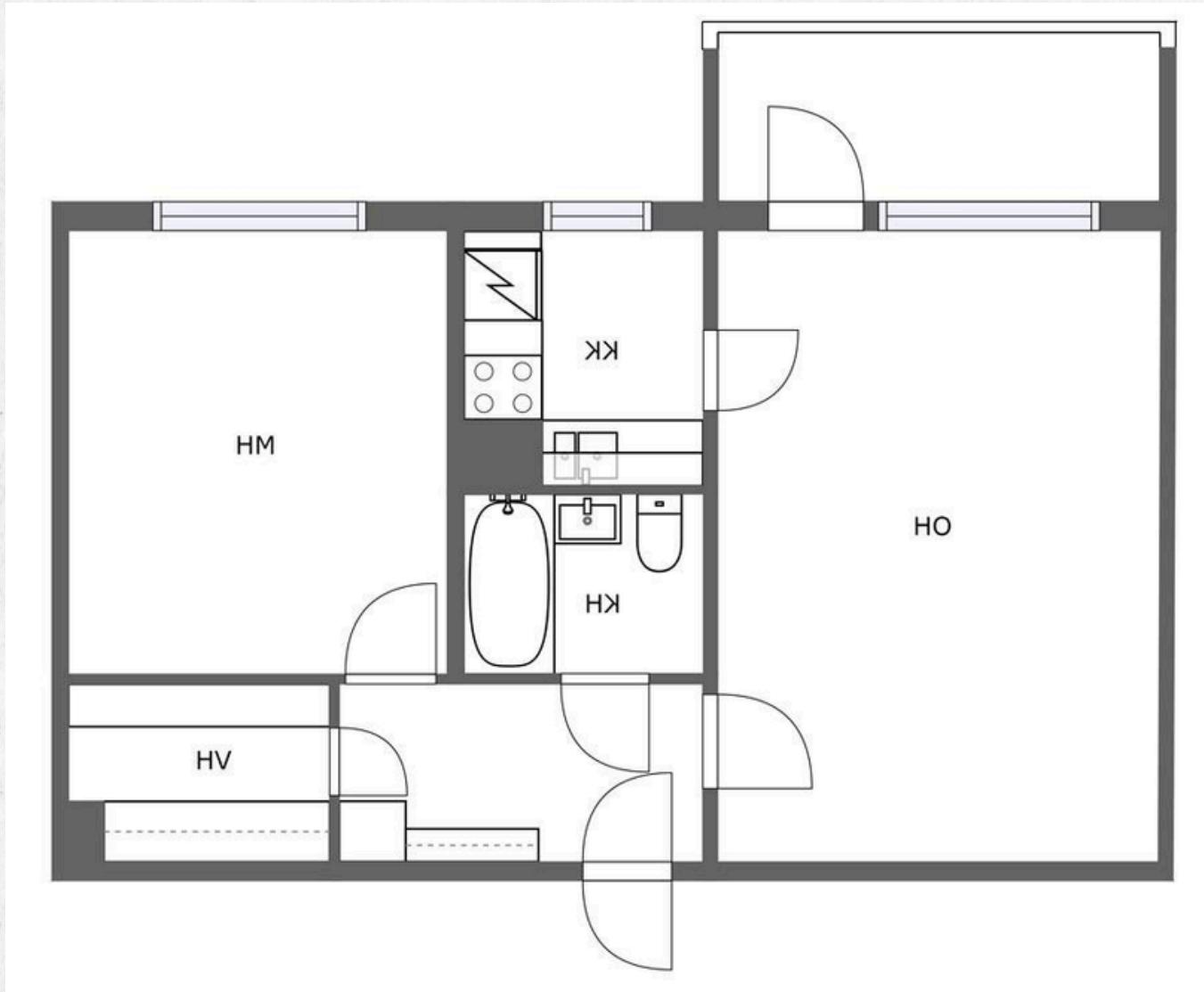
AFTER:



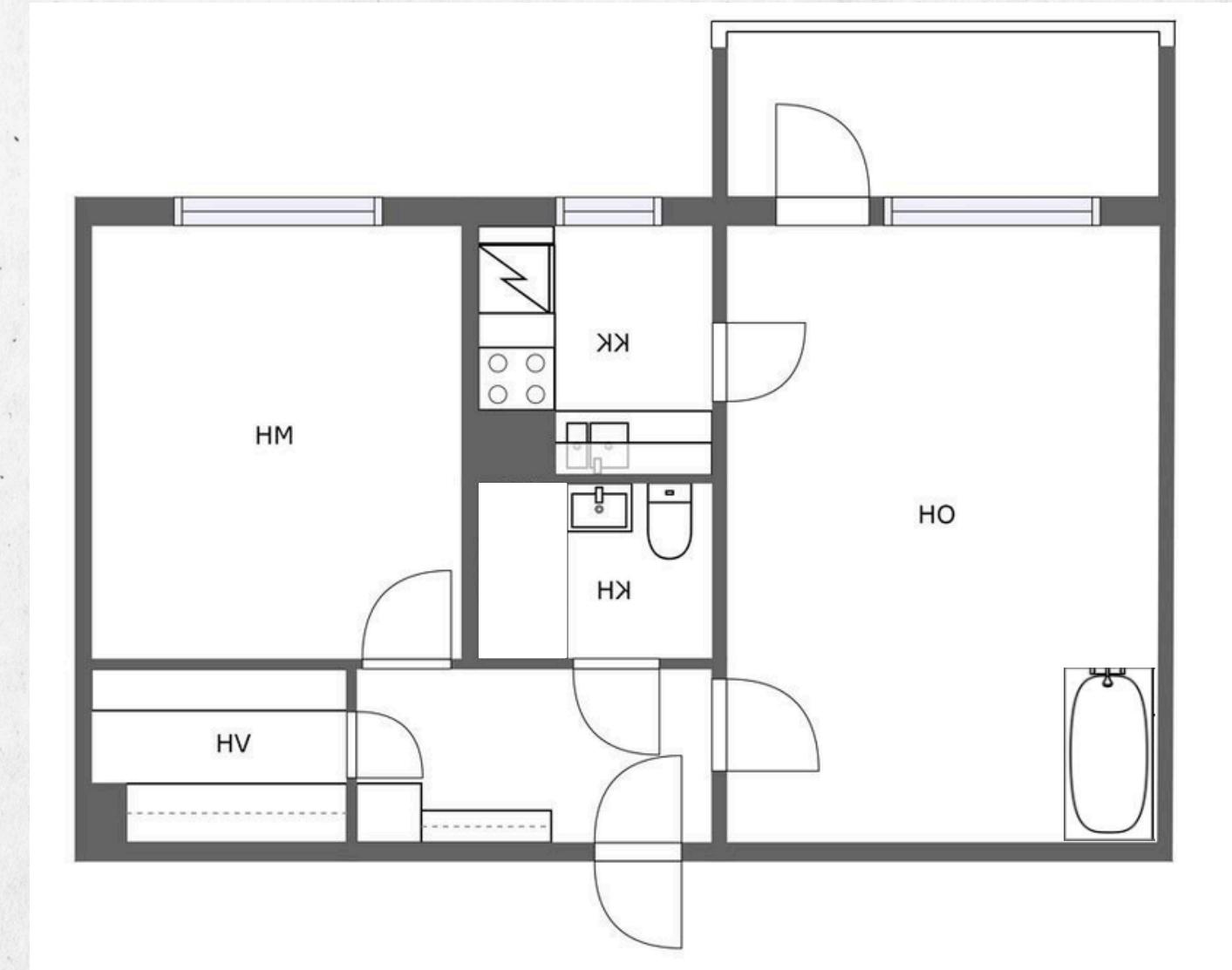
output: 0 – stylistic differences only

# Example 2

BEFORE:



AFTER:



output: 1 – structural modification