Roof and Basement Detection from Building Plans

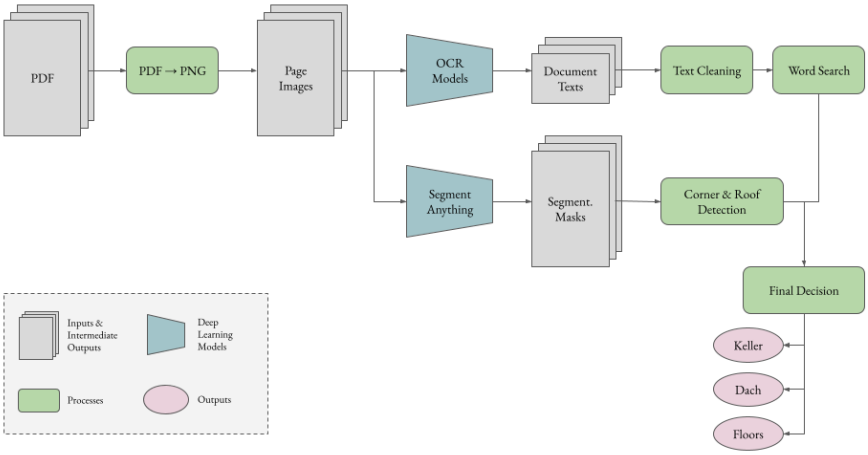

Figure 1: project-pipeline

This project has two main tasks:

- detecting basement presence (0 if not exist, 1 if exist),
- categorizing roof conversions into three classes (converted, convertible (not converted) or flat)

based on building plans. The model takes PDF files, each corresponding to a unique address/building.

My goal is to develop a solution that can accurately detect the presence of a basement and classify roof conversions for each building. Moreover, the number of floors in the building is detected by utilizing the segmentation model and OCR text outputs.

Installation

The code requires `python>=3.8`, as well as `pytorch>=2.0`. Please follow the instructions here to install both PyTorch dependencies.

Run the following command to install required libraries:

```
pip install -r requirements.txt
```

For PaddleOCR, run the following commands:

```
python -m pip install paddlepaddle-gpu -i https://pypi.tuna.tsinghua.edu.cn/simple

pip install "paddleocr>=2.0.1"
```

Getting Started

First download all the weights from the link: model checkpoint. Place the weight files into `checkpoints/` folder.

- To start your evaluation from pdf file, use `--pdfs <path/to/pdf_files>`.
- To evaluate directly from page images extracted from pdfs, use `--pngs <path/to/png_files>`. Each page image should be named as `<record_id>_<page_cnt>.png`.
- To run OCR model on pngs or pdfs, use `--ocr-model <easyocr or paddleocr>`. If you have already extracted OCR text files, then do not specify this option but set `--ocr-path <path/to/txt_files>`. Each txt file should be named as `<record_id>.txt`.
- To save the pages from pdfs, the cleaned OCR texts, and the extracted segmentation maps, you may set a saving directory with `--save-dir <path/to/save_dir>`.

Here is an example usage of my pipeline:

```
python main.py --png <path/to/png_files> --ocr-path <path/to/txt_files>

or

python main.py --pdf <path/to/pdf_files> --ocr-model "easyocr" --save-dir "out"
```

Segment Anything Model Checkpoints

Click the links below to download the checkpoint for the corresponding model type.

- **`vit_h`: ViT-H SAM model.**

Frameworks Used

- **OCR:** 2OCR, paddleOCR, easyOCR
- **Image Segmentation:** segment_anything
- **OpenCV**

Visual Analysis on Roof Existence

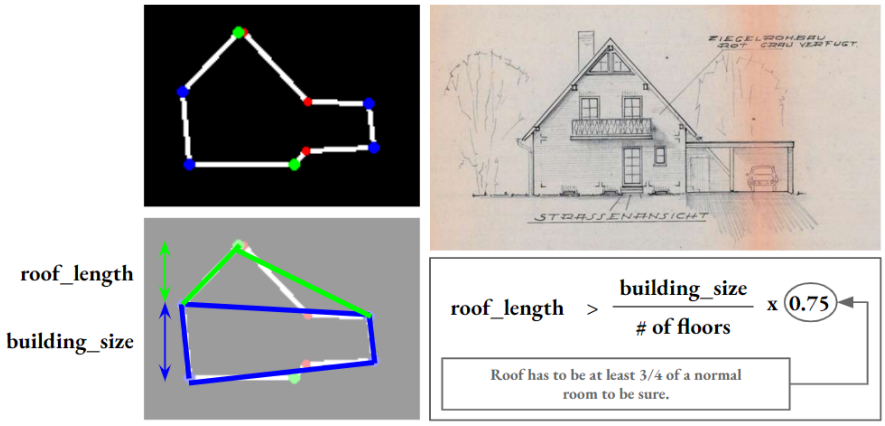

Figure 2: roof-existence

With our algorithm, the corners of the house and the roof top point are detected. Based on roof length and an approximated floor length, the roof existence is evaluated.