

Summary of results

Results from the Bachelor groups

At first, there were two Bachelor groups (the standard method group and the deep learning method group) worked for this topic as their Bachelor theses.

1. SIFT

One Bachelor group (the standard method group) implemented the SIFT algorithm to realize the local feature extraction.

- This is the reference of SIFT: Object Recognition from Local Scale-Invariant Features. David G. Lowe. <https://www.cs.ubc.ca/~lowe/papers/iccv99.pdf>
- This is the final report from this group: <https://repository.tudelft.nl/islandora/object/uuid:d0b96e9b-d383-448e-9342-db0b2560b560?collection=education>
- This is the Github link about the report: <https://github.com/Avraamu/EHM-BEP-2021>

2. BF matching

Both the Bachelor groups implemented the Brute-Force (BF) matching to realize the matching part.

3. D2-Net

The other Bachelor group (the deep learning method group) implemented the D2-Net as the local extraction method.

- This is the final report from this group: <https://repository.tudelft.nl/islandora/object/uuid:f1a2902b-14be-416c-ae1a-ce4f179a0425?collection=education>
- This the Github link about the report: <https://github.com/EHM-Search-Engines/ISEDH-Deep-Learning>

Results from the extra projects

After the Bachelor groups, two students continued this work as their extra projects.

1. AdaLAM

One student (Qi Zhang) implemented AdaLAM to make the former engine more accurate and faster.

- This is the reference of AdaLAM: <https://github.com/cavalli1234/AdaLAM>
- The report of the AdaLAM method: <https://drive.google.com/file/d/1CVDW-oWbKEyWkGP3DzIqcZtSEpxYVTui/view?usp=sharing>

2. GPU acceleration

The other student (Renjie Dai) implemented the GPU acceleration to make the engine faster.

- The report of the GPU acceleration: <https://drive.google.com/file/d/1a2MaKkCpy30hyrLYKPygRWASCzNIXn/view?usp=sharing>

Results from Yuanyuan Yao

After the extra project, Yuanyuan Yao, Yanan Hu, and Qi Zhang (me) continue to work on the engine.

Yuanyuan Yao implemented Product Quantization to make the global feature engine faster. And she also set up the Github.

Results from Qi Zhang

I implemented the LoFTR, which is a local feature extraction method, to make the local feature engine more accurate.

This is the reference of LoFTR: <https://arxiv.org/pdf/2104.00680.pdf>

Datasets

We have decided five datasets to test our engine:

- HPatches: <https://github.com/hpatches/hpatches-dataset>
- InLoc (for indoor images): <https://www.visuallocalization.net/datasets/>
- Aachen Day-Night dataset (for outdoor images & illumination situations): <https://www.visuallocalization.net/datasets/>
- Google Landmarks Dataset v2: <https://github.com/cvdfoundation/google-landmark>
- The customized dataset: https://drive.google.com/drive/folders/1nWA7ppAWbp_U8kZWuupuRBnFOgUBmQlt?usp=sharing