

# Literature Research for Vision Transformers for Optical Flow Estimation

Research Project or Master Thesis

July 6, 2023

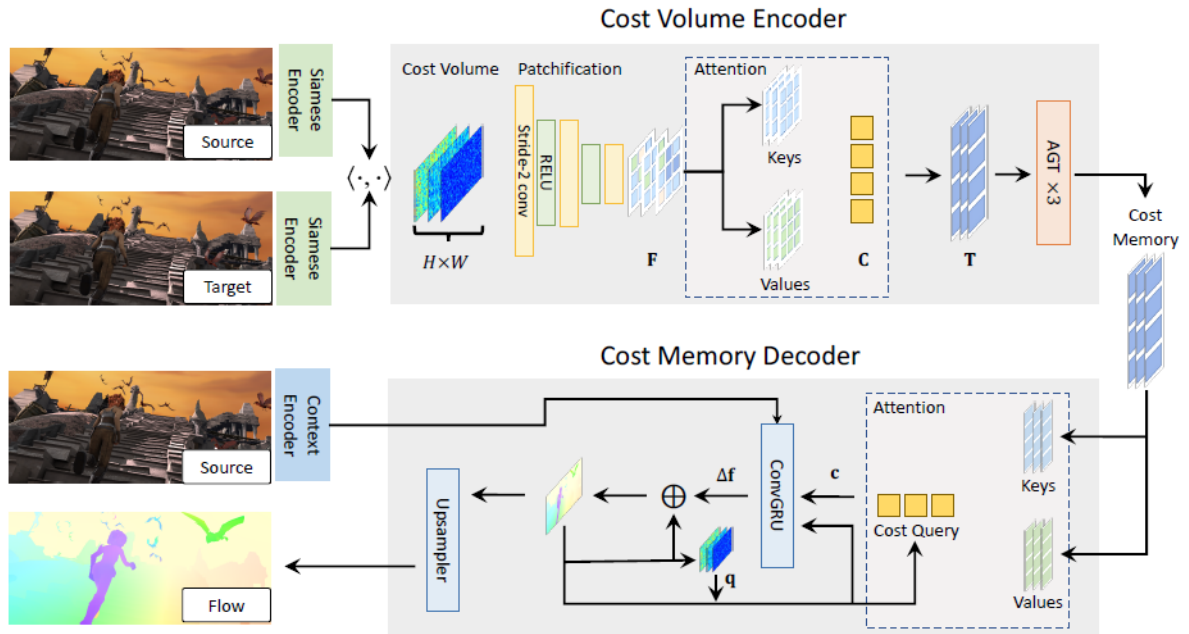


Figure 1: Model architecture of a ViT for optical flow estimation from [1]

The professorship of Digital- and Circuit design (DST) is working in the field of Vision Transformers (ViT) for various computer vision tasks. In this context one aim can be the estimation of optical flow and depth information with ViT.

With the help of a transformer-like architecture, the ViT was first use as a model for image classification. For this, an image is split into fixed-size patches. Each of the patch are linearly embedded and position embeddings are added, where a sequence of vectors is fed into a standard Transformer encoder.

Nowadays, various ViT for the estimation of Optical Flow were developed, e.g. the [1] or the Unimatch architecture [2].

The main goal of this work is the research of existing optical flow ViT. Additionally, if implementations are available, the performance and runtime of a given dataset should be reported.

**The students work isn't limited to this work but should at least contain the following steps:**

- literature research about ViT for optical flow estimation
- discussion of each paper with advantages and drawbacks
- performance + runtime measurement on a given dataset

## Requirements

- basic understanding in computer vision
- at least a ‘good‘ result in Computer Vision I
- good programming skills in e.g. Python or C++

## Contact Information

If you're interested in this topic please send a Mail to [roman.seidel@etit.tu-chemnitz.de](mailto:roman.seidel@etit.tu-chemnitz.de) or +49 371 531 30527 )

## References

- [1] Zhaoyang Huang, Xiaoyu Shi, Chao Zhang, Qiang Wang, Ka Chun Cheung, Hongwei Qin, Jifeng Dai, and Hongsheng Li. Flowformer: A transformer architecture for optical flow, 2022.
- [2] Haofei Xu, Jing Zhang, Jianfei Cai, Hamid Rezaatofghi, Fisher Yu, Dacheng Tao, and Andreas Geiger. Unifying flow, stereo and depth estimation, 2022.