Prof. R. Wattenhofer

View-Specific Video Compression

The performance of learned video compression depends on the model's ability to predict the frame distribution. For a fixed-position camera, like CCTV, the frame distribution is highly constrained, making fine-tuning the compression model beneficial for improved performance. This project focuses on constructing a codec that can easily adapt to this narrow frame distribution, resulting in higher compression quality for a specific camera and angle. Although the downside is that each camera will require its own compressor, this trade-off is worthwhile for CCTV systems that capture large volumes of data from a consistent angle and framing.

The project starts with fine-tuning learned video compression models, such as [4, 1, 2, 5, 3], on video data from fixed camera positions. The goal is to develop a compression model that achieves fine-tuned performance without requiring extensive fine-tuning. Instead, it would rely on a few reference videos from the dataset to adapt effectively.
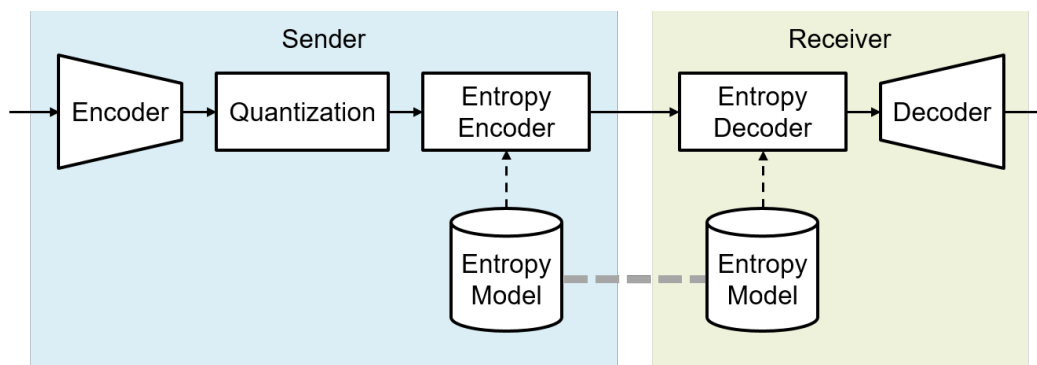
Requirements: Strong programming skills in languages such as Python, along with a keen interest in learned compression.

Weekly meetings will be scheduled to address questions, discuss progress, and brainstorm future ideas.

Contact

In a few short sentences, please describe your interest in this project and any relevant coding experience or background (e.g., projects or coursework).

- Till Aczel: taczel@ethz.ch, ETZ G60.1

References

[1] Zhihao Hu, Guo Lu, and Dong Xu. "FVC: A new framework towards deep video compression in feature space". In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*. 2021, pp. 1502–1511.

[2] Jiahao Li, Bin Li, and Yan Lu. "Deep contextual video compression". In: *Advances in Neural Information Processing Systems* 34 (2021), pp. 18114–18125.

[3] Jianping Lin et al. "A deeply modulated scheme for variable-rate video compression". In: *2021 IEEE International Conference on Image Processing (ICIP)*. IEEE. 2021, pp. 3722–3726.

[4] Guo Lu et al. "Dvc: An end-to-end deep video compression framework". In: *Proceedings of the IEEE/CVF conference on computer vision and pattern recognition*. 2019, pp. 11006–11015.

[5] Yibo Shi et al. "Alphavc: High-performance and efficient learned video compression". In: *European Conference on Computer Vision*. Springer. 2022, pp. 616–631.