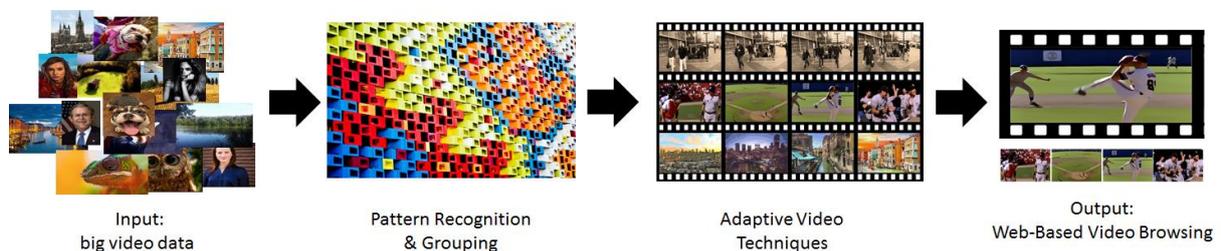


Deep Learning for Smart Video

Browsing videos for relevant information is often a time consuming and laborious task. Due to the mere number of videos available and their redundancy as well as low information density, it is inconvenient to find desired information using existing software. We developed the VideoToolKit (VTK) framework, which implements techniques for real-time analysis, processing, and rendering that transform videos "in a smart way", for example by summarization and shortening videos to its most relevant parts. This master project aims at using deep learning approaches for big video data to adaptively configure VTK techniques in a smart way.



Students should investigate the following topics (not limited to):

1. **Metric Computation:** What are meaningful metrics for videos and how can they be computed efficiently using GPU-based algorithms? This task focuses on research for suitable metrics and their implementations.
2. **Deep Metric Learning:** What metric combinations are most representative for videos? This task includes research of existing deep learning frameworks and their adaption for videos.
3. **Video Synopsis and Stylization:** How can results of deep video learning are applied to automatic video synopsis and adaptive video stylization? This task comprises the adaption and/or implementation of video synopsis and stylization operations.
4. **Web-Frontend for Video Browsing and Viewing:** How can the result of video synopsis and stylization be used for effective video presentation in terms of gaining overview of – as well as supporting navigation within videos? This task includes the design, and implementation of a web-based GUI framework based on the VTK Web-Service Interfaces.

These topics link to current research and software projects of the HPI's Computer Graphics Systems group. It is especially suited for further research in the context of a master thesis or to get in touch a direction for a future doctoral thesis. Further, the master project can be used to start working as a student assistant or software developer at our research partner Digital Masterpieces GmbH (www.digitalmasterpieces.com)

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