

VideoGene – Robust and Scalable Fingerprint for Video Search and Mining Applications (PI: Dr. Liu Yan; 2009/10)

The advances in computing and communication technologies, especially the proliferation of image/video capture, playback and communication capable devices are fueling an explosive growth in image/video content production, consumption and sharing. Thousands of commercial TV channels and millions of individual producers, as well as billions of people are sharing and consuming video content. The sheer size and complexity of video repositories and the number of people creating, sharing and consuming video content, present a challenge to applications like video bookmarks, query by capture, copyright content protection and duplication detection, video content search, mining and association. The key to enable these applications is to find a robust video fingerprint that is invariant to changes in the process of video content creation, sharing and consumption. For the video bookmarks and query by capture applications, a very short video clip is obtained from a remote video server, or captured by mobile devices from a live TV screen, then the fingerprint of this short clip is extracted to match with the content provider's video repository to locate relevant programs that contain this clip. Notice that an efficient organization of video fingerprints is also crucial to support fast search, as video repositories are growing fast. Copyright protection and duplication detection are one of the main challenges to the content providers/hosts. Copyright violations can have unpleasant legal ramifications for content host, while duplications waste storage space and makes query ranking result web pages useless. A robust video fingerprint that is robust to editing and transformation is crucial for the success of these tasks. In video content personalization, e.g. content recommendation and tracking, video

fingerprint can be used to keep track of common video segments among different programs. In addition to the robustness issues, a fast and scalable search strategy is also important to keep up with the growing size of video repositories. In this project, we are developing a robust video fingerprint feature that can address aforementioned challenges in video search, duplicate detection, and an efficient and scalable video fingerprint search solution that achieves fast response time, high accuracy under coding/communication losses and editing and image formation variations. The solution also scales well with video repository size and offers a speed-accuracy tradeoff.