SpriteDB Tool – A Web-Tool for Comparing Sprite Generation Results

Yi Chen, Abhidnya A. Deshpande, Ramazan S. Aygün
Computer Science Department
University of Alabama in Huntsville, AL USA
{ yichen, adeshpan, raygun}@cs.uah.edu

***Abstract*— *SpriteDB* tool has two main objectives. Firstly, it provides an open-source, uniform platform for accessing a vast collection of test videos used for sprite generation. Secondly, it presents the experiments with intermediate results generated by our approach for comparison and analysis. Our experimental results consist of classification of videos for sprite generation, synthetic and ground truth video generation, and the generated sprites.**

Keywords- video database, sprite generation

I. INTRODUCTION

Over the course of the last decade, significant research has been performed on sprite generation. Sprite generation is studied for both content based retrieval and video compression. Sprite coding that requires availability of sprites is part of MPEG-4 [1] Main Profile. It has been shown that extending the latest Codec H.264/AVC [2] with sprite coding achieves compression gain with up to 25% bitrates savings for the applied sequences [3]. Therefore, new standards may benefit from sprite generation. However, the experiments on sprite generation are limited to a few test sequences like 'Stefan' and 'coastguard'. Few sequences are not satisfactory to test the performance of sprite generation methods. Sprite generation research faces the following challenges in general: a) limited set of video for testing and no uniform access to these videos, b) absence of ground truth videos, and c) no access to the intermediate results. Nevertheless, there is no existing open source system to solve these challenges.

Our *SpriteDB* tool provides a uniform access to a larger set of video sequences in different varieties including ground truth videos as well as to intermediate results. It is a web-based software that can be used to present sprite generation results along with such related research information as video classification for sprite generation, and synthetic and ground truth video generation. The *SpriteDB* tool allows researchers to perform experiments on a variety of test videos and compare and analyze their results with ours.

The *SpriteDB* tool provides access to sprite generation test data including 78 classification videos categorized into 6 classes [4], 91 camera motion (ground truth) videos grouped by 13 patterns [5], 4 real sequence videos and 4 green screen videos.

*This material is based upon work supported by the National Science Foundation under Grant No. 0812307.

The classification videos consist of standard sequences such as 'Stefan' and 'coastguard,' as well as a variety of other videos suitable for sprite generation. 91 camera motion videos are generated from the high resolution image that provides ground truth for sprite comparison. 4 real videos are outdoor sequences with specific global motion patterns. These videos were used to verify our sprite generation approach [6]. 4 green screen videos were used to check the capability of our sprite generation to remove the objects by providing object masks. Our experimental results are categorized into 3 main categories: video classification results, synthetic video pattern information files, and sprite images and sprite PSNR files. For green screen videos, mask videos along with original videos are also provided. All test videos, mask videos, PSNR files, and pattern files can be downloaded and tested by others.

II. SYSTEM ARCHITECTURE

A. Database Functionality

The database is implemented using Microsoft Access and connected with OleDb link. The database stores all the information regarding test results into various tables, and maintains relationships between them. There are 2 main tables: 'Movie' and 'Sprite'. 'Movie' table stores information about the videos while 'Sprite' table stores information about the sprite. The classification information is stored in a corresponding XML file. Data Storage module provides all the videos, thumb-nails, XML files, PSNR files, pattern files, and supplementary sprite data. The database provides information required to logically relate the database to the Data Storage module.

B. Interface Functionality

The *SpriteDB* tool is implemented using ASP.net with C#. The homepage (Fig. 1) provides an introduction to the sprite generation project followed by three components of the video database. Detailed explanations of the different parameters used by the three components are stored in the database and displayed on the website. The search engine (Fig. 2) can search classification videos according to their class names. For example, we use the 'Earthquake' class option to find videos which belong to the 'Earthquake' class. It can also search specific camera motion videos based on certain patterns like "Affine." Upon selecting the "real video" option, the list of green screen and outdoor video sequences is displayed. Table I provides information related to each video category referred by the search engine.

III. DEMO

The user can access the database at: http://146.229.232.110/mosaic/Homepage.aspx. The homepage also provides a video tutorial (Fig. 1) on how to use the *SpriteDB* tool.

IV. CONCLUSION AND FUTURE WORK

This demonstration presents a user-friendly tool to share video database and test results. It allows researchers to access our video database, perform experiments and compare their results. Thus, our classification videos, synthetic videos, and real videos along with the test results form a diverse dataset useful for sprite generation.

TABLE1. Information about each video category
(VC: video classification, SG: sprite generation, P: pattern, O: Original, PSF: PSNR file)

	Video Type		
	Classification	**Synthetic**	**Real**
Related Parameter	• VC • SG	• CM • SG	• SG
Interface Reference	• SGI • VC info (VCI)	• SGI • P info	• SGI
Display / Download info	• O Video (OV) • VCI • OS • PSF	• OV • OS • P File/P image • PSF	• MV (GS) • OV • PSF • OS

The main aim of our research is to study the suitability of a video for sprite generation, to understand the effects of camera motion on sprite generation and to use real videos for sprite generation. In the future we plan to use this system to collect test videos and test results from other researchers and develop an analysis tool to compare their results with ours.

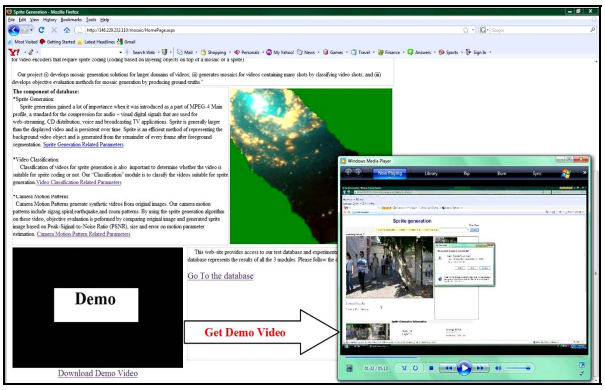

Figure 1. Demo video on web-page

References

[1] MPEG-4, http://www.chiariglione.org/mpeg/standards/MPEG-4/MPEG-4.htm

[2] T. Wiegand, G.J. Sullivan, G. Bjntegaard and A.Luthra, "Overview of the H.264/AVC video coding standard," IEEE Transactions on Circuits and Systems for Video Technology vol. 13, pp. 560–576, July 2003.

[3] M. Kunter, P.Krey, A. Krutz and T. Sikora, "Extending H.264/AVC with a background sprite prediction mode," Image Processing, 2008. ICIP 2008. 15th IEEE International Conference on 12-15 Oct. 2008 Page(s):2128 – 2131.

[4] A. A Deshpande and R. S Aygun. "Motion Based Video Classification for sprite generation," 3rd International Workshop on Multimedia Data Mining and Management August 31 ~ September 4 2009, Linz, Austria, in press.

[5] Yi Chen and Ramazan Aygün. "Synthetic Video Generation to check the correctness of sprite generation," *Advances in Multimedia MMEDIA,International Conference on,* pp 140-145, 2009 First International Conferenceon Advances In Multimedia,2009.

[6] Y. Chen and R. S. Aygun. "Synthetic Video Generation with Complex Camera Motion Patterns to Evaluate Sprite Generation," The Fifth IEEE International Workshop on Multimedia Information Processing and Retrieval IEEE-MIPR 2009 December 14-16, 2009- San Diego, California, in press.

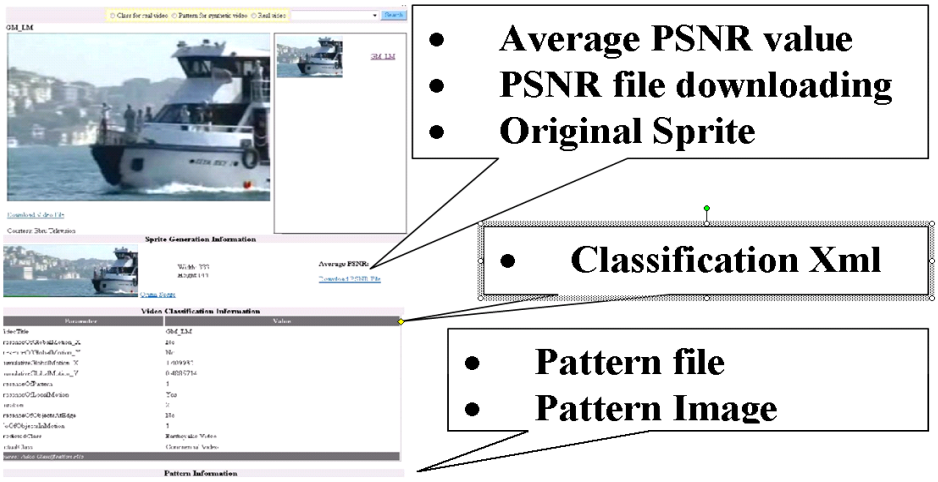

Figure 2.Information for each frame on web-page