

# LUMinance Field Trace (LUFT) Based Video Indexing and Retrieval

The data set consists of two set of videos. Data set 1 is made up of 540,000 frames (5 hour) of video from NIST TRECVID 2005 shot boundary data set, and its indexing tree of height  $L=12$ . This results in 4096 leaf nodes with roughly 132 frames each. Data set 2 consists of 50,000 frames also from NIST TRECVID 2005 shot boundary data set, but not included in data set 1. The positive queries are constructed from data set 1 video clips with random locations and clip length of 0.5, 1.0 and 20 sec, i.e.,  $m=15, 30, 60$  frames. The negative queries are constructed randomly from data set 2. Noisy clips are constructed from additive Gaussian noise with PSNR quality of 25, 28, 31, 33 and 36 dBs.

The system achieves very fast retrieval performance, ranging from 12 to 40ms. The indexing efficiency,  $\mu$ , as ratio of query clip length over data base size, the time to search through kd-tree to locate leaf nodes,  $t_{search}$ , as well as the actual trace matching time,  $t_{match}$ , are plotted in the Table I. below.

TABLE I  
INDEXING EFFICIENCY AND RETRIEVAL SPEED

$d_{indx}$	$m$	$\mu$ ( $^{0}/_{100}$ )	$t_{search}$ (ms)	$t_{match}$ (ms)
2	15	1.211	0.93	27.45
2	30	2.011	1.61	48.53
2	60	3.568	2.78	91.11
4	15	<b>0.659</b>	0.65	12.38
4	30	1.204	1.23	21.65
4	60	1.994	2.08	41.91
8	15	0.681	<b>0.62</b>	<b>11.32</b>
8	30	1.138	1.20	20.82
8	60	1.834	1.87	41.15

The retrieval accuracy for the indexing dimension of  $d_{indx}=8$ , and query clip length of 0.5 sec cases are plotted below. Precision-Recall performance of noisy query clips with different quality (PSNR) dB levels are shown in Fig. 1. It achieves very good accuracy.

