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CONTRIBUTION

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Video Teleconferencing/Video Telephony Service

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Timecodes for Editing Subjective Viewing Tapes

Introduction

In order to reduce costs and improve the accuracy of tape editing for the T1A1.5 subjective testing, the creation of an edit decision list (EDL) by one or more of the member organizations is desirable. An edit decision list can be entered into an automated edit controller and editing equipment can then operate more or less automatically. This should reduce both operator time and equipment time and hence the cost of editing the subjective viewing tapes.

This contribution examines the possibility of *calculating* a set of timecode tables from which an EDL can be assembled. These timecode tables could be calculated from the timecodes for each scene on the Master tape and the beginning timecode on each of the 25 HRC (hypothetical reference circuit) tapes. (Note: This method of deriving edit timecodes is equivalent to re-stripping the timecodes on the HRC tapes so that the first frame of the first scene on every tape has the same timecode.) The timecode tables so calculated could then be used to create the EDL according to the randomization given in the subjective test plan.

Although this method of calculating the timecode tables would be less time-consuming than manually recording the timecodes for each scene on each tape, we have discovered that the results are not sufficiently accurate for the purposes of the T1A1.5 committee. We therefore recommend that timecode tables be created by visually verifying the timecodes for each scene on each HRC tape.

Calculation of Timecode Tables

The calculation of the timecode tables was carried out at ITS. *Exact* timecode tables were created manually (by viewing each tape) for the Master tape, HRC01(NULL), and HRC06. Exact timecodes for the beginning of scene #1 (vtc2mp) were recorded for each of the remaining HRCs. A computer program was written to perform the calculations and the timecode tables were created. As might be expected, the timecode table for HRC01 came out perfectly. However, the table for HRC06 was not accurate. Due to the nature of the compression scheme used by HRC06, which results in variable video delay, the scenes did not begin at the calculated timecodes. This can be observed in Table 1 below by noting the time-varying differences between the *calculated* and the *actual* scene-begin points. If the differences were small enough, they could be ignored.

Note that each of the scenes in Table 1 are shorter than the 390 frames present for each scene on the Master tape (360 frames for vtc2zm which is 1 second shorter than the other scenes). Several problems will occur if we use the *calculated* timecode table. As is evident from Table 1, the starting point is as much as 55 frames off. The method for choosing the 9 second interval for the subjective test is to begin the 9 second interval 3 seconds

(90 frames) after the beginning of the 13 (or 12) second test scene. In the case of *roadmap*, using the calculated timecode table would result in three deviations from the subjective test plan:

- (1) Only 35 frames will be used to allow the HRC to come to steady-state (as opposed to 90 frames as called for in the test plan).
- (2) 55 frames at the beginning of the HRC output scene will not have been shown in the reference scene.
- (3) 55 frames shown at the end of the reference scene will not be shown in the HRC output scene.

Similar problems occur when the timecode difference is in the opposite (positive) direction. In these cases, if the difference is greater than 30 frames, then the degraded segment will have less "scene" which will have been replaced by the "grey" at the end of the scene. This grey will include artifacts which may occur as the scene cuts to grey. These artifacts can be significant and should not be shown to the viewers. Furthermore, it is possible that a portion of the next scene could be presented if the variable video delay was large enough (the largest variation present in HRC06 was 81 frames).

Conclusion

Although results reported in this contribution involved examination of only 1 HRC tape, other HRC tapes may exhibit even greater variations. Therefore, it is our opinion that the timecode table should be created by visually observing the timecodes on the HRC tapes (or dubs). Edit decision lists can then be created using these timecode tables and the randomization tables in the subjective test plan. These edit decision lists would be supplied to the editing facility for the production of the subjective viewing tapes.

Table 1: Timecode Table Comparisons: HRC06

SCENENAME	Timecode Difference	Length of Scene on HRC Tape
	(calculated - actual)	(390 frames = 13 seconds)
vtc2mp	0	349
vtc2zm	-9	311
washdc	-31	320
3inrow	2	353
boblec	24	371

Table 1: Timecode Table Comparisons: HRC06

SCENENAME	Timecode Difference	Length of Scene on HRC Tape
	(calculated - actual)	(390 frames = 13 seconds)
vtc1nw	18	365
5row1	9	357
flogar	-52	299
ftball	-35	316
susie	10	359
disguy	26	373
disgal	21	370
smity1	-23	330
smity2	-21	332
intros	9	358
3twos	12	363
2wbord	2	350
split6	-13	336
cirkit	-15	334
rodmap	-55	295
filter	12	361
inspec	14	363
ysmite	-11	337
vowels	-2	347
fredas	-1	347