Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6)
23rd Meeting: San Jose, California, USA, 21–27 April, 2007

Document: JVT-W084
Filename: JVT-W084.doc

Title: **Observations of Multi-view Test Sequences**

Status: Input Document to JVT

Purpose: Information

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Source: GIST and KETI

Abstract

In this document, we introduce information by observing the multi-view test sequences. The observations are related to vertical and horizontal displacement caused by inaccurate camera arrangements, illumination changes, synchronization of multi-view sequences, and focusing. Future multi-view video sequences should solve these problems for efficient multi-view coding and the real applications.

1. Introduction

Multi-view video sequences are captured by two or more adjacent cameras simultaneously. Therefore, it is not easy to control the accurate setting and to keep the consistency of multi-views. The problems such as vertical and horizontal displacement cased by inaccurate camera arrangements, illumination changes, asynchronism of multi-view sequences, and focus mismatche of each camera result in inefficient coding and lead to the unnatural scene at the multi-view display devices. We point out the above problems by observing the current multi-view test sequences. Future multi-view video sequences should solve these problems for efficient multi-view coding and real applications.

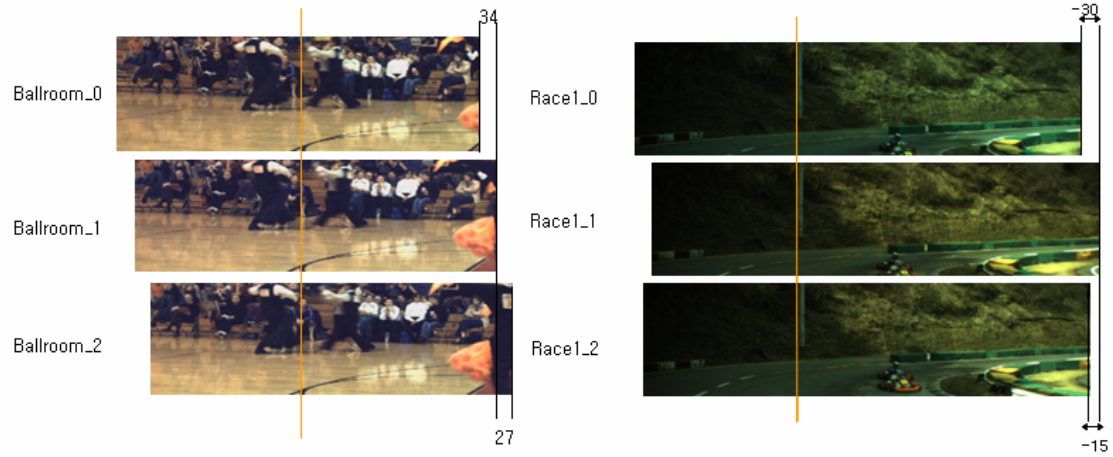
2. Observations of the Multi-view Test Sequences

2.1 Vertical and horizontal displacement

Inaccurate camera arrangements cause the vertical and horizontal displacements. Again, these displacements affect the view prediction and vertical displacement will cause the unnatural 3D scene. Figure 1 shows the vertical displacements of 'Race1' sequences.

Fig. 1 Vertical Displacements of 'Race1' Sequences

Some 1D parallel sequences show unequal horizontal displacement. Unequal horizontal displacement causes inefficient coding and it affects the intermediate view generation. Figure 2 shows the unequal horizontal displacements and even 'Race1' looks like the view order is incorrect.



(a) 'Ballroom' (b) 'Race1'

Fig. 2 Horizontal Displacement of 'Ballroom' and 'Race1' Sequences

2.2 Illumination changes

We already know illumination change problem and some schemes for illumination compensation are already proposed. Figure 3 shows the illumination change for 'Uli' sequence.

Fig. 3 Illumination Changes of 'Uli' Sequence

2.3 Asynchronism of Multi-view Sequences

Since multi-view video capture several videos at the same time, sometimes asynchronism is occurred. Figure 4 and Fig. 5 show the 178th and 179th frames for 1st, 2nd, and 3rd views of the 'Ballroom' sequence. As you can see, the flashlight is turned on at different times.

Fig. 4 178th Frames for 1st, 2nd, and 3rd Views of the 'Ballroom' Sequence

Fig. 5 179th Frames for 1st, 2nd, and 3rd Views of the 'Ballroom' Sequence

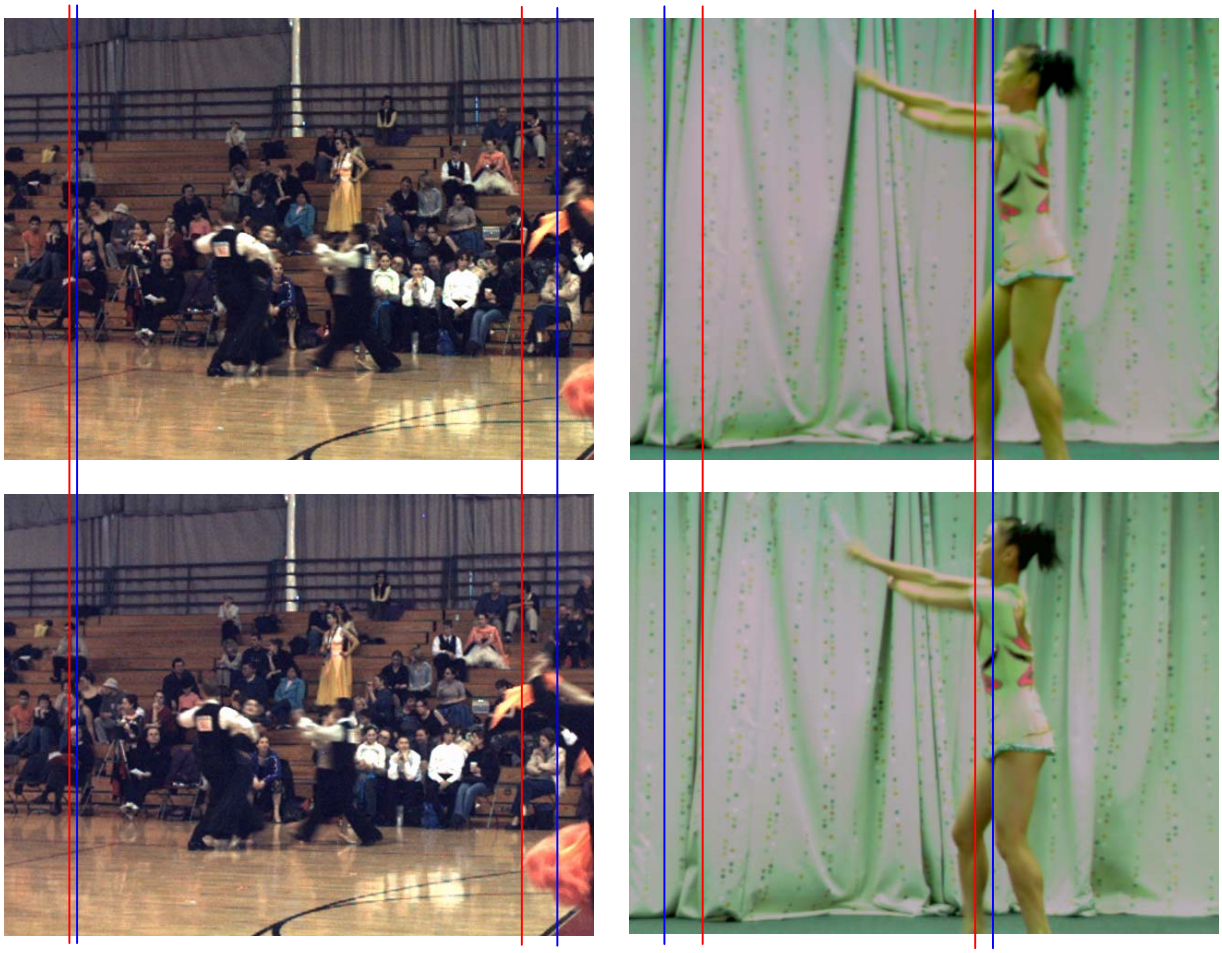
2.4 Focus Mismatches of Multi-view Sequences

Since multi-view video contains the several videos, focus mismatches occur. It may lead to inefficient coding and unnatural 3D scene generation. Figure 6 shows certain regions of 6th and 7th views of 'Race1' sequence. As you can see, the focus mismatch is quite noticeable.

Fig. 6 Focus Mismatch for 'Race1' Sequence

2.5 False Information

According to document [1], the camera arrangement of 'Rena' is 1D parallel. However, it is close to 1D convergent sequence when analyzed. Usually, the background disparity is smaller than foreground disparity for 1D parallel sequence. However, in case of 'Rena' sequence, the foreground disparity is smaller than background disparity. Figure 7 supports the above insistence. Above images are left view images and bottom images are the right view images.
The blue lines are set to above images and the red lines are set to bottom images.



(a) ‘Ballroom’ (b) ‘Rena’

Fig. 7 Unequal Horizontal Displacement of ‘Ballroom’ and ‘Rena’ Sequences

3. Conclusion

In this document, we have reported several problems of the current test sequences: vertical and horizontal displacement cased by inaccurate camera arrangements, illumination changes, asynchronism of multi-view sequences, and focus mismatches. Since the above problems can cause inefficient coding and unnatural 3D scene generation, we need to gather additional multi-view test sequences free from the above problems.

4. Acknowledgements

This work was supported in part by the Information Technology Research Center (ITRC) through the Realistic Broadcasting Research Center (RBRC) at Gwangju Institute of Science and Technology (GIST), and in part by the Ministry of Education (MOE) through the Brain Korea 21 (BK21) project.

5. References

[1] ISO/IEC JTC1/SC29/WG11 JVT-U211, “Common Test Conditions for Multiview Video coding”

(Append for Proposal Documents)

JVT Patent Disclosure Form

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Place and date of submission	San Jose, California, 21-27 April, 2007
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