ISO/IEC JTC1/SC29/WG11
MPEG93/399
March 1993

Telecommunication Standardization Sector
Study Group 15
Experts Group for ATM Video Coding
(Rapporteur's Group on Part of Q.2/15)

Document AVC-461
March 1993

Source : JAPAN
Title : Up-sampling Methods for Spatial Scalability
Purpose : Proposal
Relevant sub-group: Video

.....

1. Introduction

Appendix G to MPEG93/225 (TM4) describes the compatibility and spatial scalability. To realize this requirement, up-sampling filter must be specified. Three methods can be the candidates to specify the filter.

2. Up-sampling methods

1) Method 1: specifying unique set of filters

The merit of this method is the possiblity to minimize the pertinent hardware size when filter coefficients can be selected. On the other hand, demerit of it is the rise of additional filter set specification requirement if unexpected combination of upper and lower layers are requested.

The study items are;

- -listing up conbination of upper layer and lower layer,
- -specifying filter coefficients for
  - each combination of upper and lower layer,

  or
  - size ratio of upper and lower layer, including some condition such as progressive/interlace or interlace/interlace conversion,
- -specifying accuracy of calculation.

2) Method 2: downloading the same filter coefficients to coder and decoder

With this method, it is easy to modify the filter coefficients when improvement of coding efficiency is necessary. However, hardware size may may be increased because full adders and multipliers are required.

The study items are;

- -investigating actual hardware size, and specifying maximum tap size and calculation accuracy as the result,
- -adding a syntax to sequence header to order to transit filter coefficients between coder and decoder.

3) Method 3: tolerating filter coefficients mismatch between coder and decoder

This method leaves maximum free hands to manufacturers, but causes picture quality degradation as a result of mismatch error accumulation.

The study items are;

- -investigating how to specify the tolerance such as
  tap size, cut-off frequency, calculation accuracy,
  or
  the extent of deviation from standard values of filtering,
- -examining degradation picture quality degradation and possible improvement by intra-picture or intra-slice.

3. Conclusion

Three methods are described to make their merit, demerit and study items to be discussed. At this moment, the ratios of pixel numbers and line numbers between upper and lower layers are not clear and this appears to be the main obstacle for the further discussion. Even if the ratios are fixed, it is very obvious that filtering a plural number of ratios by a single hardware is difficult job to realize. Therefore, "method 2" is not desirable as the standard in view of expected hardware overload.