CCITT SGXV   Document AVC-82
Working Party XV/1   August 1,1991
Experts Group for ATM Video Coding

SOURCE: JAPAN
TITLE: Merits and demerits of the progressive
       and interlaced formats
PURPOSE: Discussion

1. Introduction

At the Paris meeting, there was some discussion about
SCIF.   The subjects discussed were as follows;

  - Should we define single or plural format ?
  - Which parameter set should we choose?
     or
    How should we consider the relationship between SCIF
    and CIF or EDTV, HDTV ?

There we proposed to adopt single format under the
restriction for the communication use, as long as there is
no problem in picture quality degradation with format
conversion, degradation of coding efficiency, and
processing delay with format conversion.
    Here we considered the merits and demerits of each of
the formats (progressive or interlaced),if they were to
be adopted as SCIF, and arranged them below.

2. Comparison of both formats

The progressive format and the interlaced format are
compared in some points of view.

2.1 Layered coding

From the coding algorithm's point of view, the
progressive format is suitable for compatible coding.   If
the progressive format is also chosen for HDTV coding in
the future (this situation would require progress in image
input device technology and we don't know when this will be
realized), the compatibility in picture formats of CIF,
SCIF and HDTV could easily be realized with the use of a
subband filter.
    On the other hand, it is required that a newly devised
means should be added to the low-pass filtering in order
that a compatible coding can be realized for the interlaced
format.   Two different types of systems are required; one
for the compatibility between CIF and SCIF, and the other
for compatibility between SCIF and HDTV.   For the case of
CIF to SCIF, the compatibility probrems lie with the
differences of frame image and field image.   However with
SCIF and HDTV, the compatibility probrems lie with field
images of different sizes.

2.2 Suitability for current devices

The interlaced format is well suited to current camera and display devices. This might mean that the interlaced format is likely to be chosen as the format for other media (for example, a storage media). If this is true, then the interlaced format is also well suited to those other media.

The progressive format is less suited to current camera and display devices. This problem has something to do with the current trends of progressive devices (see Ref. (1) for details). But, whether the diffusion of progressive devices comes sooner or later, there is no doubt that the converted progressive picture from an interlaced picture will be used in the transition period.

2.3 Coding efficiency

Coding efficiency for the progressive format may not be sufficient for the quality target at the implicitly assumed bit rate (cf. the target at MPEG is recieving quality of around 4 Mbps and distribution quality of around 9 Mbps) .

The increase in information generated is said to be about 25 to 40 % for the converted progressive picture (cf. Ref. (2)). Further study is necessary to determine whether this increase can be saved by a coding method or by a conversion method. And discussion for this item should be done also considering the fact that the interlaced format presents a higher resolution than the progressive format as long as the same number of pixels are transmitted.

note: The increase ratio of information generated is supposed to be higher for the picture from the progressive camera. In this case, resolution is higher than that of the converted progressive picture, so the increase in information generated will be reasonable.

2.4 Field identification

If we use interlaced format, identification between odd fields and even fields is required, or an odd field and an even field should be treated as a set. This point may have influence on frame (or field) skipping etc.

3. Conclusion

We arranged the merits and demerits of the progressive format and the interlaced format as SCIF. Further discussion of picture format should be undertaken, considering these items.

References
(1) AVC-81 ' Progressive scanning camera '
(2) AVC-79 ' Loss of coding efficiency by using SCIF '

END