CCITT SGXV
Working Party XV/1
Experts Group for ATM Video Coding

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SOURCE : JAPAN
TITLE : Hardware consideration on line scanning conversion
PURPOSE: Information

## 1.Introduction

Line scanning conversion (i.e. interlace scanning to progressive scanning conversion) is one of the most important technique for SCIF format conversion. A consideration is made from the view point of hardware implementation.

## 2.Line Scanning conversion

Several line scanning conversion models are adopted for the consideration. The examples of models are illustrated in Fig.1. For each model, rough cost of Camera, hardware of scanning converter, hardware size of video codec, coding efficiency and picture quality are estimated. Table 1 shows the results of the consideration.

## 3.Conclusion

The progressive scanning format improves the picture quality for only who have expensive cameras (or complicated scanning converters) and progressive monitors. The format does not make remarkable improvements for the rest. The format decrease the coding efficiency in comparison with interlace scanning format.

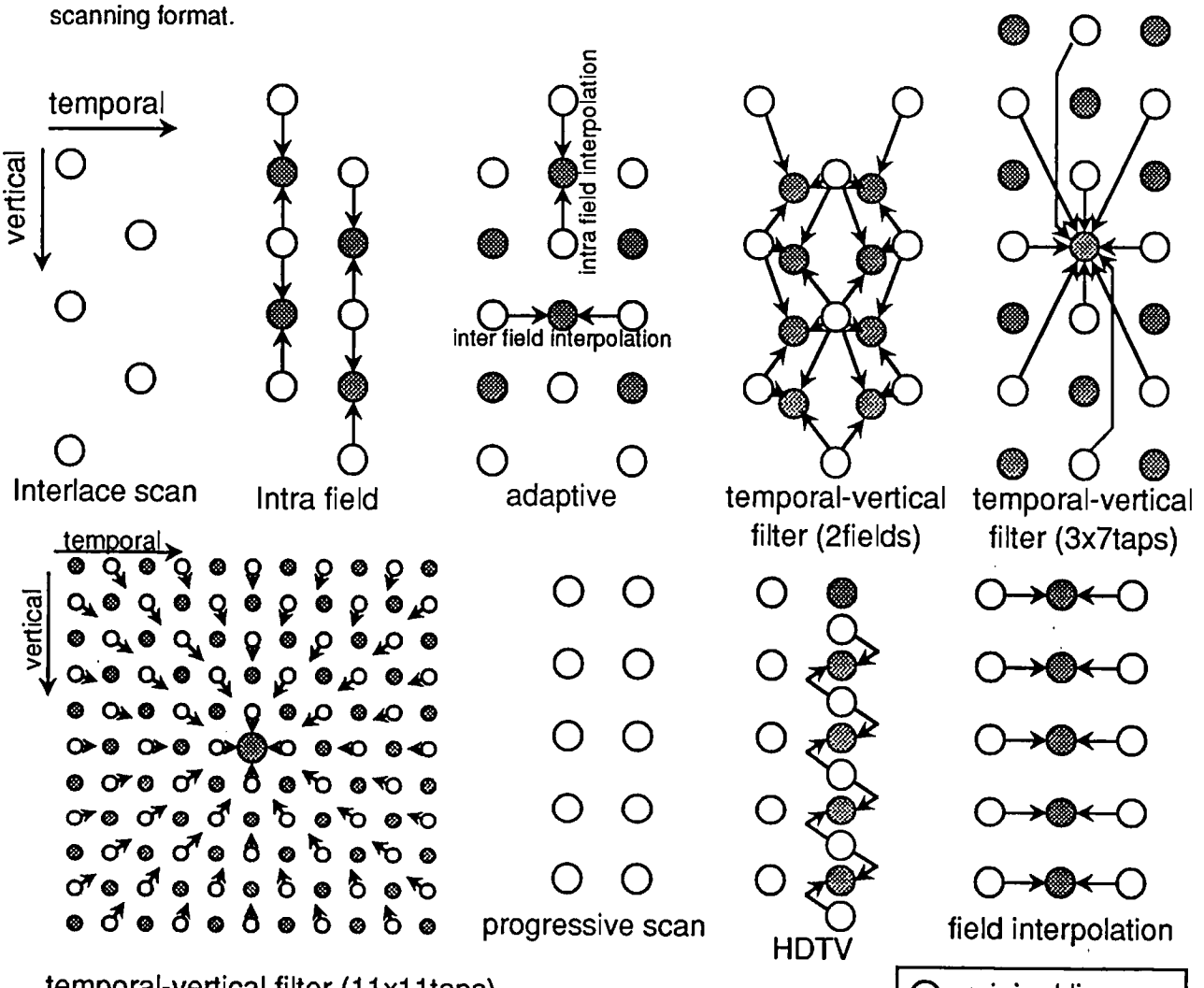
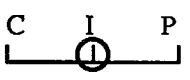
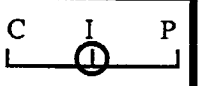
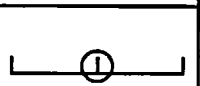
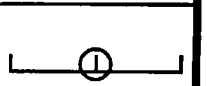
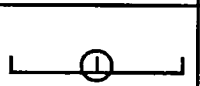
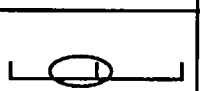
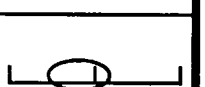
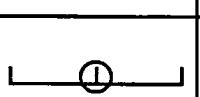
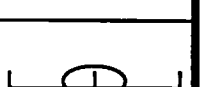
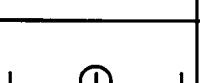
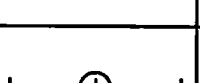
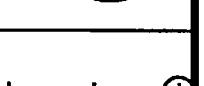
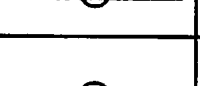
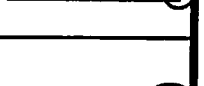
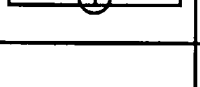
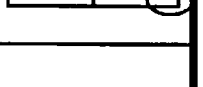
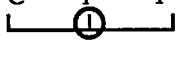



Fig1. Examples of scanning conversion methods

# Table 1. Hardware consideration on line scanning conversion

| Picture Format | Camera | | Scanning Converter | | VideoCODEC | | | Picture Quality (*1) | |
|---|---|---|---|---|---|---|---|---|---|
| | | relative cost | | hardware | relative pixel rate | relative hardware size | relative bit rate(*2) | on interlace monitor | on progressive monitor |
| 525/2:1 (reference) | Interlace | 1 | —— | — | 1 | 1 | 1 |  |  |
| 525/1:1 | | | Intra field interpolation | line memory | 2 | 2 | 1.3~1.5 |  |  |
| | | | motion adaptive Interpolation | 2 x field memory | | | 1.3~1.5 |  |  |
| | | | temporal-vertical filter (2fields) | 1 x field memory | | | 1.3~1.5 |  |  |
| | | | temporal-vertical filter (3x7 taps) | 2 x field memory | | | 1.3~1.5 |  |  |
| | | | temporal-vertical filter (11x11 taps) | 10 x field memory | | | 1.3~1.5 |  |  |
| | progressive 60Hz | 10 | —— | — | | | 1.5~1.8 |  |  |
| | HDTV (interlace) | 10 | Intra field interpolation | line memory | | | 1.5~1.8 |  |  |
| | progressive 30Hz | 2~5 | field interpolation | 1 x field memory | | | 1.3~1.5 |  |  |

(*1) : subjective picture quality




P : progressive scanning TV quality
I : Interlace scanning TV quality(4:2:2)
C : CIF format quality

(*2) : bit rate for a INTRA field in fixed quantized coding