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Title : Countermeasures against cell loss from the view point of image deterioration and transmission efficiency

Purpose : Discussion

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## 1. Introduction

Possible measures against cell loss include reduction of image deterioration by error concealment, leaky prediction, refresh and layered coding, and synchronization recovery for VLC such as structured packing, unique words, interleave + FEC (AVC-120, AVC-190). A final choice should be made by setting target values for image deterioration and transmission efficiency. At that time, the following points should be taken into consideration.

## 2. Image deterioration

(1) Below what level should spatial deterioration of images caused by cell loss be kept?

By means of coding schemes and cell assembly, spatial deterioration could be kept below the level of MB. If there were deterioration of MB, some degree of quality could be maintained by error concealment but artifacts would be generated.

The following questions should be considered;

- Are local factors more important in determining the image quality?.
- Which is the most frequently encountered, burst cell loss or random cell loss?.

(2) Below what level should temporal deterioration of images caused by cell loss be kept?

If interframe coding is used, temporal image deterioration is unavoidable.

The following questions should be considered;

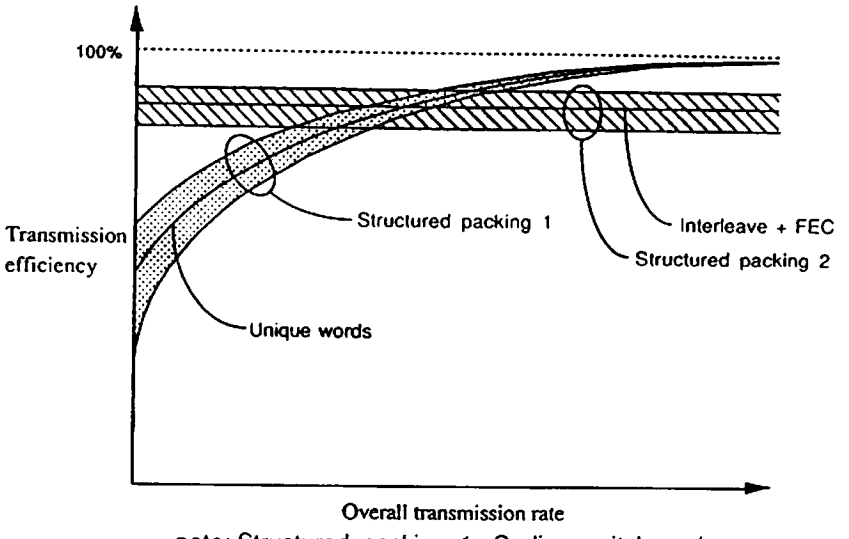
- Synchronization recovery time of frame memory and decrease of prediction efficiency due to leaky prediction.
- Cyclic refresh overheads.
- Demand refresh overheads. Can they be used in distributive services?.

3. Transmission efficiency

Synchronization recovery techniques for cells and VLC include structured packing, unique words, and interleave + FEC. Overheads are unavoidable with any method; transmission efficiencies are shown in Figure 1. In the case of interleave + FEC, a delay arises (for an FEC of AAL Type 1 in I.363, the overhead is 3.1% and the delay is 128 cells).

The following questions should be considered;

- What is a suitable level for the overhead and delay from the view point of services?.
- What would be the hardware expenditure involved?.
- Regarding synchronization recovery, how should the burden be shared between the cells, network and CODEC?.
- Is the chosen technique also effective for multi-point and bitstream scalability?.




note: Structured packing 1: Coding unit based
Structured packing 2: Packet length based

**Figure 1**

4. Conclusion

We have summarized above what items should be taken into consideration regarding countermeasures against cell loss from the aspects of image deterioration and transmission efficiency.

Other questions are:

- although the cell loss ratio when both public networks and private networks are included is still not clear, what would be reasonable measures to take against cell loss?
- how could a compromise be achieved between the different requirements of telecommunications, broadcast and storage media?

END