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Title: Pre-transmission of high priority information

Subject: Error resilient transmission

Introduction:

The impact of cell losses on decoded video quality is most severe if they cause loss of "high priority (HP) information" which may be defined as the information contained in the HP partition of the data partitioning technique of MPEG-2 corresponding to small break point values (<= 64). This information can be protected by transmitting it over a high priority connection with a low cell loss rate; however, many networks, including existing packet networks, some ATM networks, and all mixes of the two, do not facilitate transmission with different priorities. On such networks, particularly when previously encoded video is being transmitted, the HP information can be pre-transmitted using a reliable transport protocol and stored in the decoder's memory to be used during the real-time decoding when cell losses occur. Since the HP information defined as above constitutes a very small percentage of the entire video data, for most cases, the pre-transmission can be accomplished without causing long start-up delays. Also, for the same reason, required decoder memory to store the HP information is not large.

Additionally, the following functionalities may be needed:

1. For very long sequences for which the HP information gets too large to be pre-transmitted in its entirety, it may be transmitted in parts during the play-back.
2. In cases where the same material needs to be transmitted several times, after the first transmission, the pre-transmission step may be skipped.
3. For certain types of HP information, e.g. HP partition corresponding to a break point of one, an indicator of the "coding type" which specifies for example, M and N values and Q matrix selections, etc. may be transmitted instead of the actual HP information reducing the pre-transmission time and storage requirements. In this case, the decoder generates the required information locally.
4. In addition to the HP information as defined above, some other information such as certain key I frames may be included in the pre-transmitted information.
5. The method, when used for restricted HP information as in item 3, can be applied to interactive real-time systems also. If delay is not important, the scheme in item 1 can be used with real-time encoders buffering a portion of the encoded data.

Syntax:

1. HP video information can be encoded according to the data partitioning specification of MPEG-2.
2. A header needs to be included with the HP data to associate it with an upcoming transport stream.
3. In the transport stream, the following needs to be included:

   1. An indicator for the use of the HP pre-transmit scheme.
   2. An identifier to associate the stream with the pre-transmitted HP information.
   3. If HP information is going to be transmitted in parts, the association indicator needs to be updated as needed.

4. For case 2 of the Introduction, the decoder may need to inform the encoder for not sending the HP data again. Or, the encoder may always assume this.
5. For case 3 of the Introduction, special codes need to be defined.
6. For case 4 of the Introduction, other data types to be included in HP information need to be defined.