ROBUST DECODING OF DAMAGED FOUNTAIN CODE PACKETS

ÉTS-107

BACKGROUND

In wireless networks, data packets are often affected by bit errors during their transport. Typically, when a packet is corrupted by such errors, it is discarded. Fountain codes generate redundant packets for the original data to transmit with the property that it can be recovered from any subset containing a sufficient number of these redundant packets. However, when too many redundant packets are damaged, fountain decoding is unable to regain the lost information.

TECHNOLOGY

This technology permits to decode, in a wireless environment, corrupted packets beyond what is currently possible in the context of fountain codes. It exploits the information contained in the damaged packets to permit the recovery of the original data. Since fountain decoding discards these damaged packets, the proposed method has more information to work with and therefore can achieve better performance.

The method is fully compatible with current standards (e.g. 3GPP Multimedia Broadcast/Multicast Service (MBMS) TS 26.346, RFC 5053).

OPERATING CONDITIONS

The technology works under the following assumptions:

- The packets contain fountain codes.
- The packets are transmitted using the UDP/IP protocol and contain a checksum (the UDP checksum) permitting to identify corrupted vs non corrupted packets.
- The packets are not extensively damaged (e.g. the bit error rate in the packets is less than 10^{-3} depending on the packet sizes).
- The corrupted packets are not discarded (their content is reused in the proposed correction method).

COMPETITIVE ADVANTAGES

The method provides the following benefits:

- Significantly lower packet loss rate compared to traditional fountain decoding methods (see an example in Figure 1).
- Fully compatible with existing standards.
- Low computational complexity (computational complexity comparable to fountain decoding).

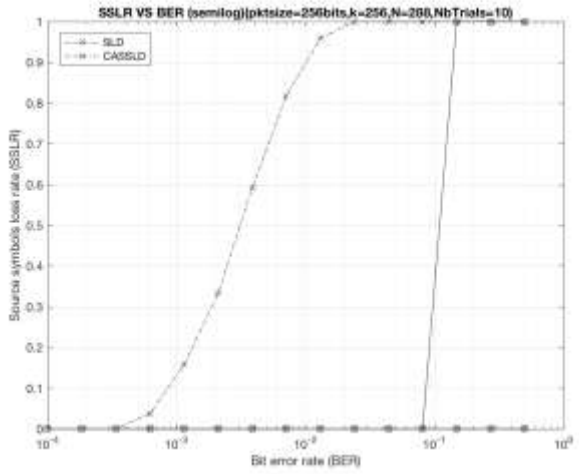

Figure 1: Source symbol loss rate versus bit error rate for various traditional fountain decoding (SLD) and proposed method (CASSLD) for 256 source symbols of 256 bits each and 288 transmitted fountain codes.

APPLICATIONS

- Transmission of video information using fountain coding such as digital cinema over satellite, application layer forward error correction (ALFEC), 3GPP MBMS TS 26.346, RFC 5053.

TECHNOLOGY DEVELOPMENTAL STAGE

Working prototype

INTELLECTUAL PROPERTY STATUS

Patent pending with priority date of September 2016.

BUSINESS OPPORTUNITY

The Technology is available for licensing.

FOR INFORMATION PLEASE CONTACT:

Duc LeVan
Senior Director – Business Development
Phone: 514-840-1226 # 3003
E-mail: dlevan@aligo.ca