

iLBC Speech Codec Software

Internet Low Bitrate Codec

<http://www.vocal.com>

VOCAL Technologies, Ltd. modem software libraries include a complete range of ETSI / ITU / IEEE compliant modulations, optimized for execution on ANSI C and leading DSP architectures (ADI, ARM, DSP Group, LSI Logic ZSP, MIPS and TI). This software is modular and can be executed as a single task under a variety of operating systems or it can execute standalone with its own kernel.

iLBC (internet Low Bitrate Codec) uses a block-independent linear-predictive coding (LPC) algorithm and has support for two basic frame lengths: 20 ms at 15.2 kbit/s and 30 ms at 13.33 kbit/s. When the codec operates at block lengths of 20 ms, it produces 304 bits per block. Similarly, for block lengths of 30 ms it produces 400 bits per block. The two modes for the different frame sizes operate in a very similar way. When they differ it is explicitly stated in the text, usually with the notation x/y, where x refers to the 20 ms mode and y refers to the 30 ms mode.

The iLBC algorithm results in a speech coding system with a controlled response to packet losses similar to what is known from pulse code modulation (PCM) with packet loss concealment (PLC), such as the ITU-T G.711 standard which operates at a fixed bit rate of 64 kbit/s. At the same time, the described algorithm enables fixed bit rate coding with a quality-versus-bit rate tradeoff close to state-of-the-art. Some of the applications for which this coder is suitable are: real time communications such as telephony and videoconferencing, streaming audio, archival, and messaging.

Terminology:

- iLBC is a speech codec suitable for robust voice communication over IP. The codec is designed for narrow band speech and results in a payload bit rate of 13.33 kbit/s with an encoding frame length of 30 ms and 15.20 kbps with an encoding length of 20 ms. The iLBC codec enables graceful speech quality degradation in the case of lost frames, which occurs in connection with lost or delayed IP packets.
- Standard low bit rate codecs exploit dependencies between speech frames, resulting in error propagation when packets are lost or delayed. In contrast, iLBC encoded speech frames are independent. This unique technology gives iLBC robustness against packet loss and delay.

Features:

- Bitrate 13.33 kbps (399 bits, packetized in 50 bytes) for the frame size of 30 ms and 15.2 kbps (303 bits, packetized in 38 bytes) for the frame size of 20 ms
- Basic quality higher than G.729A, high robustness to packet loss
- Computational complexity in a range of G.729A
- Speech quality better than G.729A and G.723.1.
- Better packet loss robustness compared to other low-bit rate codecs, including G.729A, G.729E, G.723.1 and G.728.
- iLBC supports multiple frame sizes giving increased flexibility to meet the needs of different applications and/or VoIP equipment.
- Provide low delay and high packet loss robustness for low-bit rate codecs.
- iLBC delivers the same basic quality as G.729E and exceeds G.729E under packet loss conditions
- Gain- shape waveform matching forward in time
- Gain- shape waveform matching backward in time
- Start state encoding
- Pitch enhancement
- Packet loss concealment

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