DEMO: Efficient interframe no-motion prediction and compression for wireless 1K-pixel visual sensors

Geert Braeckman
Vrije Universiteit Brussel

This work focuses on the efficient compression of video acquired with a very-low resolution visual sensor, developed for healthcare monitoring and people tracking applications. The sensor contains two cameras, each generating 30x30 pixels 6bpp grayscale video.
A new compression system has been developed in order to comply to the very strict European regulations concerning bandwidth usage for this type of sensors. The compression system should be of low complexity in order to minimize power consumption on the sensor. The proposed codec performs low complexity intra prediction combined with no-motion inter-frame prediction. The intra modes and entropy coding are selected such that the performance-complexity trade-off is optimized. Implementation-wise, video capture on the sensor is interrupt-driven to ensure a stable frame rate. By chosing a frame rate which is the same as the power grid frequency, flickering light patterns induced by phosforited lighting are eliminated. A denoising filter effectively combines multiple frames to obtain a lower frame rate with reduced noise levels. On the sensor, the frames are compressed, packetized and wirelessly transmitted to the receiver. Simple protection mechanisms are foreseen in order to cope with the errors on the communication channel. At the receiver end, the bitstream is decoded, the transmission errors are concealed and the reconstructed frames are displayed. In the demonstrator, intra- as well as inter-predicted codec configurations are shown, and the resulting bit rates are displayed in real-time.