

# Global Summit and Expo on **Multimedia & Applications**

August 10-11, 2015 Birmingham, UK

## Low-power multimedia compression for wearable biosignal transmitter

**Robert Rieger**

National Sun Yat-sen University, Taiwan

Recent advances in wireless technology and multimedia computing enable new generations of wearable systems for the monitoring of biophysiological parameters including the electric activity of the heart (ECG) and muscle (EMG), as well as force recordings for application in gait analysis and rehabilitation. Miniaturization of sensors allows the interconnection of several sensing nodes with associated transmitters to form a body-area-network (BAN) for collecting, processing and streaming multi-media data from different recording sites on the body. We present a low-power algorithm with low computational complexity for the compression of biosignals. Sample decimation is guided by the second derivative of the signal as a metric for signal activity. Here, we describe the implementation of the algorithm on a general purpose microcontroller as part of the streaming node of a BAN. The algorithm is optimized for low computational complexity and consists of 180 controller instructions. It incorporates feedback to achieve a targeted compression factor (CF). Simulated and measured results with different signals confirm that the code achieves a typical CF around 10, needs 137 controller cycles per input sample and consumes 507 nJ per sample on the prototype hardware. The data buffer is very short (15 samples) to keep the memory footprint small.

### Biography

Robert Rieger received the PhD degree in Electronic and Electrical Engineering from University College London (UCL), London, U.K., in 2004. He then joined the Industry and Medical Business Unit of Austria microsystems AG, Rapperswil, Switzerland, as a Design Engineer involved in the design of robust low-power integrated circuits. Since 2006 he is with the Department of Electrical Engineering, National Sun Yat-sen University, Taiwan. He is now a Professor of Electronics Engineering and the Head of the Bionics Integrated Systems Laboratory. His research interests are in the areas of integrated electronics for biomedical application and embedded and digitally assisted low-power analog circuits.

[rieger@mail.nsysu.edu.tw](mailto:rieger@mail.nsysu.edu.tw)

### Notes: