

UC San Diego's Calit2 and Image Essence LLC to Collaborate on Advanced Multimedia Streaming Codec Research

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Doug Ramsey

Image Essence, LLC will collaborate on advanced codec research with the University of California, San Diego division of the California Institute for Telecommunications and Information Technology (Calit2). Image Essence and its chief executive officer, Gary Demos, will work with UC San Diego researchers in the Calit2 Microelectronic Embedded Systems Laboratory to explore acceleration of the Image Essence codec on graphics and other processors, as well as to develop advanced codec features enabled by the codec's internal structure.

"I have known Gary Demos as a pioneer in computer graphics for California's entertainment industry for over 25 years," said Calit2 Director Larry Smarr, also the Harry E. Gruber Professor in the Computer Science and Engineering Department of UCSD's Jacob School of Engineering. "It is exciting to have such a gifted, private-sector innovator working with Calit2 as part of our CineGrid initiative."

One of the challenges of moving from an analog film and video-based industry to an all-digital industry is that compression techniques should strive to preserve the image quality of the full range of new cameras (even of film negatives), as well as of new displays and projectors. "We were attracted to Gary's company Image Essence because his codec does such a good job in terms of both quality and efficiency," said Calit2 Research Scientist Tom DeFanti, CineGrid lead for Calit2.

The Calit2 project with Image Essence will explore the use of a variety of multi-core PC processors, Graphics Processing Units (GPUs) and Field Programmable Gate Arrays (FPGAs) to enable the encoding and decoding of standard definition, high definition, and digital-cinema video streams in real time using the Image Essence codec software.

The FPGA and GPU acceleration work will be directed by UCSD Professor Rajesh Gupta, director of the Calit2 Microelectronic Embedded Systems Laboratory. "The challenges that Gary's codec brings to Calit2 are just the sort of difficult application drivers that we look for in our laboratory's research," said Gupta, who holds the Qualcomm Chair in Embedded Microsystems in the Jacobs School's Department of Computer Science and Engineering. "His novel wavelet-based compression algorithms and video analytics provide an excellent vehicle for us to explore the limits of architectural efficiencies and their potential for on-chip implementation."

The exploration of advanced codec features will be led by Truong Nguyen, a noted expert in wavelets and filter design and professor in the Jacob School's Department of Electrical and Computer Engineering. Nguyen will collaborate with Demos to explore issues such as super-resolution and temporal enhancement.

Gary Demos is a well-known Hollywood technologist and he was the recipient of the 2005 Gordon E. Sawyer Academy Award for lifetime technical achievement. He has received three technical achievement Oscars during his career. In the early 1980s, his Cray supercomputer at Digital Productions was used by the National Science Foundation (NSF) to provide high-performance computing to U.S. university researchers before the current NSF supercomputer centers were opened in 1985.

"The Calit2 CineGrid infrastructure provides an excellent testbed for high-quality codecs," said Demos. "As networks increase in streaming capacity and as digital cameras, displays, and projectors improve their range, there is a need for high-efficiency codec technology which can preserve that full range yet be efficient enough to fit within the developing network infrastructure. It is a tribute to the University of California 's commitment to industrial competitiveness that Calit2 can enable this unique opportunity for public-private collaboration."

Media Contact: Doug Ramsey, 858-822-5825

