

“Nosey Elephant Studios” - Audiovisual laboratory for research and industrial applications



Vrije Universiteit Brussel

Nosey Elephant Studios is a new audiovisual laboratory part of the infrastructure of the Department of Electronics and Informatics of Vrije Universiteit Brussel (ETRO). The lab is operating as a service provider in audiovisual content creation in the fields of speech/audio and video processing, audiovisual behavior analysis, speech emotion recognition and synthesis and film/TV post-production. Research groups active in these fields can use the facility in order to capture audiovisual data optimized for their projects, in controlled environment (acoustic and lighting conditions) using state-of-art equipment.

At the same time, Nosey Elephant Studios operates as a platform for tech-

nology transfer, valorizing the results of research produced at ETRO and investigating ways of offering them as services.

A technology that is currently available at Nosey Elephant Studios/Movies is a system for automatic dialogue replacement (ADR). During post-production of soundtracks for film, video and television series, it is often necessary or desirable to replace the original actors' dialogues that were recorded live on the film set by re-recorded studio dialogues, because the original location recordings might for example be distorted by some kind of background noise that is difficult to control. This dialogue replacement introduces a lot of mismatches between the lip movements that the audience

perceives and the actual speech sounds they hear. Our system allows to automatically edit a studio soundtrack, measure its timing relationship with the original reference soundtrack and compensate for the lip-synch errors by time-scaling the studio soundtrack, such that the synthesized output signal precisely synchronizes with the lip movements in the picture. This ADR system is the result of many years of research of the ETRO based DSSP research group. More info and demos can be found here: <http://www.etro.vub.ac.be/Research/DSSP/DEMO/ADR/>

Nosey Elephant Studios/Multimedia is providing all the infrastructure and engineering of a professional grade record-



Altreonic's scalable and formalized technology gives more for less.

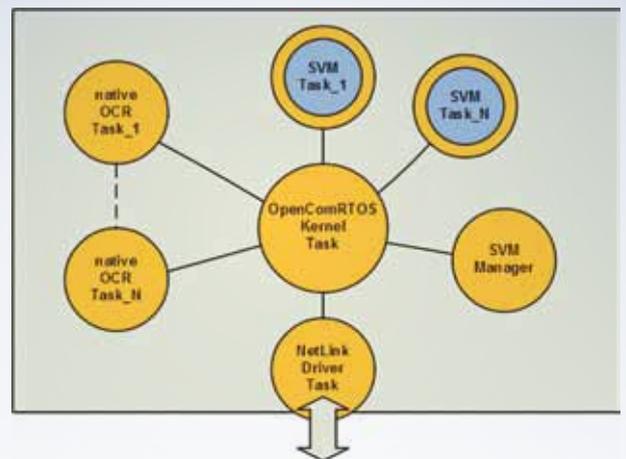
Altreonic is now announcing two new products that clearly demonstrate how a formalized development can result in more scalability and less energy consumption. A formalized development is more than verifying correctness; it actually results in cleaner, more efficient and more scalable architectures.



Virtual Machine for C in 3.8 KBytes

A first example is Altreonic's novel **Safe Virtual Machine for C (SVM)**. Tuned to the needs of embedded systems it allows to dynamically download C compiled binary code to OpenComRTOS nodes independently of the target processor. Yet, the Virtual machine only requires **3.8 Kbytes of program memory** (measured on an ARM Cortex M3). Every processing node in an OpenComRTOS supported system can host multiple Safe Virtual Machine tasks, each of which can use the native kernel

services and hence communicate system wide. SVM tasks can also be unloaded, updated at runtime as well as moved between networked OpenComRTOS nodes. For safety purposes the Virtual Machine can verify memory accesses and catch boundary violations and numerical exceptions at runtime.



Other OpenComRTOS nodes

ing studio for the production of audiovisual databases. Multimodal audio-visual signal processing (in-synchrony processing of multiple audio and video signals) is an emerging research area, where data obtained through microphones and cameras are used in order to develop, train and test new multimedia applications. The audiovisual recording system installed in its full deployment can capture up to 6 SD/HD SDI video streams and 24 audio channels. All these data are captured in uncompressed format and can be distributed in a desired compressed format. Nosey Elephant Studios is producing databases for the technologies being developed at ETRO, like microphone arrays, 3D surround sound, audiovisual photorealistic text-to-speech synthesis and emotional and expressive speech synthesis and recognition. In conjunction with other departments, researchers are using this facility to explore human behavior analysis, studying mother-child communication or ways of enriching the interaction between humans and robots. In addition, researchers can test their algorithms using microphones, loudspeakers or video cameras under variable acoustic and lightning conditions.

Together with the Department of Culture of VUB, Nosey Elephant Studios/Music is investigating an application for real time video streaming of live music events, through wireless networks, on mobile devices. Nosey Elephant Studios/Music also provides music production services for musicians or bands (www.myspace.com/nosey-elephantstudios).

Nosey Elephant Studios can also be hired by external costumers for research or industrial projects. ■



Recording room



Control room

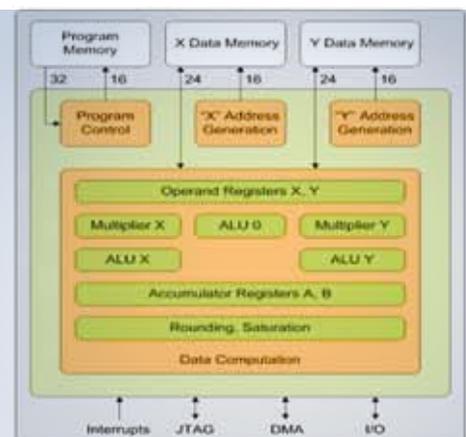
As the VM is based on the ARM Thumb2 instruction set, it is also possible to execute the binary images in native mode on most of the ARM processors. While VM tasks execute slower than native code, the performance is adequate given the intended range of applications. Typical applications for the SVM are remote diagnostics, fail safe, fault tolerant control, and processor independent programming.

Full OpenComRTOS on CoolFlux DSP in just 2 Kwords.

A second example is the **port of OpenComRTOS to the ultra low power CoolFlux DSP** core of NXP. A full kernel with all services only requires about 2 Kwords for program memory and less than 1 Kwords of data memory. Nevertheless, this is still a complete priority based preemptive scheduling RTOS.

Besides task scheduling, services provided are events, semaphores, resources, port hubs, fifos, packet and memory pools in blocking, non blocking, blocking with timeout and asynchronous semantics. Porting on CoolFlux DSP has been swift and efficient thanks to the excellent C-language support from the CoolFlux DSP tools originating from Target Compiler Technologies.

For applications where power consumption is paramount, using less memory means higher performance and less energy consumption. With OpenComRTOS, this is a result of the formalized development resulting in a very clean architecture. In addition, with OpenComRTOS one can transparently use a multicore architecture allowing to distribute the application. If this allows to reduce the clock frequency, thus even more power can be saved.



The OpenComTOS suite consist of the high level visual development environment (OpenVE) in which the user specifies applications and target topology in an independent way allowing to simulate the application on his development PC. Code generators than generate most of the target specific C code and the buildsystem. A new task level debugger and the visual OpenTracer allow examining and profiling the application at runtime. ■