

Cognitive Radio and High Performance Computing Applications



J. Olivares¹, R. Palomar^{2,3}, F. León¹, I. Balasingham³, J. Gómez-Luna¹, O. J. Elle³, A. Cubero¹, F. Alaya Cheikh², J. M. Palomares¹
 ✉ olivares@uco.es

¹ Dept. Computer Architecture, Electronics, & Electronic Technology. University of Córdoba. Spain
² Norwegian Media and Technology Laboratory, NTNU, Gjøvik, Norway
³ The Intervention Centre, Oslo University Hospital, Norway.

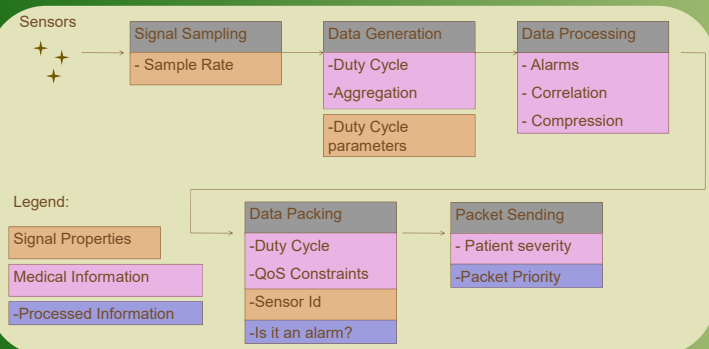


COGNITIVE RADIO WITH MEDIUM RESERVATION IN HOSPITAL ENVIRONMENTS - 014-ABELCM-2013

ABSTRACT:

The Cognitive Radio (CR) concept defines smart wireless communication systems that can be aware of the environment in which they operate. Their internal operational parameters can be adapted so as to use the radio-electromagnetic spectrum in a more effective way. That concept has been developed in different wireless communication environments, specially for Personal Area Wireless Sensor Networks – PA WSN or simply, WSN).

By using the CR paradigm, wireless networks with more intense use of the radio-electromagnetic space with less interference between stations can be achieved. In these networks, the communication elements (receivers and transmitters) carry out constant estimations on the status of the different communication channels, determining which ones are being currently used and which ones are free. These measures allow the receivers and the transmitters to establish communication in different channels according to their respective occupancy. Thereby, outstanding characteristics can be obtained, such as fine control of the transmission power, higher reliability rates, fewer network collisions, etc.



RESULTS:

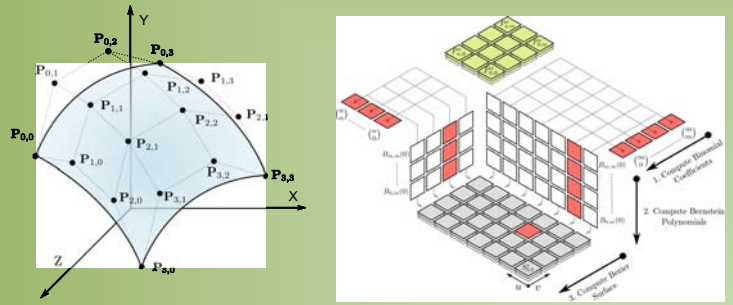
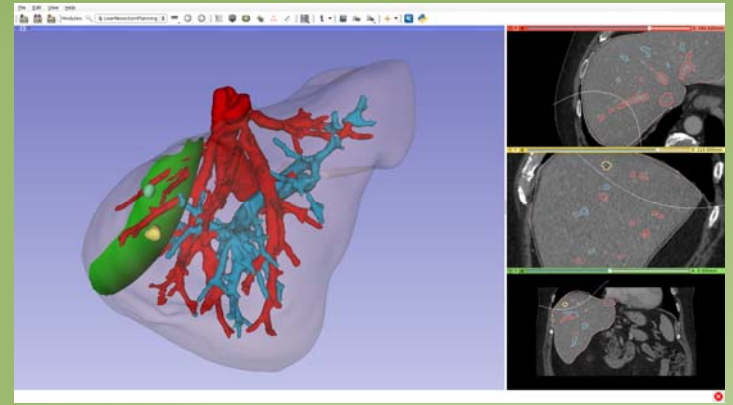
- New Project: NILS 004-2BBRR (Grant: 1,879 €)
- 1.- Multiplicative composition of clock-skew components for improving time synchronisation. JM Castillo-Secilla, F León, J Olivares, JM Palomares. Electronics Letters 51 (13), 991-993. 2015
 - 2.- SnifferWSNTOS: Software implementation for multi-channel IEEE 802.15.4 sniffer. M Sánchez-Polonio, J. Olivares, JM Palomares, F León, JM Castillo-Secilla, A Cubero. VI Jornadas de Computación Empotrada. 49-56. 2015
 - 3.- An Approach to the Internet of Event-Driven Motes [in preparation]
 - 4.- Medical Sensor Network with dynamic priorities [in preparation]

GPU PROCESSING FOR PLANNING OF LIVER RESECTION SURGERY - NILS 004-2BBRR

ABSTRACT:

New processing technologies allow to increase the performance of planning and navigation in liver surgery in GPU processors, reaching real-time processing. This enhancement is achieved thanks to the redesign, optimization and parallelization of the algorithms used in liver surgery planning.

The results will benefit surgeons and patients involved in therapies for liver resection. The Intervention Centre Oslo and Gjøvik University College offer scheduling algorithms for liver resection and clinical facilities and expertise. The University of Cordoba offers expertise and infrastructure to develop high-performance computing. This collaboration will improve the techniques of liver resection techniques thanks to high performance computing.



RESULTS:

- New Project: "HiPerNav" High Performance Soft-tissue Navigation H2020-MSCA-ITN-2016 (Score: 94,80/100) (Budget: 4,041,920 €)
- 1.- High-performance computation of Bézier surfaces on heterogeneous platforms. R. Palomar, J. Gómez-Luna, F. Alaya Cheikh, O. J. Elle and J. Olivares. International Journal of High Performance Computing Applications. 2016 [submitted]

