Grupo de Investigación en Microelectrónica

Microelectronics Group

The Microelectronics Group is presented as the possibility of conducting research and development within the faculty of Electrical Engineering from the Universidad Pontificia Bolivariana, in areas related to programmable logic, processor architecture, digital signal processing and design and implementation of embedded systems.

PRODUCTS

- High Performance Optical Flow Architecture Based on a Multiscale and Multi-Orientation Phase- Based Model
- A Novel Architecture for a Massively Parallel Low Level Vision Processing Engine on Chip
- Grid computing cluster
- Automation and networking of two beowulf type cluster in the Universidad Pontificia Bolivariana Linux operating system – Rocks
- Distributed computing hardware for solving numerical methods applied to an electromagnetic phenomenon using FPGAs.
- Reactive Robot Based on Artificial Retina
- Dual Processor Real Time Video

- Event Detection based parallel Multiprocessor.
- Prototype of a SISO digital communication system based on the concept SDR using FPGA.

SERVICES

Design and implementation of embedded systems using microcontrollers and FPGAs

- Design of embedded systems that integrate processor, bus systems and peripherals on a single chip, used in control and telecommunications applications. Including handling high-speed peripherals such as DDR memory, system controllers WiFi, Bluetooth, Zigbee, GigaEthernet and touch screens.

Design, synthesis, and simulation of digital logic circuits

- Digital circuit design using hardware description languages (VHDL, Verilog) and simulation,

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Implementation of multiprocessor system architectures in FPGAs

- Multiprocessor systems for parallel processing on high-density FPGAs.

Design of digital communication systems defined by software (SDR)

- SISO communication systems, including modulation and digital coding.

Cluster Configuration computer infrastructure.

- Cluster systems for massively parallel processing under Linux.

ADDITIONAL INFORMATION

Possible applications to integrate our services:

Missiles and Munitions

- Integrated PowerPC processors, DSP engines, logic, and high-speed links
- Imaging, and radar real-time DSP processing
- Guidance, control, target tracking, and RF applications

Secure Solutions

- FPGA cryptographic solution

Communications Systems

- High speed radio systems, software-defined-radio (SDR)

Signals Intelligence

- Robust signal processing capabilities for reliable detection of signals under extreme conditions
- Providing flexibility for systems that monitor and detect signals across a wide frequency range

UAV

- Guidance and navigation control for currently deployed UAVs
- Image processing IP for target recognition