



Montana Section News

September, 2004

Chair's Message

Ross Snider

The last several weeks have shown the usefulness of information technology and communication systems that EEs have developed and its benefit to society. People can know almost a week ahead of time that a destructive storm is potentially headed their way. It's amazing that I can sit at my desk in Bozeman and view satellite images of hurricanes as they form in the Atlantic and then impact the southeast. Having this information freely available saves lives.

On the technology progress front, Xilinx just announced details on their new Virtex 4 FPGAs. The smallest DSP family (XC4VSX25) contains 128 DSP slices where each slice contains an 18x18 bit multiplier, an adder, and an accumulator and is "supposed" to run at 500 MHz. It also contains 128 Block RAMs and is priced at \$60 in 25K quantities. Compare this to two generations back (the Virtex II 3000s), which were the devices that I used to build the boards in the lab that had 96 18x18 bit multipliers and block RAMs and was valued at \$1,500 (xilinx donated the parts) and ran at <250 MHz. The largest DSP SX device contains 512 DSP slices and 320 Block RAMs

The largest Embedded FX device contains:

- 192 DSP slices
- 552 Block Rams
- 1 10bit 200 KHz A/D converter
- 2 Embedded PowerPC cores (450 MHz)
- 4 Ethernet MACs (10, 100, 1,000)
- 24 RocketIOs that can run at 11.1 Gb/s each
- 896 User IOs

Xilinx just reorganized to create two new divisions – a DSP division and an embedded division. Xilinx thinks there is a 2 billion dollar untapped DSP market for high end applications that are not currently economically feasible and is targeting this with the SX family.

September Section Meeting

The speaker will be David Arathorn who will talk about his breakthrough solution to the computational object recognition problem. He has developed a "map-seeking circuit" that can find a 3D object in an image no matter if it has been translated, rotated, sized, blurred, or even partially occluded. The Air Force is interested because this will enable a new generation of missile/bomb that will be able to "see" its target, whether it be a tank on the ground hidden in trees or a plane in the sky. "Map-Seeking Circuits: A Biomimetic Mechanism for Finding Image-Model Correspondences in Massive Transformation Spaces."

Map-Seeking Circuit theory is a biologically based computational theory of vision with direct, practical application to machine vision. It provides a general computational mechanism for tractable solution of recognition of objects under transformation, even amid distractors and clutter. The solution exploited by map-seeking circuits makes tractable the number operations necessary to search the whole space of transformations and memory models. It does this by exploiting an ordering property of superpositions which allows a set of transformations of an input image to be formed into a superposition and for that superposition to be "collapsed" to the single correct mapping by a competitive process which matches the superposition against a memory pattern, or a superposition of memory patterns. The architecture that performs this is based on a number of neuroanatomical features of the visual cortices, including reciprocal dataflows and inverse mappings.

Did You Know

That there are 3 Montana Counties named after generals? Who are they? Answer to the last "Did You Know?" – Roosevelt, Madison, Lincoln, Jefferson & Garfield.

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