MISSOURI S&T University of Science & Technology

Distinguished Seminar Computer Science

A Scalable Architecture for High-Throughput Regular-Expression Pattern Matching

Dr. Ron Cytron, Washington Univ. in St. Louis

Oct 25th Tuesday, 12:30 to 1:30pm

St. Pats A – Havener Center

Abstract - Regular expressions specify patterns of interest in many computer science applications. We present and evaluate an architecture for high-throughput pattern matching of regular expressions. Our approach matches multiple patterns concurrently, responds rapidly to changes in the pattern set, and is well suited for synthesis in an ASIC or FPGA. Our approach is based on an easily pipelined state-machine representation that uses encoding and compression techniques to improve density. We have written a compiler that translates a set of regular expressions and optimizes their deployment in the structures used by our architecture. We analyze our approach in terms of its throughput, density, and efficiency. We present experimental results from an implementation in a commodity FPGA, showing better throughput and density than the best known approaches.

Brief Bio - Ron K. Cytron is a professor of computer science and engineering at Washington University. His research interests include optimize middleware for embedded and real-time systems, fast searching of unstructured data, hardware/runtime support for object-oriented languages, and computational political science. Ron has served as a technology advisor and has worked as a software engineer at Exegy, Inc., a startup company in St. Louis that is commercializing applications accelerated in reconfigurable logic. Ron has over 100 publications and 5 patents. He has received the SIGPLAN Distinguished Service Award and is a corecipient of SIGPLAN Programming Languages Achievement Award. He is a Fellow of the ACM.