Developing a Hardware Coprocessor for Petri-Net Execution

李柏成、黃其泮

E-mail: 8804786@mail.dyu.edu.tw

ABSTRACT

The ECAM is derived from CAM, which proposed a virtual word concept to construct an extensible architecture on a single chip. The virtual word has been proved that can effectively simplify the word length adjustment and reduce the overhead compared with the traditional CAM architecture. The ECAM also proposed FCMO that is one physical word of the virtual word that is designed to represent the concise information about the related virtual word. It is designed to provide another matched information to abound the applications of the matched virtual word. For example, ECAM is applied to identify the triggerable transition in a Petri net. The FCMO can directly represent an identified triggerable transition to simply the following processes of Petri net execution. Therefore, the ECAM is further applied to the design of Petri net execution coprocessor, which makes the triggerable transition identification and token updating in a constant time. So, the Petri net execution coprocessor based on the ECAM can promote the Petri net being applied to the applications of real time systems and control systems. Moreover, the prototyping and implementation of ECAM has adopted the FPGA, because the FPGA owns the capability of reconfigurable hardware. It is helpful on the design, implementation, performance evaluation, and function improvement of ECAM.

Keywords : Petri Net Model ; Extensible Content Addressing Memory ; Triggerable Transition

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