Temperature Sensitive Microprocessor Design to Reduce Heat Generation and Improve Performance

Abstract

Microprocessors are designed with very tiny microchips and heat induced due to operation makes the chip deteriorate their performance in many extents. Heat causes a portion of chip-area to get heated which degrades operation of many applications in chip-level. This work wants to make a watcher to watch the applications running in pipeline, and then by utilizing slack time in hardware level this work wants to improve performance of the processor. In this paper, this work proposes two new heat-control mechanisms to improve performance, one is at operation-level and the other is at architectural-level. At operation-level, this work proposes a prediction mechanism to predict the useful operations inside the microprocessor that performs as a sink for heat dissipation. At architectural-level, this work proposes a drain system for heat dissipation. The proposed prediction and drain mechanisms will reduce heat generation and thereby increase performance. This work has simulated the proposed system using Matlab and observed that the system works perfectly well. Java program has been devised to take care of fault tolerance and fault detection.
References

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1-16.

21. Matlab, Mathwork’s Simulation Tool.
22. B. Zhai, S. Pant, L. Nazhandali, S. Hanson, J. Olson, A. Reeves, and M. Minuth, “Energy-Efficient Subthreshold Processor Design,” In IEEE

Index Terms

Computer Science
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Keywords

Heat detection, heat control, power dissipation, drain system, runtime, fault tolerance, fault detection.