

Posit as an Alternative to Floating Point: Opportunities & Challenges

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Abstract

Floating-point number system is used extensively in many applications to perform arithmetic operations. With the advent of massively parallel cores (e.g., GPU and AI hardware accelerators), the memory bandwidth of a computer system has become a bottleneck for system performance. Also due to the large number of computations in DNNs and machine learning applications, reducing the number of bits would have a great impact on power and energy consumption. Recently the Posit number system has been introduced by John Gustafson as a drop-in replacement to improve the accuracy of the arithmetic operations with more efficient use of bit storage, hence, reducing memory contention and energy consumption. Being a newly proposed format, it is imperative to study Posit on different applications and position their performance and precision against the existing IEEE 754 standard way of computing. Moreover, efficient hardware structures for Posit-based arithmetic units should be developed.

In this talk, first some general features on Posit Number System including details on the representation, its effectiveness in some arithmetic operations and its high-level implementation will be presented. Then, some state-of-the-art works of Posit are briefly reviewed. Finally, the shortcomings of the Posit compared to the Floating-Point Number System are addressed.

Biography

Saba Amanollahi received her B.Sc. degree in Computer Engineering from University of Tehran, in 2007, and her M.Sc. and Ph.D. in Computer Architecture from Shahid Beheshti University, in 2011 and 2017, respectively. Now, she is a Lecturer at University of Tehran. Her research interests include Computer Arithmetic, Approximate Computing, Low Power Design, In-Memory Computing and Embedded System Design.

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