World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Optimal Solutions for Real-Time Scheduling of Reconfigurable Embedded Systems Based on Neural Networks with Minimization of Power Consumption

Authors : Ghofrane Rehaiem, Hamza Gharsellaoui, Samir Benahmed

Abstract : In this study, Artificial Neural Networks (ANNs) were used for modeling the parameters that allow the real-time scheduling of embedded systems under resources constraints designed for real-time applications running. The objective of this work is to implement a neural networks based approach for real-time scheduling of embedded systems in order to handle real-time constraints in execution scenarios. In our proposed approach, many techniques have been proposed for both the planning of tasks and reducing energy consumption. In fact, a combination of Dynamic Voltage Scaling (DVS) and time feedback can be used to scale the frequency dynamically adjusting the operating voltage. Indeed, we present in this paper a hybrid contribution that handles the real-time scheduling of embedded systems, low power consumption depending on the combination of DVS and Neural Feedback Scheduling (NFS) with the energy Priority Earlier Deadline First (PEDF) algorithm. Experimental results illustrate the efficiency of our original proposed approach.

Keywords : optimization, neural networks, real-time scheduling, low-power consumption
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020