Quantitative Analysis of Multiprocessor Architectures for Radar Signal Processing

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Abstract : Radar signal processing requires high number crunching capability. Most often this is achieved using multiprocessor platform. Though multiprocessor platform provides the capability of meeting the real time computational challenges, the architecture of the same along with mapping of the algorithm on the architecture plays a vital role in efficiently using the platform. Towards this, along with standard performance metrics, few additional metrics are defined which helps in evaluating the multiprocessor platform along with the algorithm mapping. A generic multiprocessor architecture can not suit all the processing requirements. Depending on the system requirement and type of algorithms used, the most suitable architecture for the given problem is decided. In the paper, we study different architectures and quantify the different performance metrics which enables comparison of different architectures for their merit. We also carried out case study of different architectures and their efficiency depending on parallelism exploited on algorithm or data or both.

Keywords : radar signal processing, multiprocessor architecture, efficiency, load imbalance, buffer requirement, pipeline, parallel, hybrid, cluster of processors (COPs)

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