SCHEDULING OF DATAFLOW MODELS WITHIN THE RECONFIGURABLE VIDEO CODING FRAMEWORK

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Abstract

The upcoming Reconfigurable Video Coding (RVC) standard from MPEG (ISO/IEC SC29WG11) defines a library of coding tools to specify existing or new compressed video formats and decoders. The coding tool library has been written in a dataflow/actor-oriented language named CAL. Each coding tool can be represented with an extended finite state machine and the dependencies between the tools are described as dataflow graphs. This paper proposes an approach to derive a multiprocessor execution schedule for RVC systems that are comprised of CAL actors. In addition to proposing a scheduling approach for RVC, an extension to the well-known permutation flow shop scheduling problem that enables rapid run-time scheduling of RVC tasks is introduced.

Major steps in our approach

1. Classify actions: processing or configuration
2. Unroll state machines from model to SDF graphs
3. Combine SDF graph fragments
4. Assign actions (SDF vertices) to processors
5. Schedule each SDF graph off-line
6. Start system and run-time scheduling

RVC actor “add” after transform to SDF graphs

An SDF graph formed from smaller graphs

Run-time scheduled execution on multiple processing elements.