Universität Rostock

Traditio et Innovatio

Institut für Angewandte Mikroelektronik und Datentechnik

Thesis Topics (BA, MA,SM)

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Design Space Exploration for Dynamic Dataflow Applications (only MA)

- Streaming applications such as video de-/encoder, image processing, filter, etc. can be efficiently modeled with dataflow graphs
- Application consist of communicating tasks that produce and consume data (tokens)
  - Self-timed execution: task executes as soon as enough data is available
  - Data is exchanged via global memory
  - Synchronization has to be considered for shared resources (busses, processors, etc.)
- Quality parameters such as throughput and latency are important to evaluate a current implementation
  - Static applications modeled by synchronous dataflow graphs (SDFG) are highly analyzable
- Many applications are heavily data-dependent
  - Task functionality depends on the current available data
  - E.g.: Current frame of a video
  - Cannot be modeled with SDFGs
  - Quality parameters are hard to analyze
- Scenario-aware dataflow graphs (SA-DFG) are used to diminish the complexity
  - Synchronous dataflow graphs describe one scenario
  - FSMs define scenario transitions
  - Can be analyzed with standard techniques → (max,+)-algebra
- Goal:
  - Development of a design space exploration methodology for dynamic applications modeled as SA-DFGs
  - Integration of the method into an existing framework based on Answer Set Programming
  - Synthetic and real-life benchmarks to evaluate scalability and performance