Space & Time: Tackling Semantic Challenges in MBSE for Cyber-Physical Systems (CPS)
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History and Motivation

- Motivation: Need for "built-in" smartness (knowledge) infrastructure in MBSE for "correct by design" CPS

Summary Results and Future work

- Applications: Safety critical Transportation systems (0D, 1D, 2D+t), Unmanned & Building systems (2D, 3D+t+TZ), Energy (2D+t+TZ)...
- Future work: (1) Integrated spatio-temporal reasoning algorithm for safety-critical CPS, (2) Synthesis of physically-aware control software for distributed CPS, (3) Application to more complex CPS problems

Current state of the research

- Spatio-Temporal Framework for MBSE of CPS
  - Ontologies-based semantic framework for CPS modeling and analysis; Time and Space as meta-domains
  - Modular, flexible, reusable reasoning-enabled platform: System-level property (safety) study - as a decision problem - in MBSE for CPS
  - Decidable fragments of temporal and spatial calculus in support of reasoning services/algorithms

Implementation: Spatio-temporal modeling and reasoning for CPTS

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