
Runtime Verification of Cognitive Applications

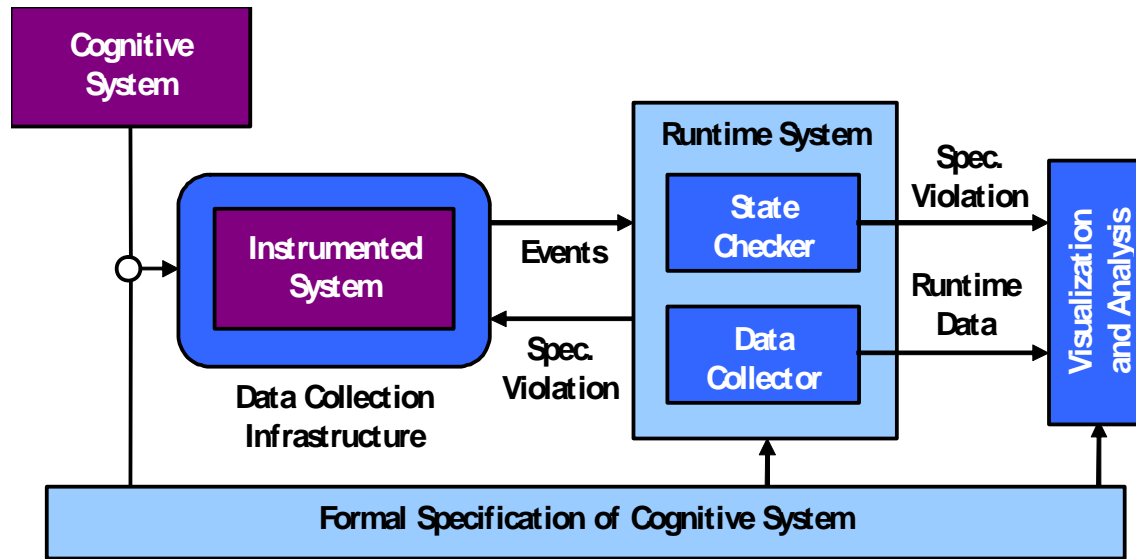
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Overview

- **We are building a tool for runtime verification of intelligent, learning cognitive systems based on the following techniques:**
 - *Formal specifications of cognitive systems*: rigorous formal specifications drive the verification system from system execution to post-mortem diagnosis.
 - *First-fault debugging*: when an error is detected, the tool saves sufficient context to allow debugging without first recreating the error.
 - *Effective visualization and analysis*: based on saved context data, the tool can identify for an error: the immediate causes, the sufficient conditions, and the possible contributing factors.
 - **This tool will provide:**
 - More efficient utilization of programmer time by partially automating debugging
 - An effective method of verifying that a cognitive system upholds certain strict formal properties
 - An machine-verifiable description of a cognitive system beyond “the system is what the code does”
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Verification System: Architecture



- Instrument cognitive system to emit a stream of events to a runtime checker and also to a data collector
- Checker verifies if events are valid with respect to the formal specification
- If an error occurs, visualization and analysis simplifies diagnosis