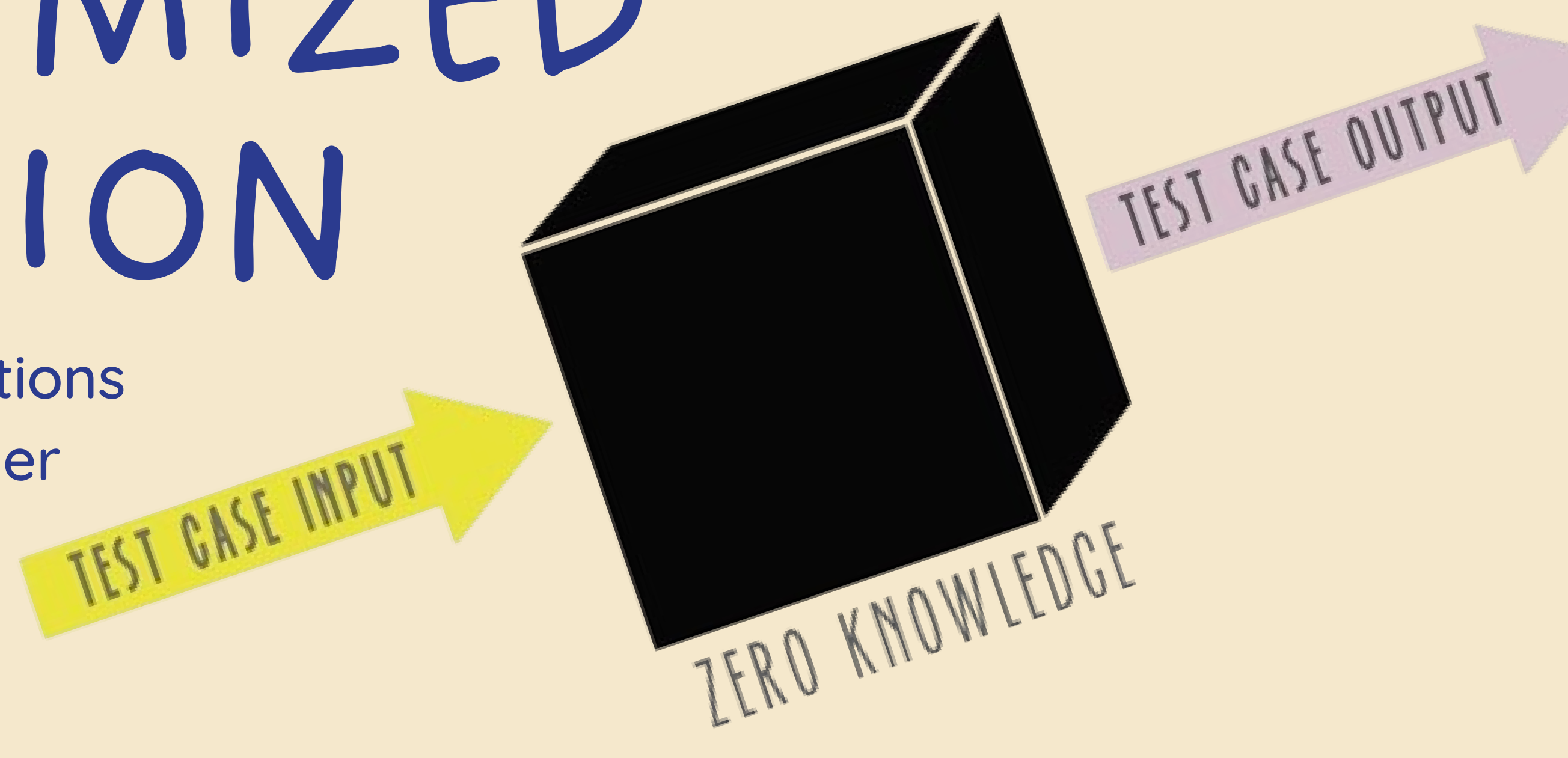


AUTOMATED AND SCALABLE FRAMEWORK FOR OPTIMIZED TEST CASE GENERATION

Utilizing Adaptive Surrogate Models and Distributed Executions for Efficient Falsification of Cyber-Physical Systems Under Resource Constraints in real-time



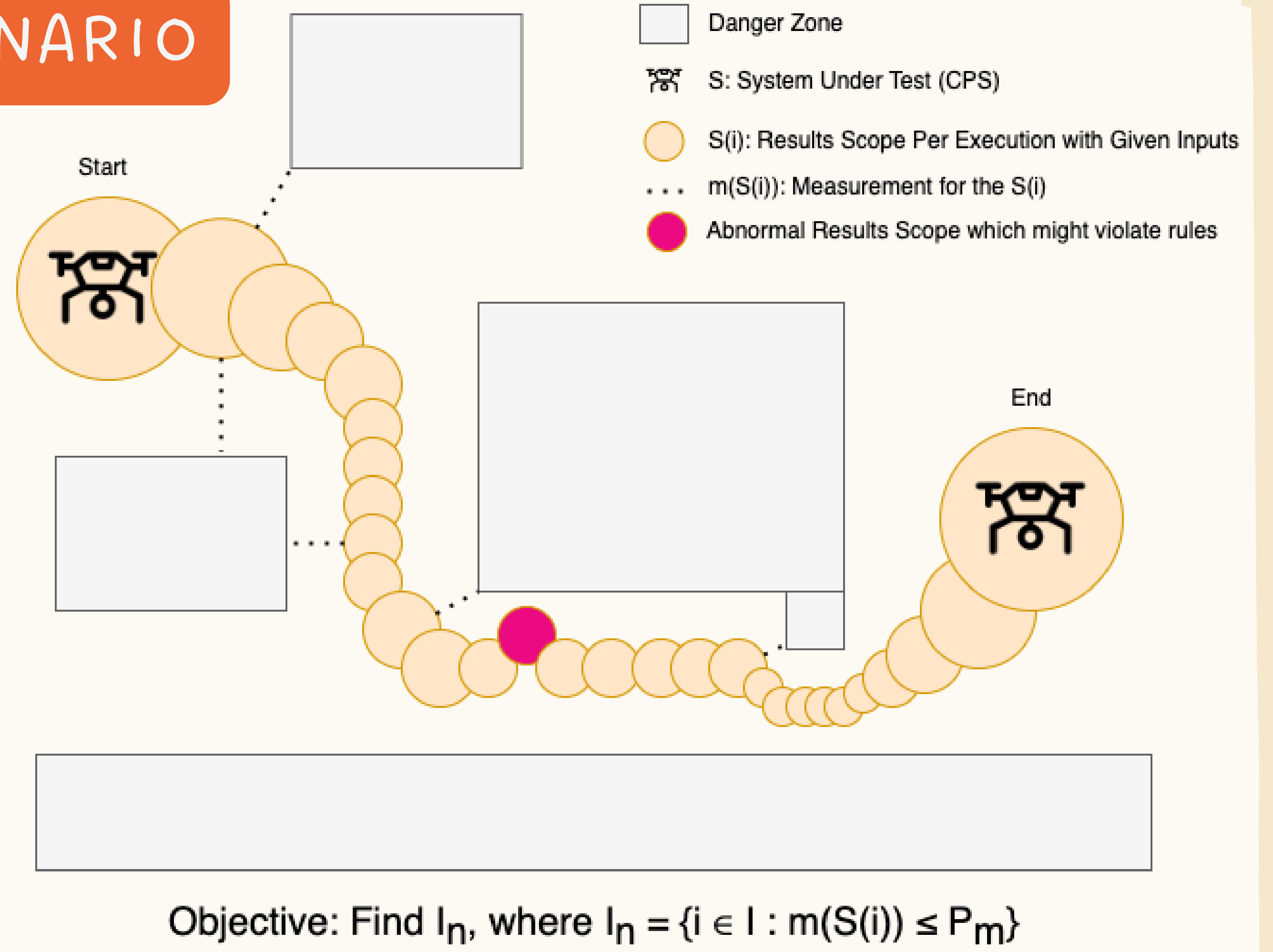
Ali Kaya, Åbo Akademi University
ali.kaya@abo.fi



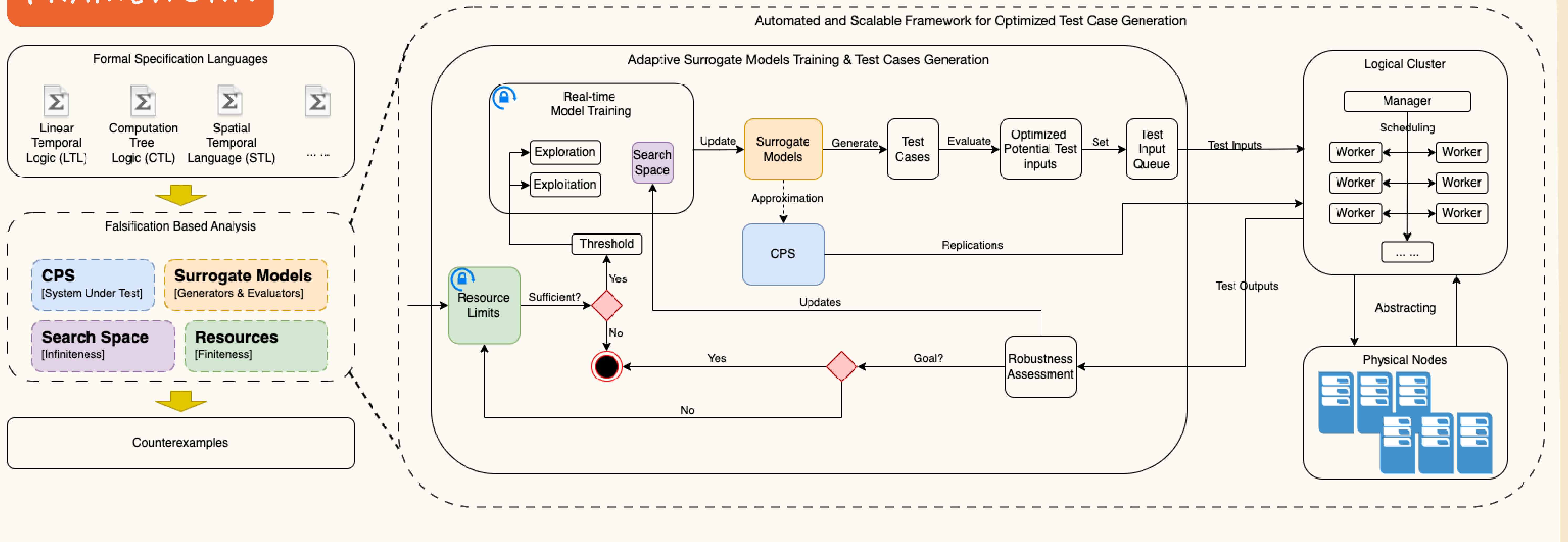
CONCEPTS

- **CPS(Cyber-Physical Systems):** From basic unit functions to complex autonomous intelligence systems
- **Resource:** Any cost related to testing, such as time, money, and manpower which can be quantified
- **Search Space:** Typically non-enumerable but formalizable via equations
- **Surrogate Models:** Approximated Models targeting on the CPS behavior of executions, could be GAN, Reinforcement Learning, Genetics Algorithms, etc.

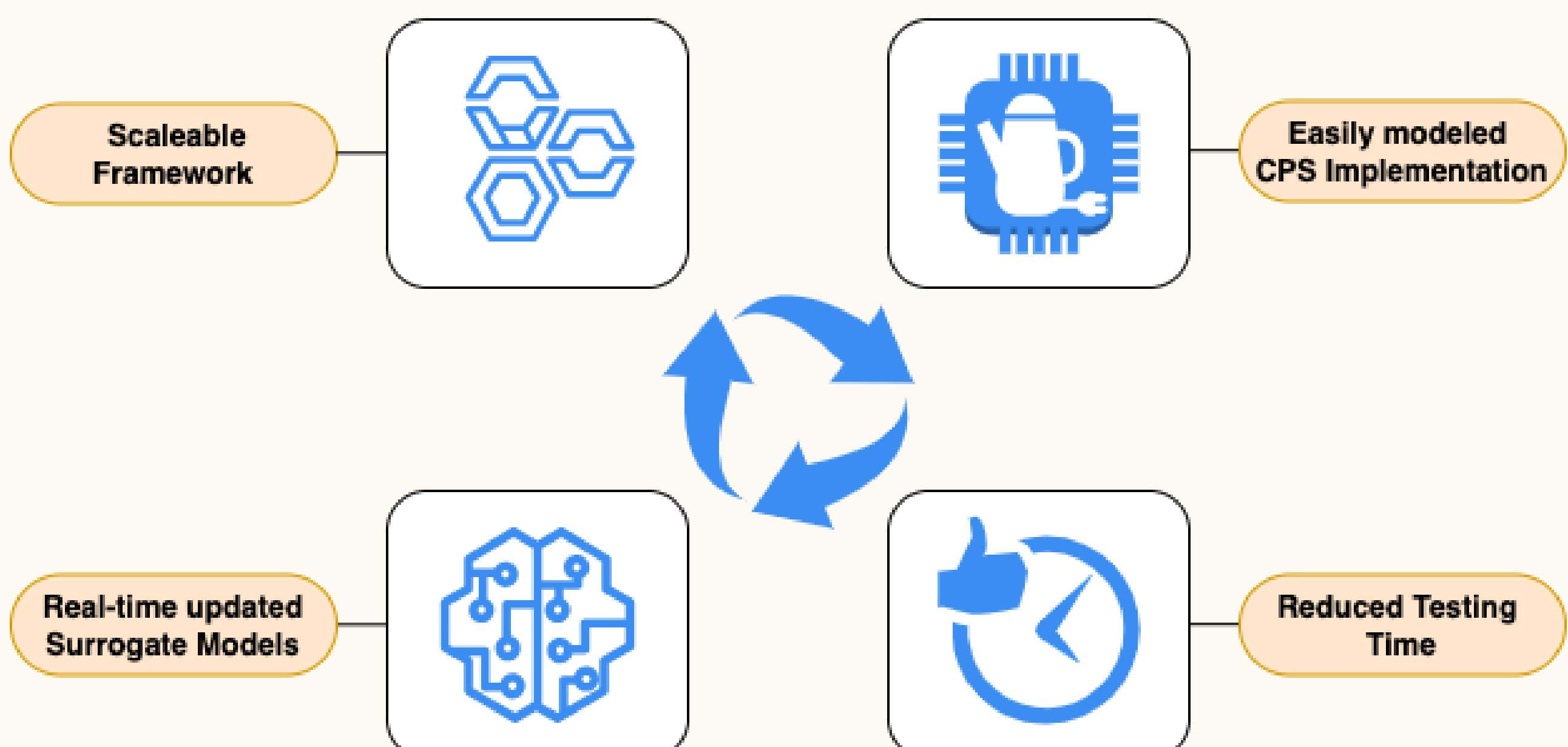
SCENARIO



FRAMEWORK



ADVANTAGES



FUTURE WORK

- Implement a state-of-the-art distributed framework using robust tools such as Ray, Dask, or a customized solution.
- Research and enhance the existing surrogate models with innovated adjustments with real-time training capability
- Test as many models as possible on diverse CPS to verify the robustness of the models and frameworks.