

1. Research Question

Can we use probabilistic inference to obtain robust schedules for the stochastic resource constrained project scheduling problem, without modifying the underlying deterministic scheduling algorithm?

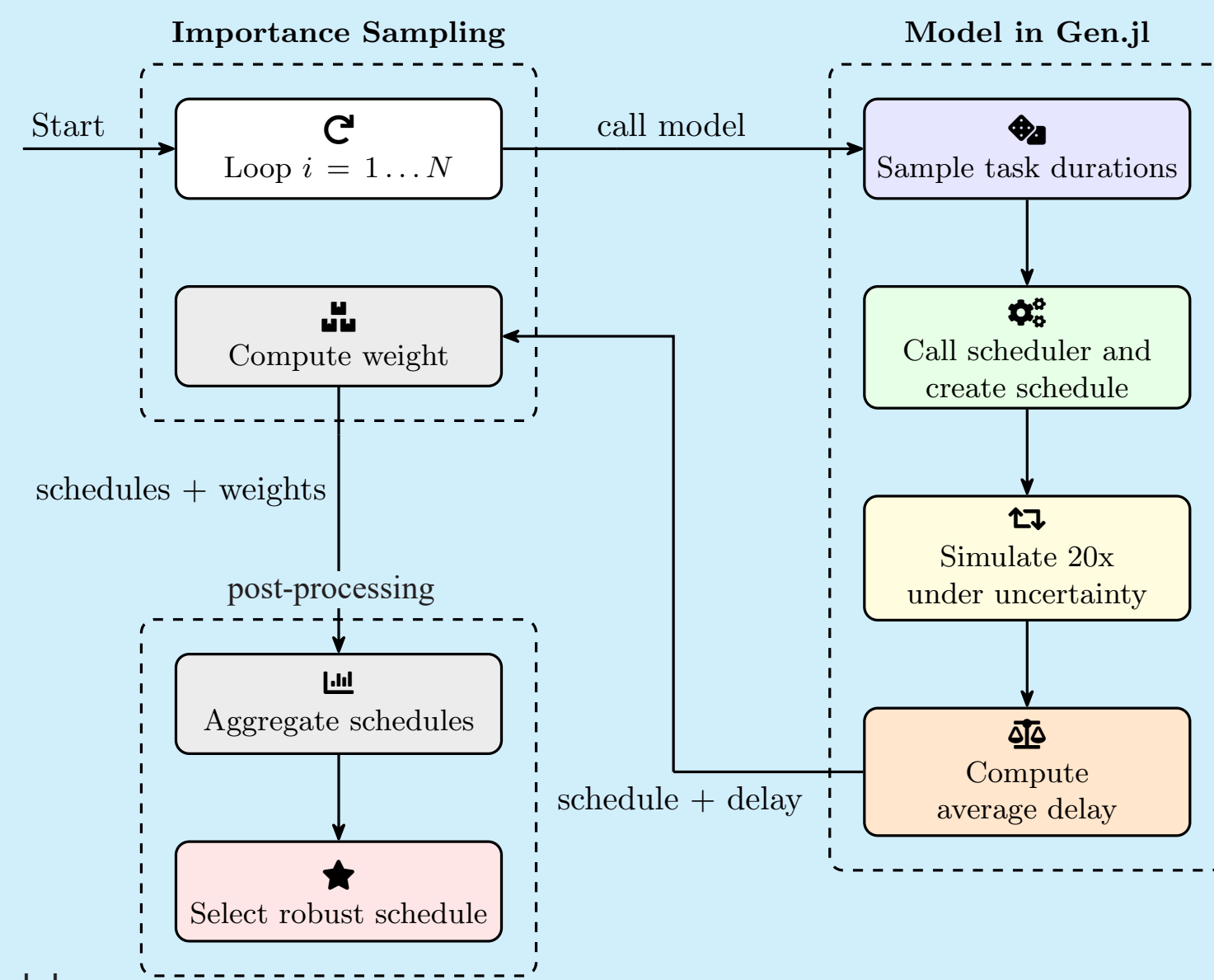
2. Introduction

- Problem**
 - RCPSP with uncertain task durations
- Goal**
 - Find schedule that performs well under uncertainty
- Current limitations**
 - Need to modify existing scheduling algorithms
 - Need to perturb or analyze created schedules

- Proposed method**
 - Build a robustness distribution over all possible schedules
 - Construct uncertainty model
 - Use importance sampling to infer robustness distribution
 - Theorize that robust schedule found at densest point of posterior

- Desired properties**
 - Treat scheduler and simulator as black-box components
 - No knowledge or access to schedules required

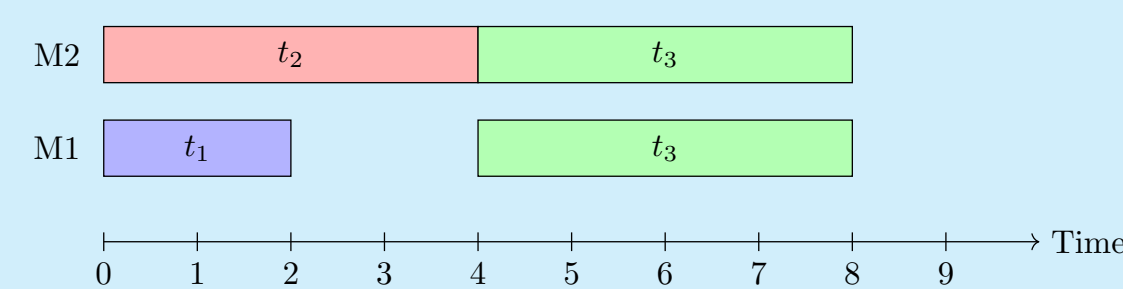
3. Methodology



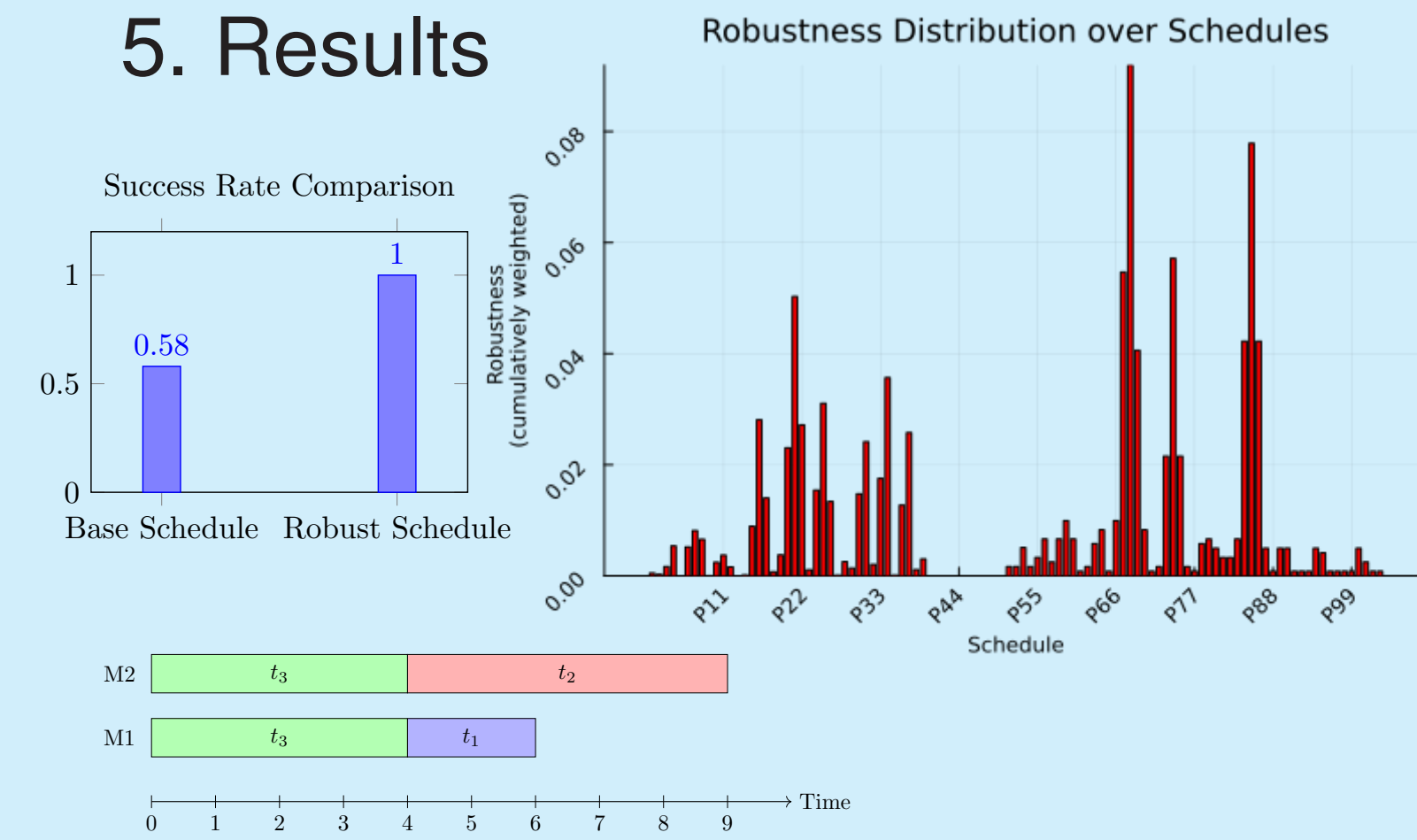
4. Experiment

Robustness = success rate of completing all tasks before their deadline (under simulated uncertainty)

Task 3 deadline of 8. Base schedule not robust.



5. Results



6. Conclusion + discussion

- Conclusions**
 - Successfully created robustness distribution over all schedules
 - Densest region was indeed theorized robust schedule
 - Black-box scheduler + simulator
 - No knowledge or access of created schedules needed
 - Robust schedule performance simulated, showing robustness
- Limitations**
 - Not tested on larger instance
 - Theorized performance issue and sparse robustness distribution in real-world instances
- Future work**
 - Larger instances, different inference technique, other uncertainty, different robustness measure