LTL Motion Planning

F. Barbosa, K. Grover, J. Křetínský, J. Tumova

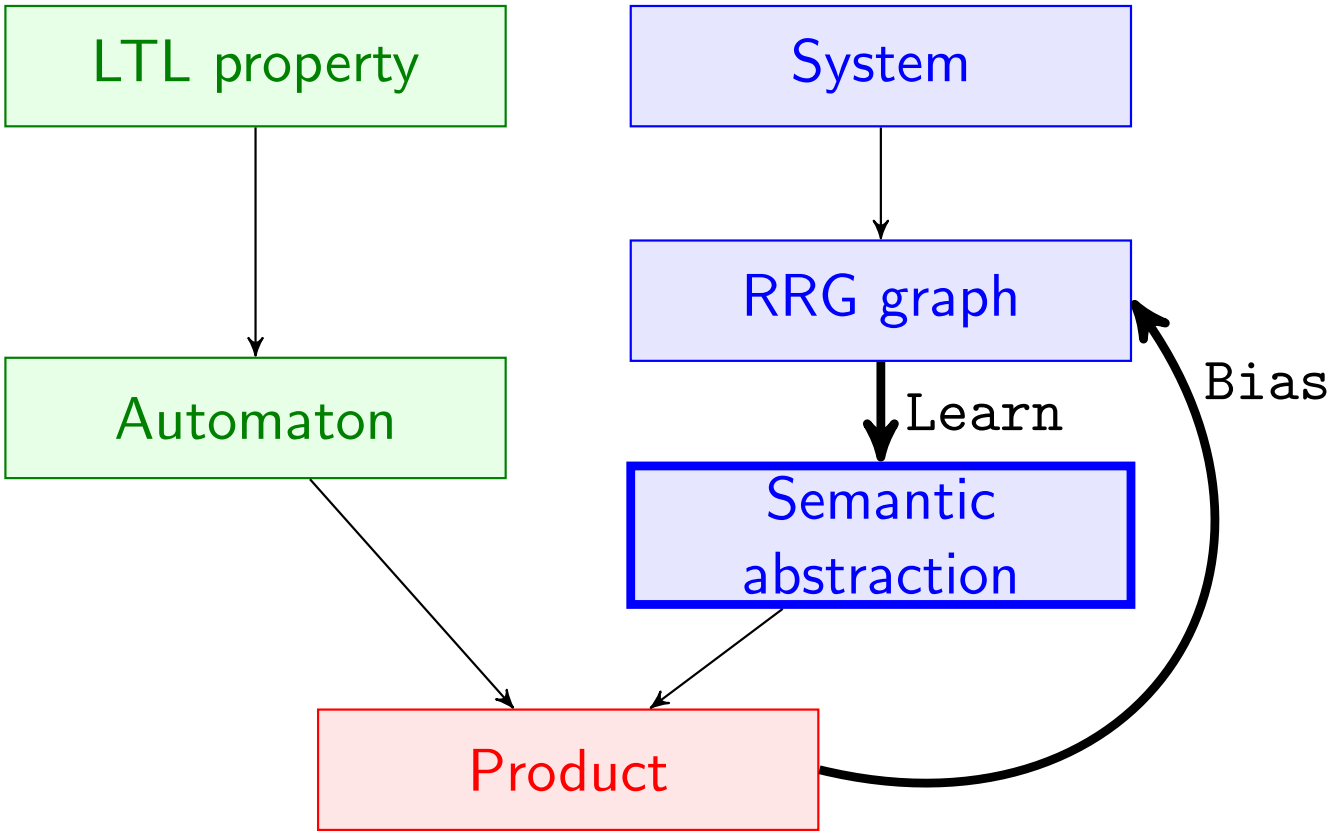
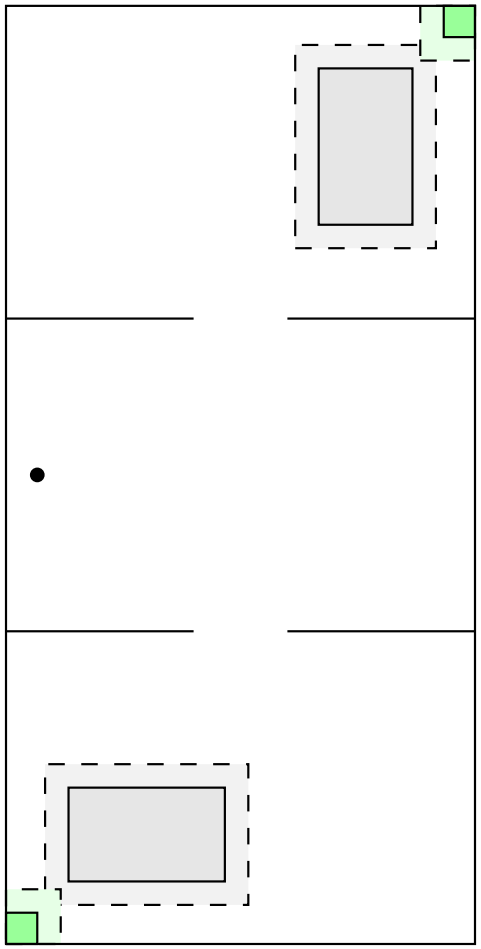


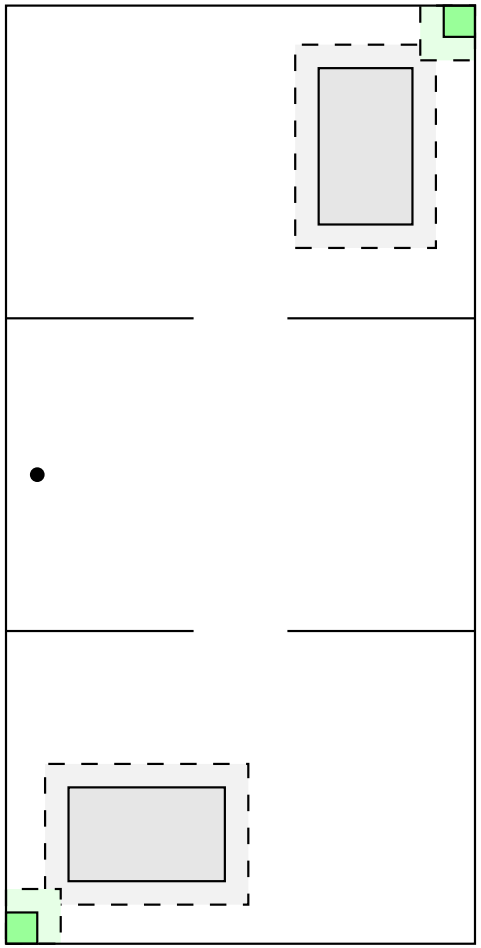
Figure: Scheme of our model-checking-inspired approach with novel elements drawn thickly.

LTL Motion Planning



Specification: $GF(r_1 \wedge b) \wedge GF(r_2 \wedge b)$

Building the product



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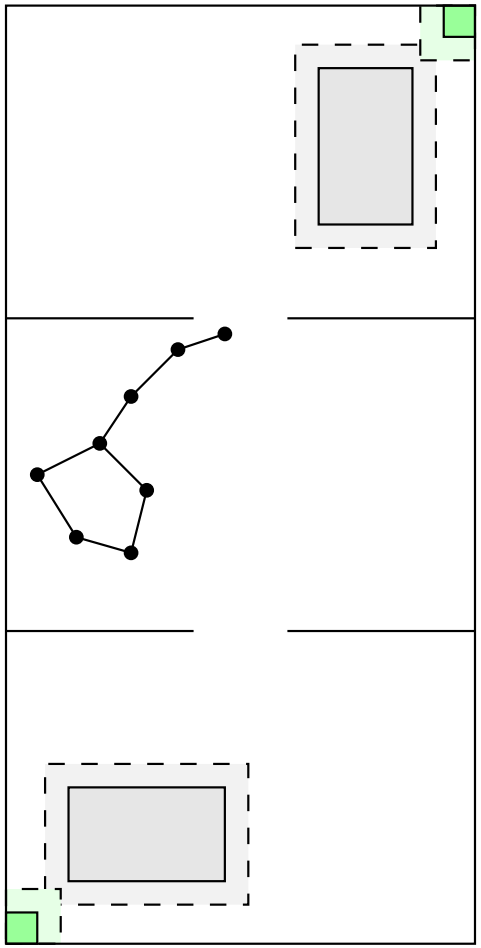

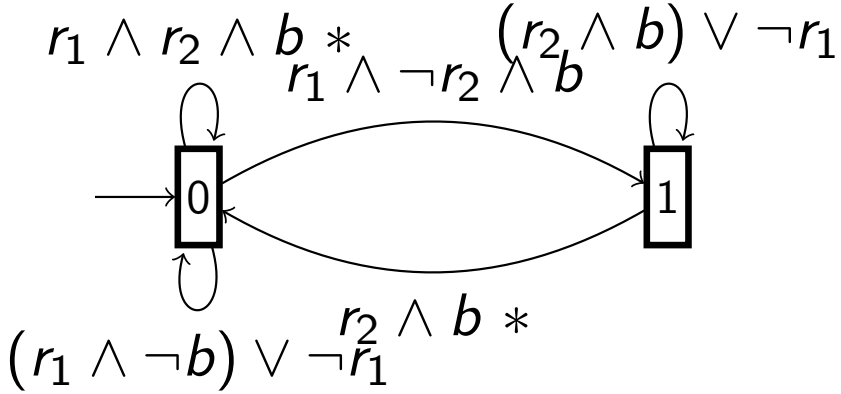

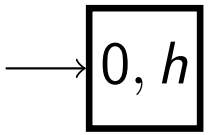

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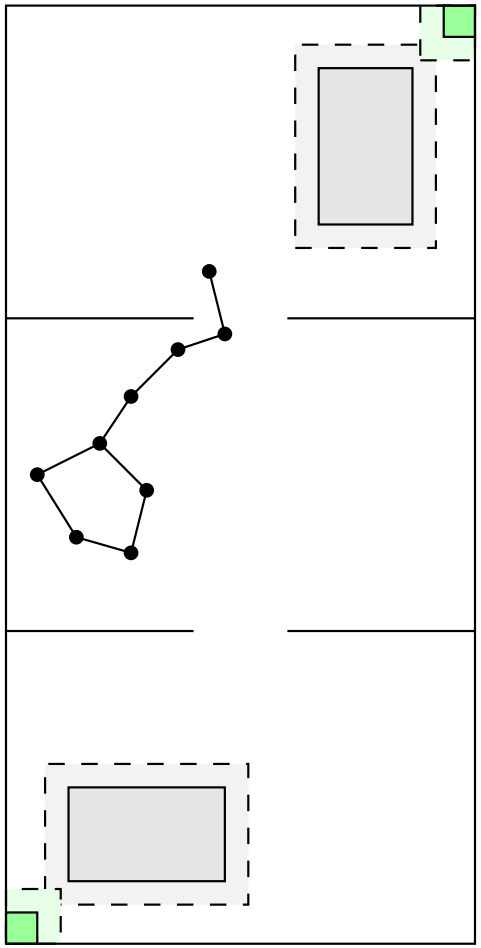

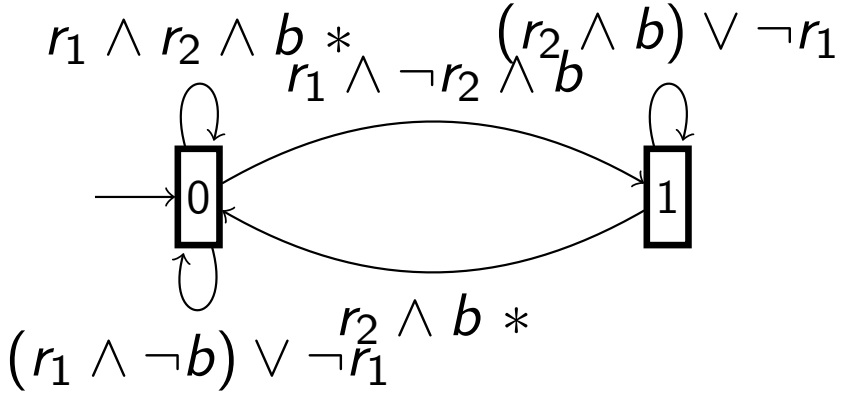

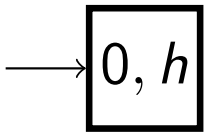

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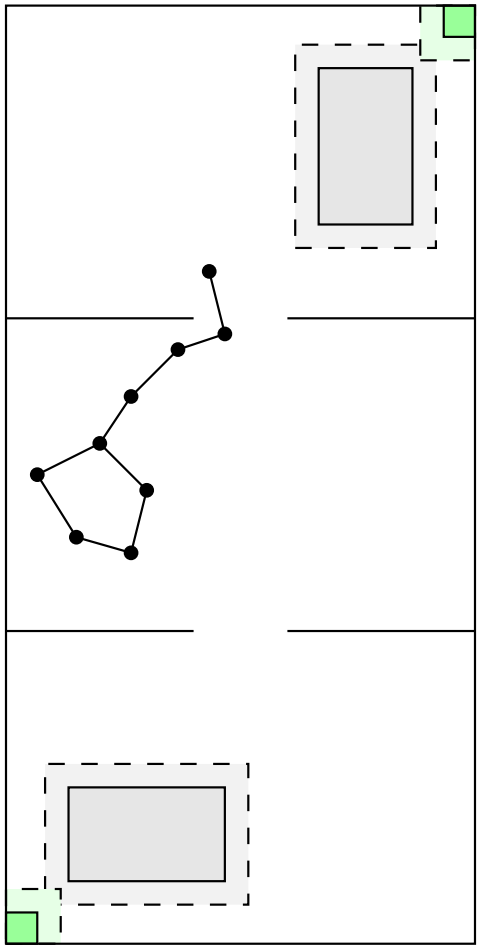

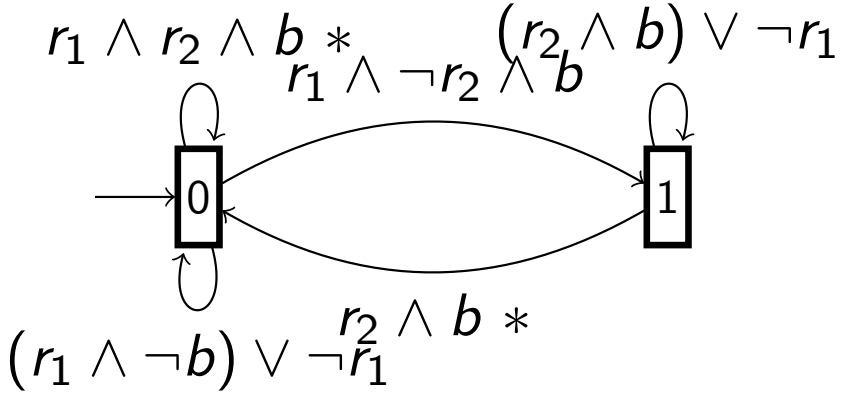

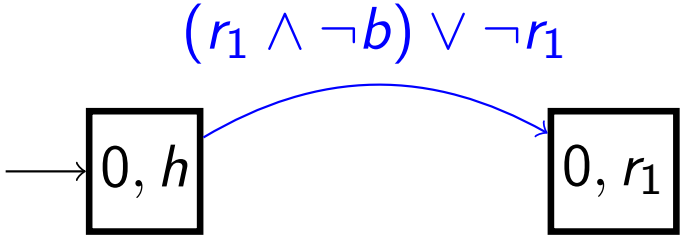

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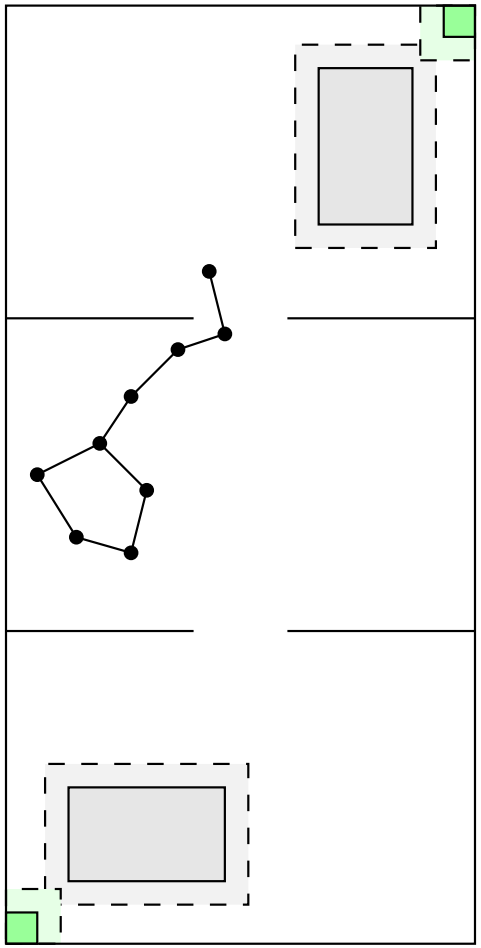

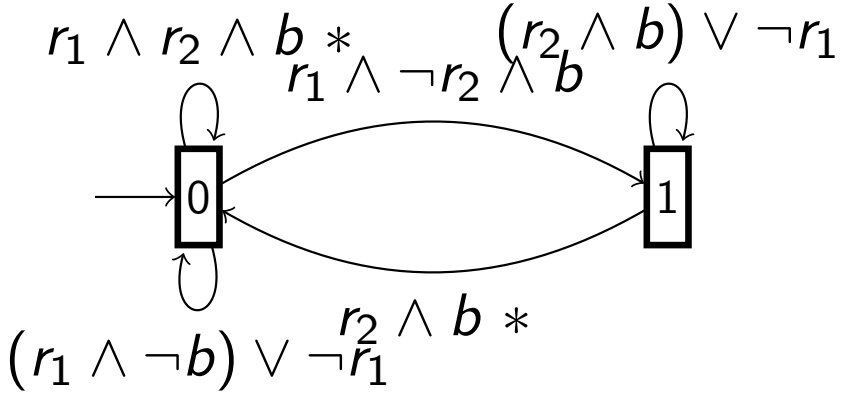

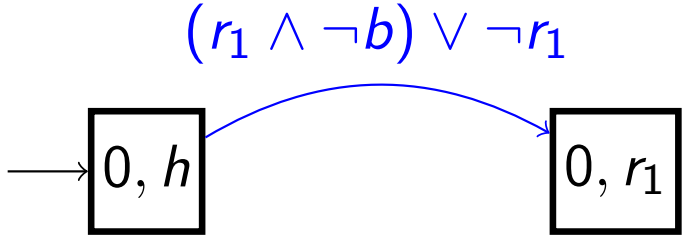

Add transitions "similar" to this also.

Algorithm

- Store map of sensing radius.

Algorithm

- Store map of sensing radius.
- Sample a batch.

Algorithm

- Store map of sensing radius.
- Sample a batch.
- Get bias.

Algorithm

- Store map of sensing radius.
- Sample a batch.
- Get bias.
- Add frontiers using bias.

Algorithm

- Store map of sensing radius.
- Sample a batch.
- Get bias.
- Add frontiers using bias.
- Learn from new samples.

Algorithm

- Store map of sensing radius.
- Sample a batch.
- Get bias.
- Add frontiers using bias.
- Learn from new samples.
- Select the best frontier and move.

Results

Average taken over 10 runs.

Environment	Bias	Time taken [s]	RRG size	Movement Length	Remaining length
Separate	No	7.54	2301	60.1	?
	Yes	4.54	1171	60.1	?
Together	No	10.84	3221	39.31	? (0.8)
	Yes	8.06	2131	49.85	? (4.3)

Table: Comparison

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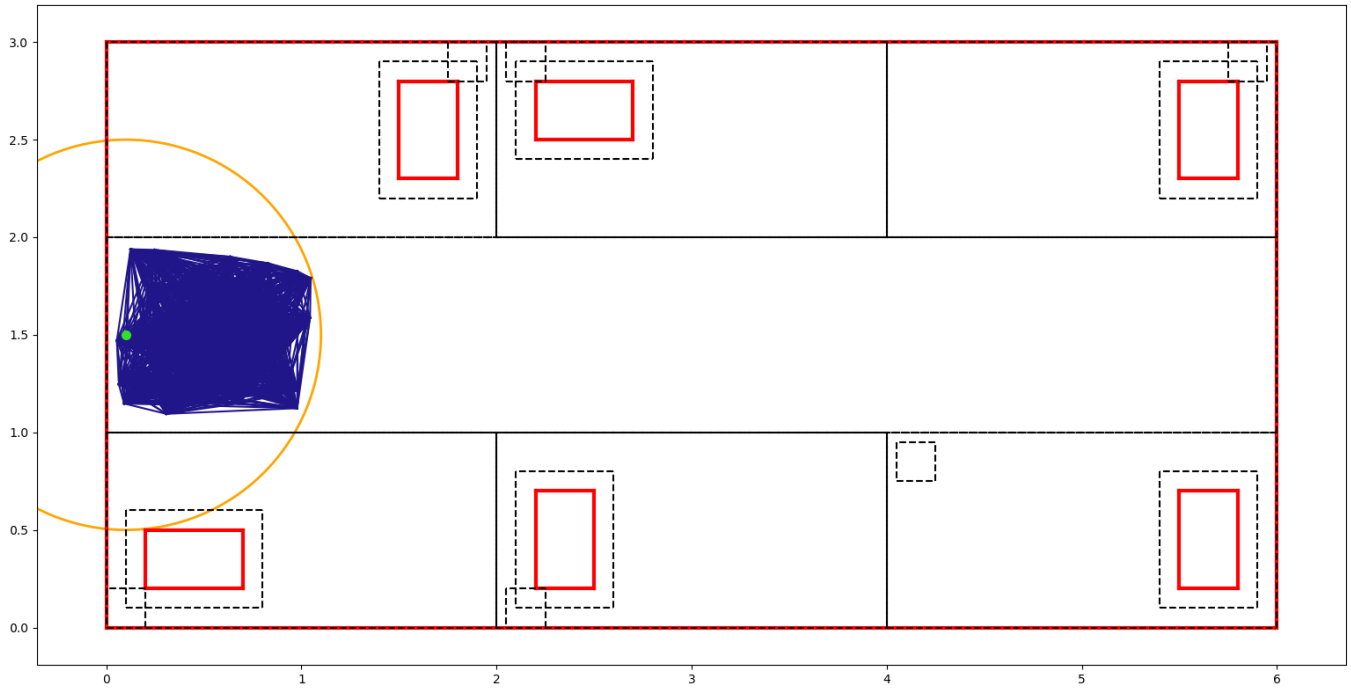
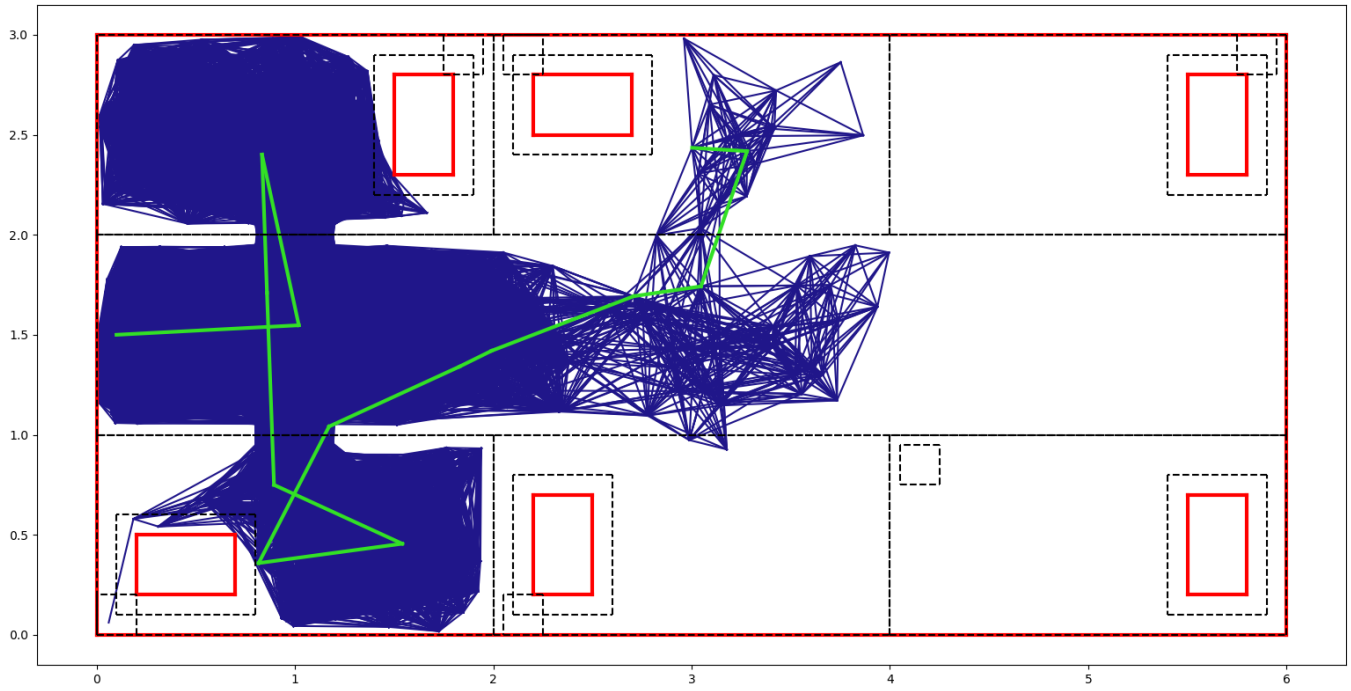
A run



A run



A run