A framework for comparing mobile robot navigation

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Abstract*— Exploration and navigation are one of the fundamental problems in mobile robotics. Efforts to address these range from reactive, map-based to learning-based approaches. With each method being developed and tested in an isolated environments, the precise improvements of these methods are unknown. This paper presents a framework to simulate, evaluate and compare these different algorithms. ******* Our results demonstrate how methods compare over a range of attributes and environments. We anticipate that this framework and findings allow for development of more advanced approaches, but also serve as a good step towards navigating dynamic environments.**

I. Introduction

II. Related work and background

III. Methodology

A. Navigational algorithms

B. Experimental environment setup

C. Evaluation methods

IV. Results

- How do we determine map complexity (needs a factor cross maps so that bigger maps are considered more complex)

$$map_{complexity} = \frac{d_{eu}}{d_{worst}} * \frac{map_{den}}{map_{size}} \qquad (*)$$

- How does an algorithm perform on average

$$algorithm_{score} = (1 - \frac{d_g}{d_{eu}}) * \frac{d_b * c}{d_{eu}^2} \qquad (*)$$

algorithm \ complexity	0-25%	25-50%	50-75%	75-100%
random walk	0	0	0	0
potential field	0	0	0	0

- How does an algorithm's performance translate to hybrid maps.

algorithm \ type	A	B	C	AB	AC	BC	ABC
random walk	0	0	0	0	0	0	0
random walk	0	0	0	0	0	0	0

V. Discussion and conclusion

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