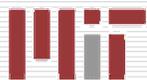
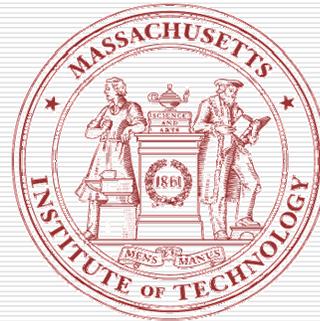


SLAM Tutorial

Course 6.834 Cognitive Robotics

SLAM for Dummies



Massachusetts Institute of Technology

Authors:

Morten Rufus Blas,

Soren Riisgaard, May 2004

Outline

- Project background
- Goal for the project
- Previous work
- Progress
- Implementation
- Screenshots
- Conclusion



Massachusetts Institute of Technology

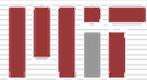
Authors:

Morten Rufus Blas,

Soren Riisgaard, May 2004

Project background

- Joint project between three courses:
 - Cognitive Robotics: SLAM Tutorial and Implementation
 - Embodied Intelligence: Behavior (APU)
 - Principles of Computer Systems: System design
- Great to be able to combine these
- Allows bigger projects



Massachusetts Institute of Technology

Authors:

Morten Rufus Blas,
Soren Riisgaard, May 2004

Goal

- Output is an easy-to-use manual of SLAM
- Tutorial style report
- Understandable by someone new to the field
- Should make it easy to create a basic but complete implementation – a foundation for additions



Massachusetts Institute of Technology

Authors:

Morten Rufus Blas,
Soren Riisgaard, May 2004

Previous work

- Lots of work within the field
- Most papers focus on innovations
- No real basic introduction
 - No complete step by step guide.
 - Many focus on one aspect (e.g. EKF).



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Authors:

Morten Rufus Blas,
Soren Riisgaard, May 2004

Complete SLAM, overview

- Landmark extraction
 - RANSAC
 - Spikes
- Data association/landmark pruning
 - Landmark policies
 - Validation gate
- EKF odometry update
- EKF re-observation
- EKF new landmark

A	E		
			
D	B		G
			
...
...
		F	C
			



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Authors:

Morten Rufus Blas,
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Progress

- Basic SLAM implementation nearly done
- Detailed description:
 - Choice of hardware
 - Landmarks
 - Data association
 - EKF
 - All variables
 - Output
 - Normal mistakes
 - How to tune the EKF



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Authors:

Morten Rufus Blas,
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The implementation

- Done in C#
- Code is easy to read
- Can be read as pseudocode
- drivers for hardware
- Will be available as a library

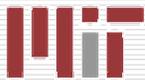
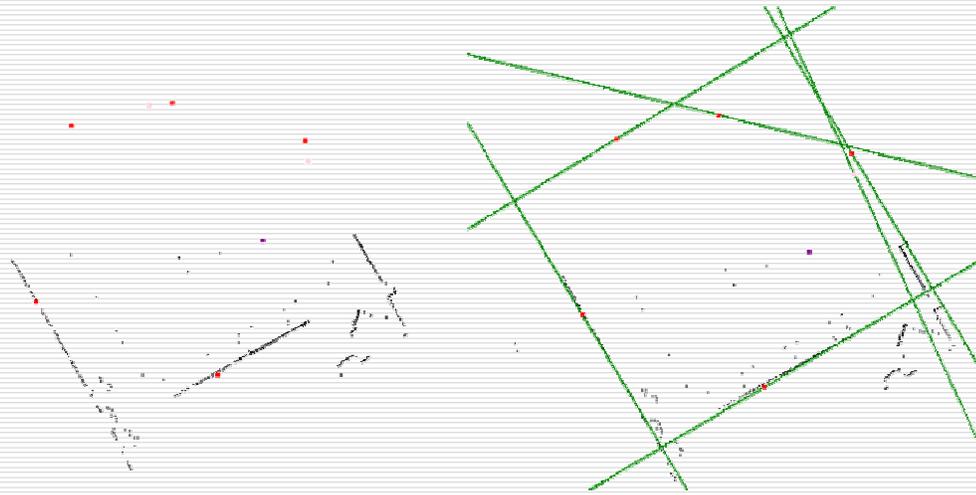


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Authors:

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Screenshots



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Conclusion

- A comprehensive tutorial
- There is really a need for it
- Enables lots of people to get up to speed
- Could bring more research into the field?



Massachusetts Institute of Technology

Authors:

Morten Rufus Blas,
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