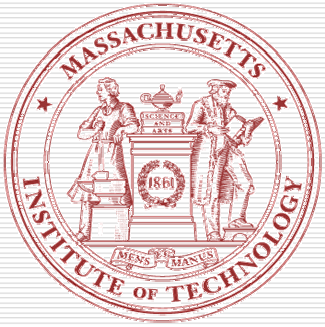
# SLAM Tutorial

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

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# 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



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# 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



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# 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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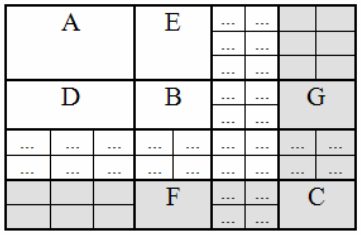
# Complete SLAM, overview

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



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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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# 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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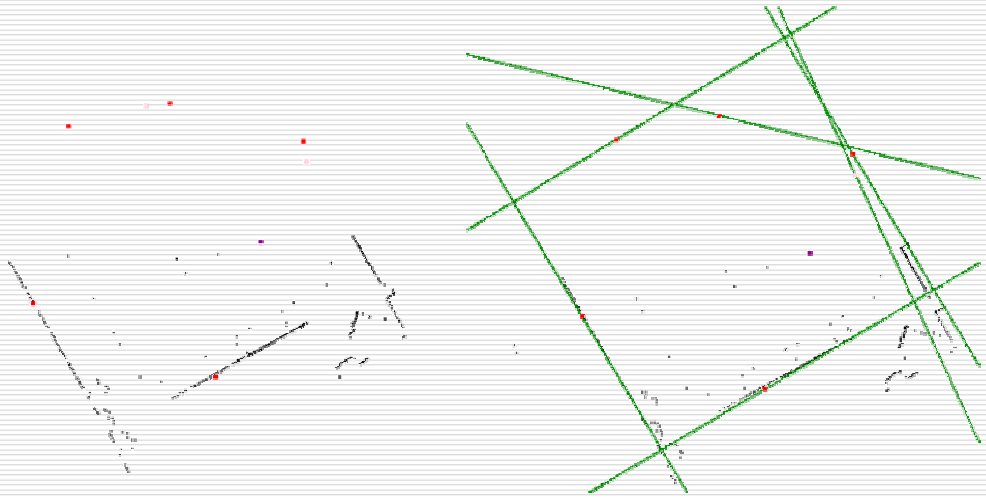
# Screenshots





# 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?