Project Presentation – Paper Guidelines

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Project Presentations

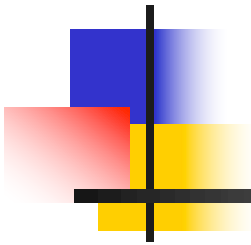
- Use MS Powerpoint
- Mail to kosecka@gmu.edu the day before presentation
  - PPT file
  - All animations/videos (links please)
- **The limits will be sctrictly enforced**

Final Project Slides

Sorry this has to fit into 7(10) minutes

- 1 Slide with title + team member names
- 1-2 Slide with problem statement and data samples
- 2-3 slide with your approach (keep it short!)
- 2-3 slides with results, animations?
- About 1 slide per minute

- (hidden slide: list percentages of who in your team did what, e.g.: Dave did 80% of the work, Mike and Ron each 10%)



Example Presentation

(John John, CS685)

GraphSLAM in a Manhattan World

Outline:

- Brief introduction about SLAM
- SLAM in a Manhattan world
- Potential problems with SLAM
- GraphSLAM
- Results
- Future work

GraphSLAM in a Manhattan World

SLAM: Simultaneous Localization And Mapping

Visual odometry mesurements:

Perception of the environment:

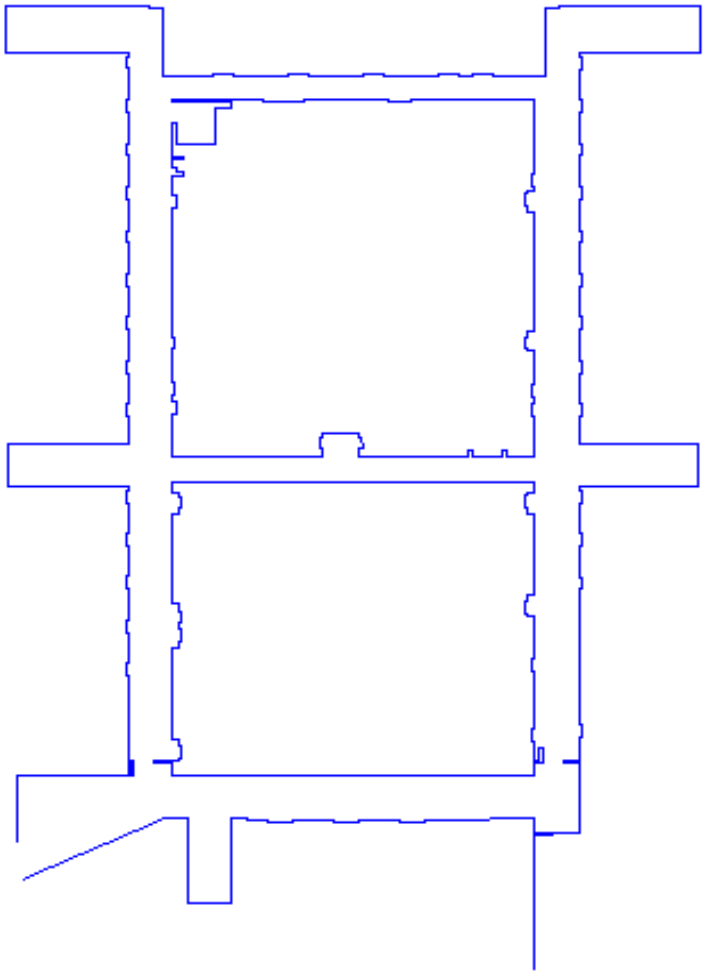
Problem: estimate the trajectory and the map

GraphSLAM in a Manhattan World

Manhattan world assumption

Scenes (city and indoors) are built on a Cartesian grid.

The walls/surfaces are perpendicular to the ground and perpendicular or parallel to one another.



GraphSLAM in a Manhattan World

SLAM with Manhattan world assumption

Pose estimation:

- Constraint of the orientation of the walls is used to estimate the orientation of the robot.
- After the orientation is recovered, translation is estimated using features.

Mapping:

- The walls are tracked and used to map the environment.

GraphSLAM in a Manhattan World

Estimate the orientation and wall layout

Segment RGB Image

↓

Extract Planar Segment

↓

Find dominant rectilinear structure

↓

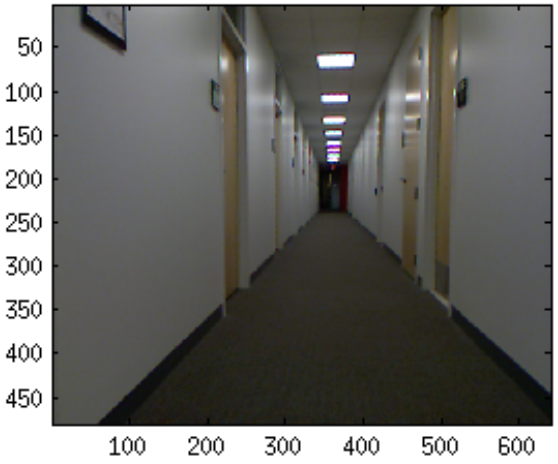
Identify candidate wall segments

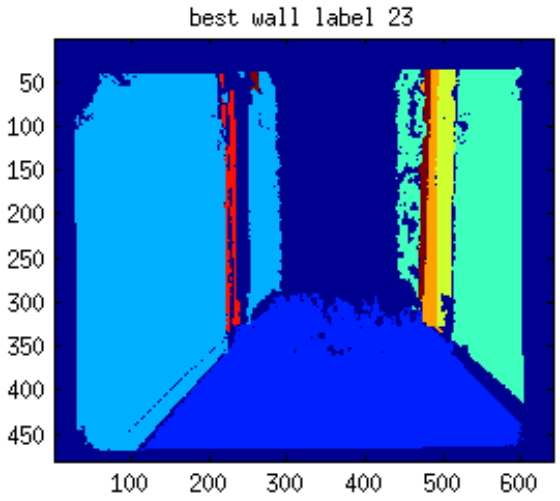
↓

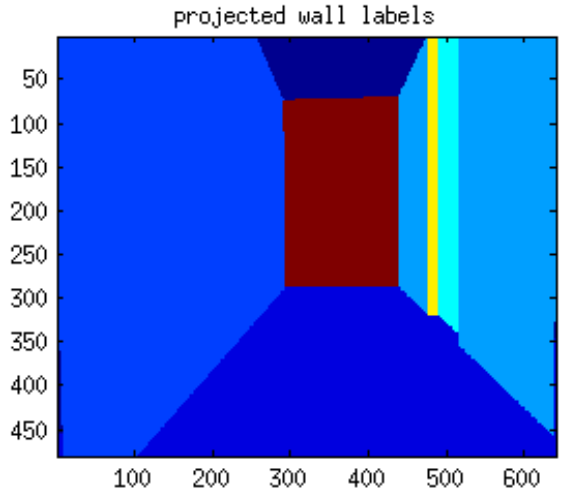
Divide image into wall intervals

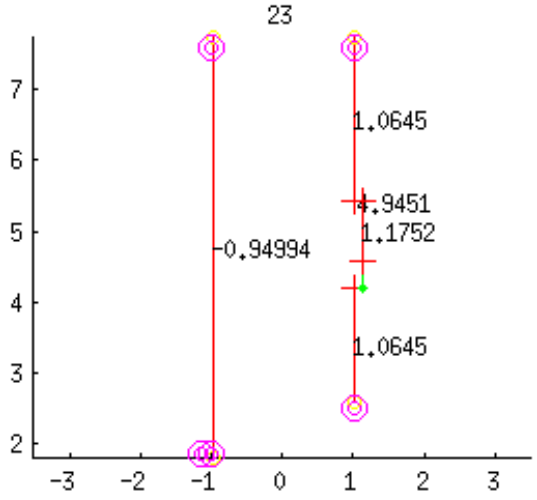
↓

Extract Wall Layout





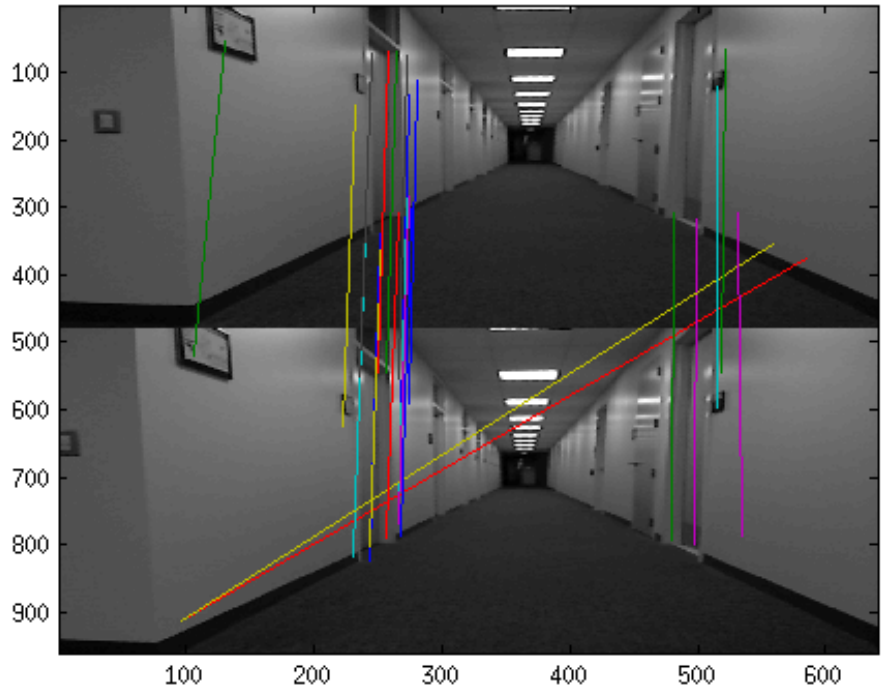




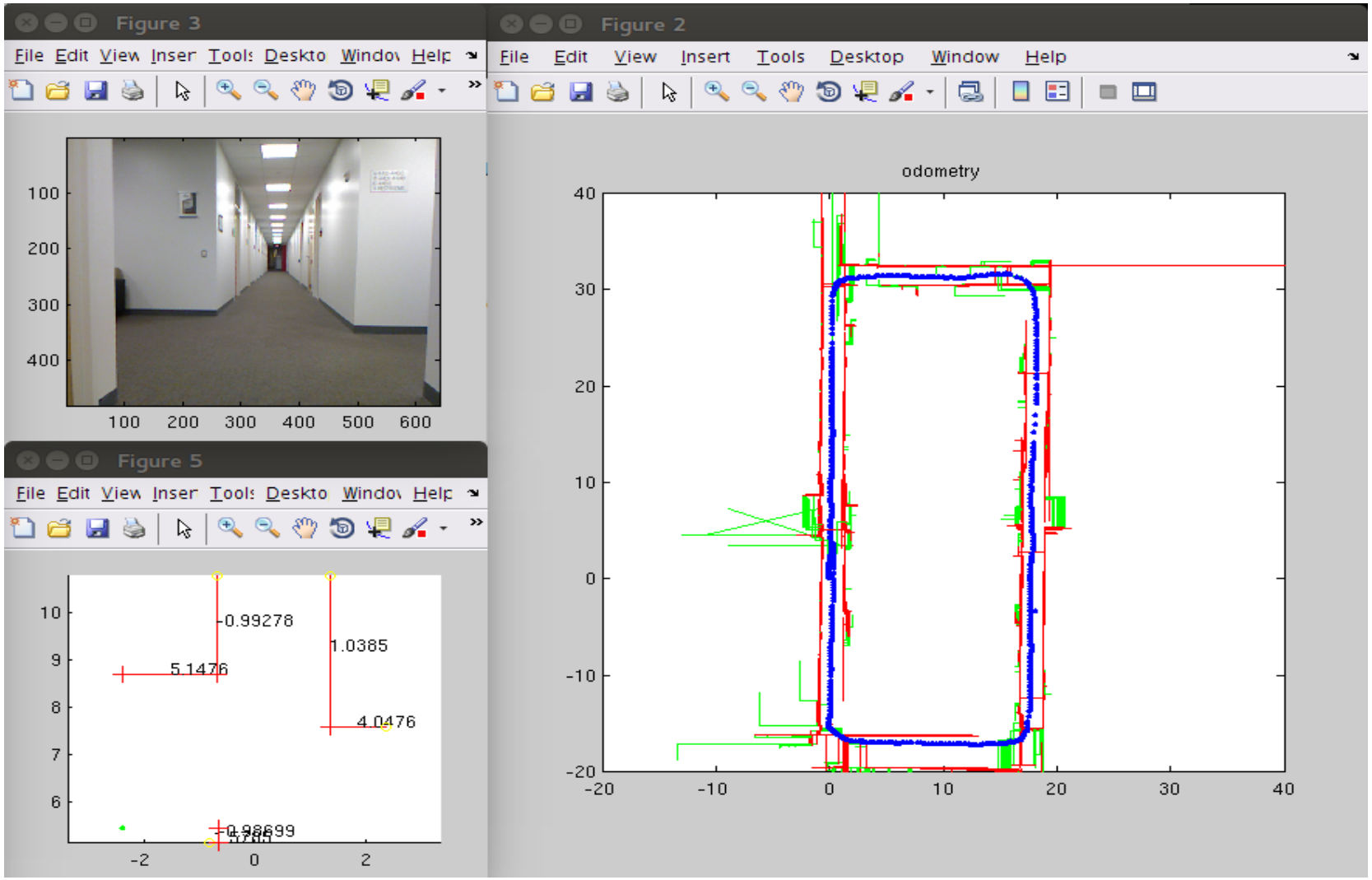
GraphSLAM in a Manhattan World

Translation estimation:

- Matching features between two frames using SIFT matching
- Estimate translation using RANSAC



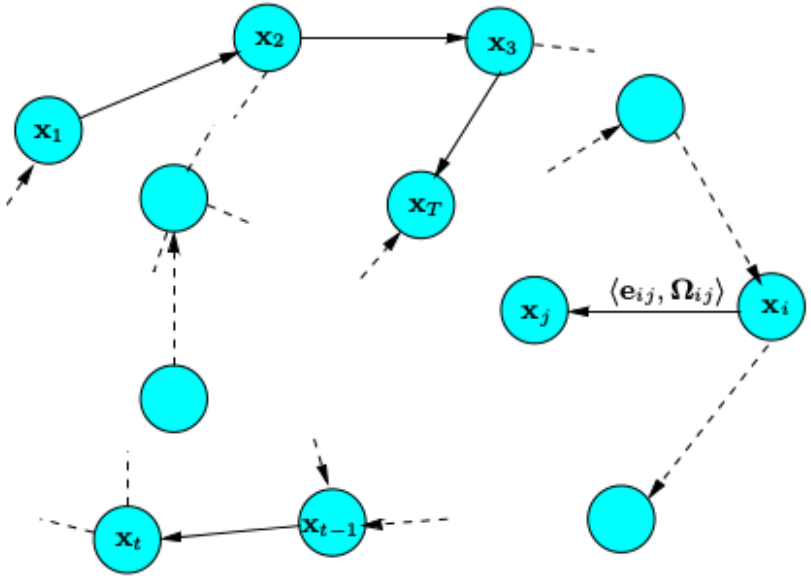
GraphSLAM in a Manhattan World



GraphSLAM in a Manhattan World

GraphSLAM to address the drift problem

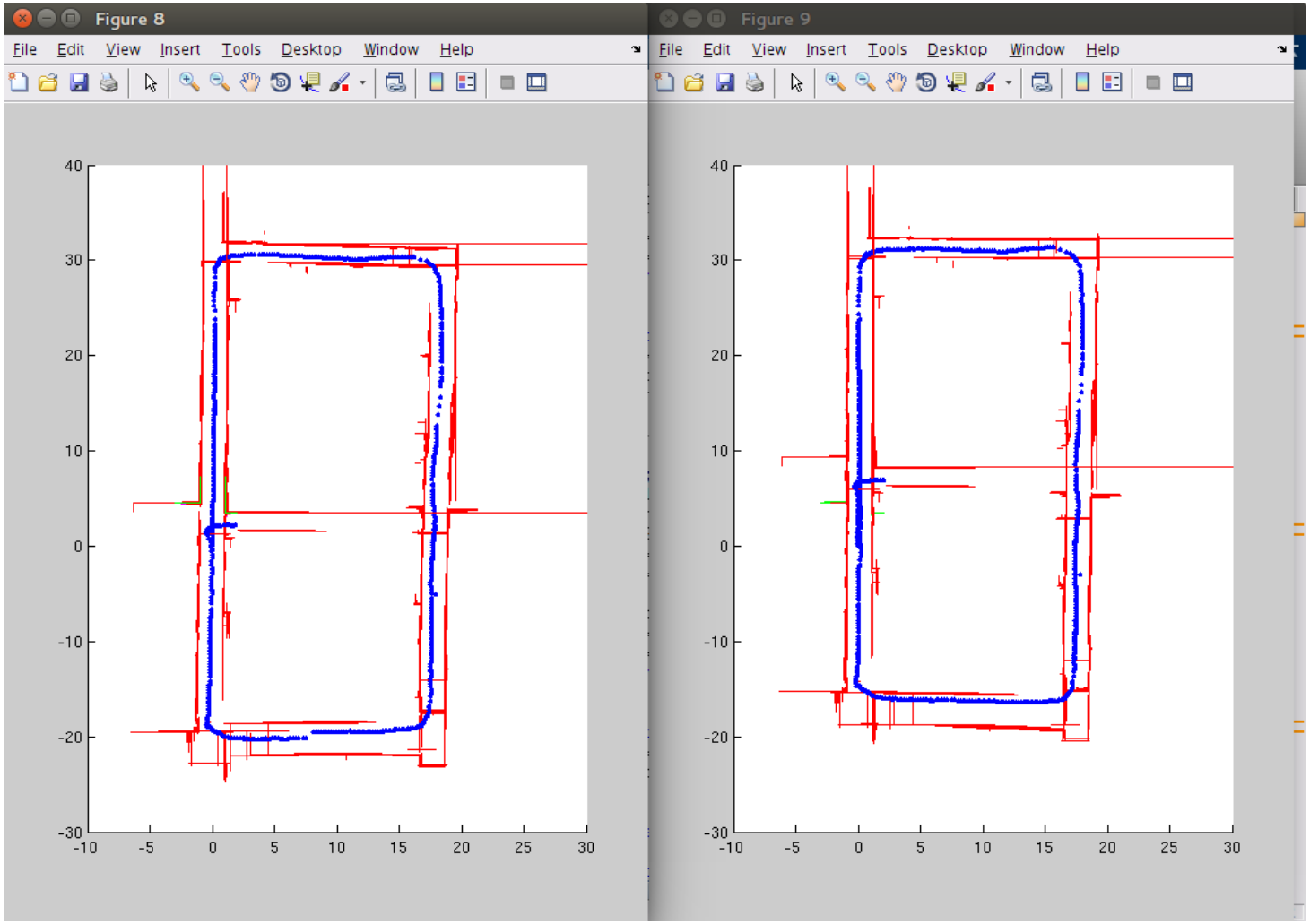
Optimize the whole trajectory based on the history of the robot motion and perception.



Correct the map when the robot detects a loop closure.

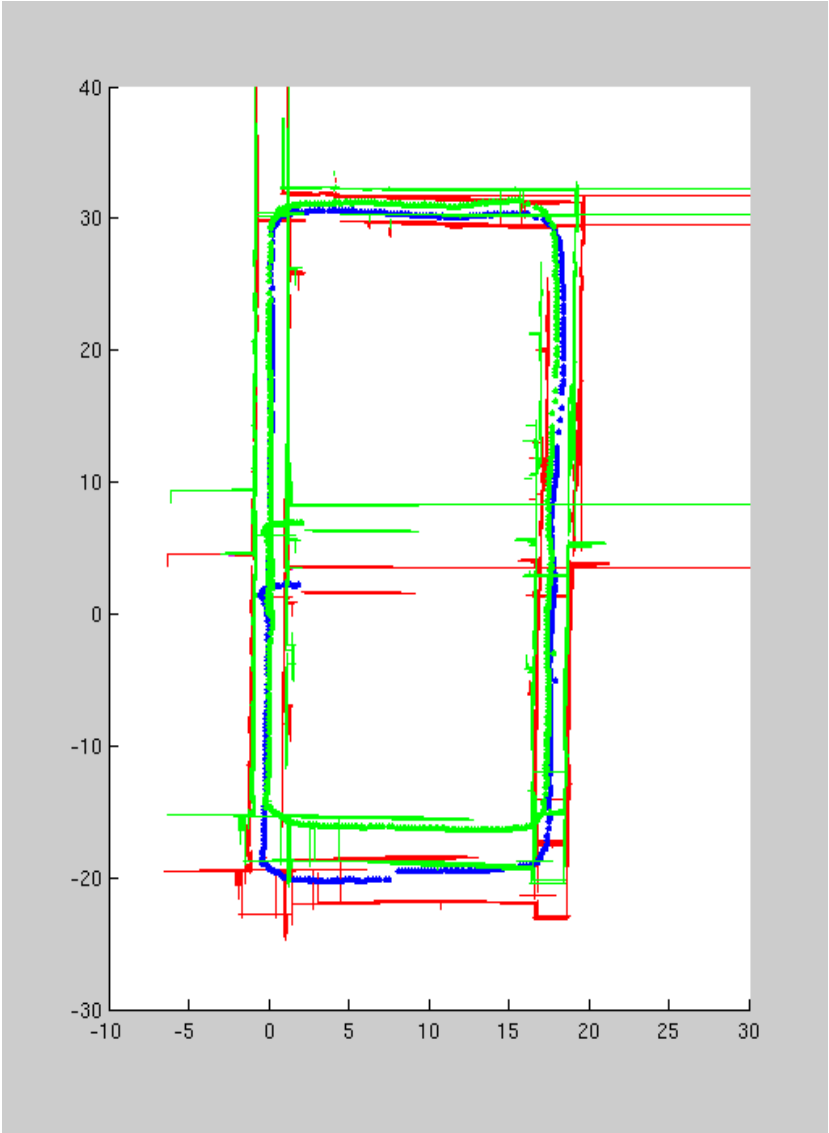
GraphSLAM in a Manhattan World

Results



GraphSLAM in a Manhattan World

Results



Final report

Your Final Project Paper On-A-Slide

- Abstract
  - Problem, gap, approach, key results
- Introduction
  - Broad problem and impact
  - "scientific gap" (what technical aspects have not yet been solved)
  - summary approach (should include reference to technical gap)
  - key results
- Approach
  - Background tutorial (if necessary)
  - Your technical innovation (might be multiple pages/sections, with repeated reference to scientific gap)
- Results
  - Data sets, simulator, implementation details
  - Empirical results (might be multiple pages)
- Related Work
  - Don't just say what's been done. Point out how prior work relates to yours and to the scientific gap you set forth in the intro.
- Summary/Discussions/Conclusion
  - Summary problem, approach, result, in past tense
  - Discuss open questions, promising research directions
- References

- It doesn't matter how you got there
  - "We tried A, it didn't work, therefore we tried B"
  - "B works. To see, let us consider an obvious alternative A, and show A does not work"
- Document your progress, not just achievement
  - "B works"
  - "B improves over A (current techniques) by X, which is important because of …"
- Resist the temptation to say everything you know.
  - A good paper makes one point, not two
  - A good paragraph makes one point, not two
  - (most points are only made in one paragraph, not too)

Completeness and Conciseness

- Provide Problem motivation
- Describe Significant application domains
- Introduce the State of the art/background material
- Use Consistent Notation
- Make sure your experiments match your claims
- Describe and motivate your measures for evaluation
- Pick informative title
- A picture is worth 1000 words
- Be concise! Get to the point!
- Run a spell and grammar checker
- Use terminology consistently
- Define abbreviations, avoid them if possible