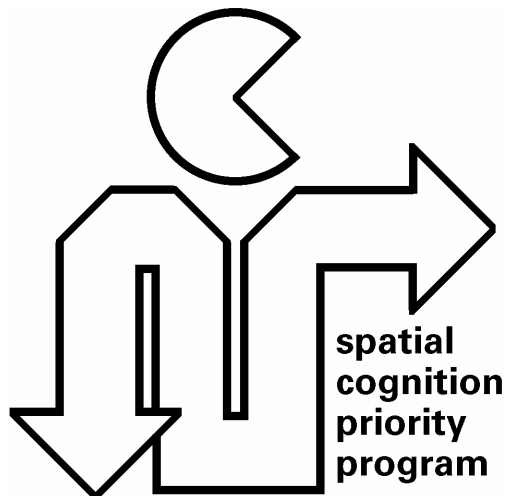


Route Navigation Using Motion Analysis

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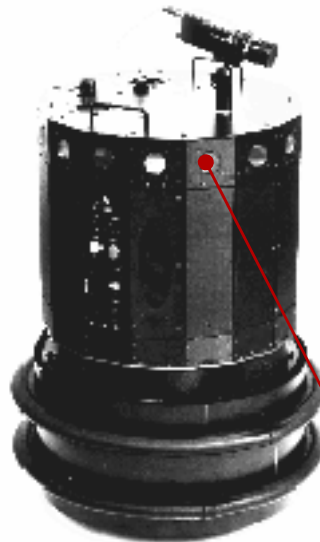
The Experimental Platforms

Rolland



ultrasound sensors

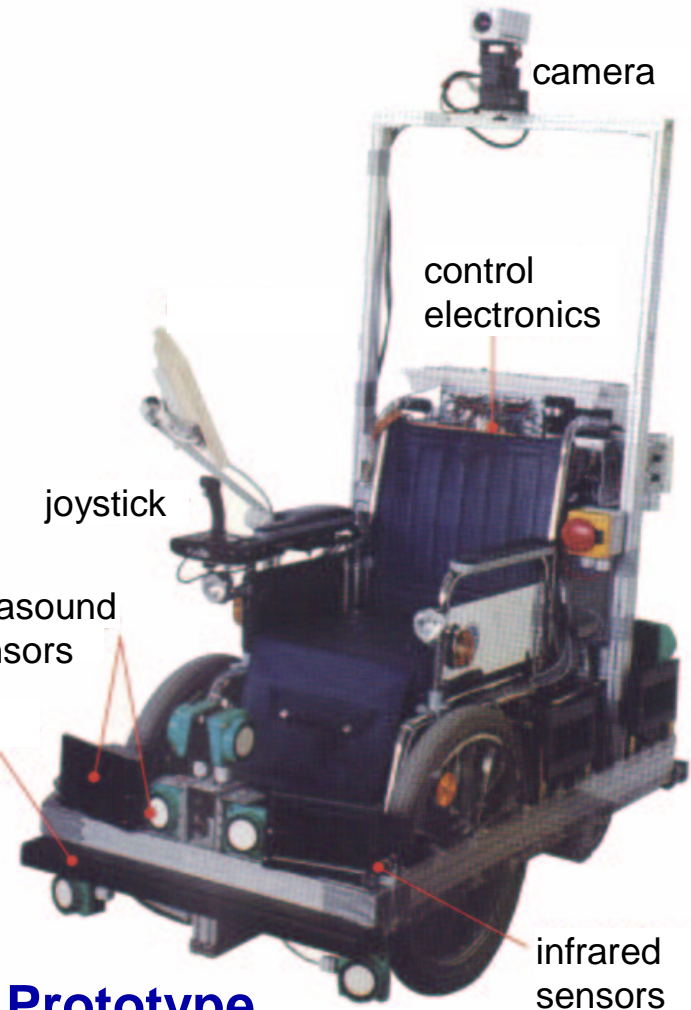
Nomad 200



ultrasound sensors
tactile sensors

joystick

1st Prototype



camera

control electronics

infrared sensors

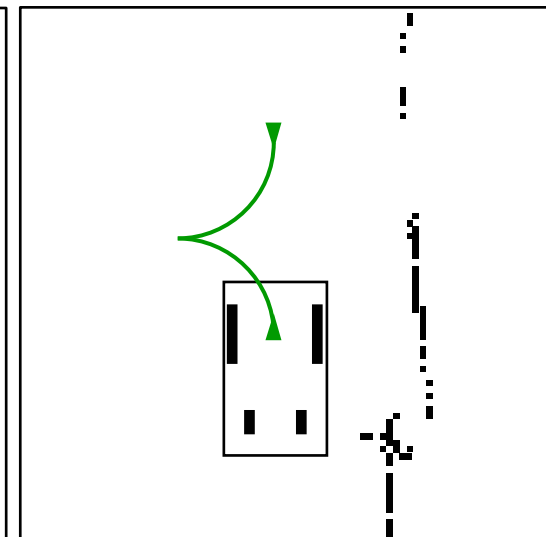
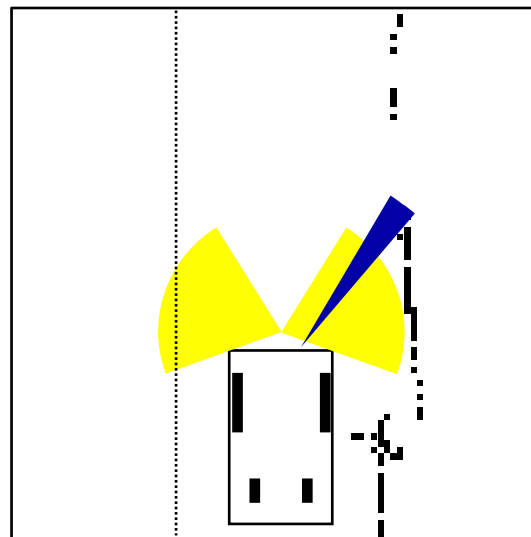
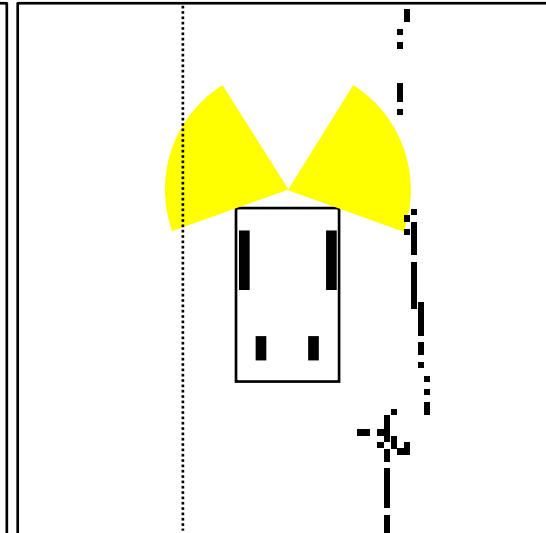
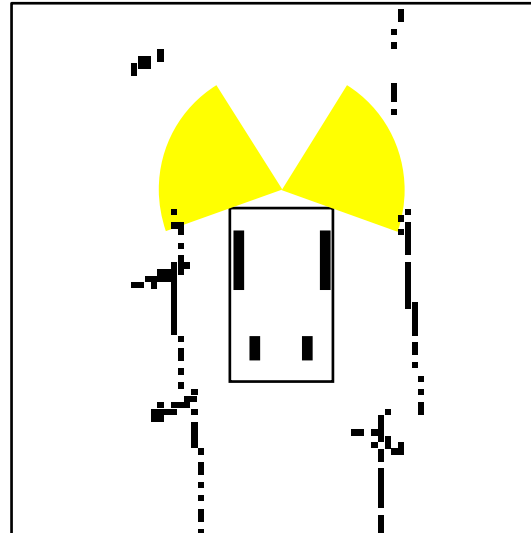
Basic Behaviors

Methods

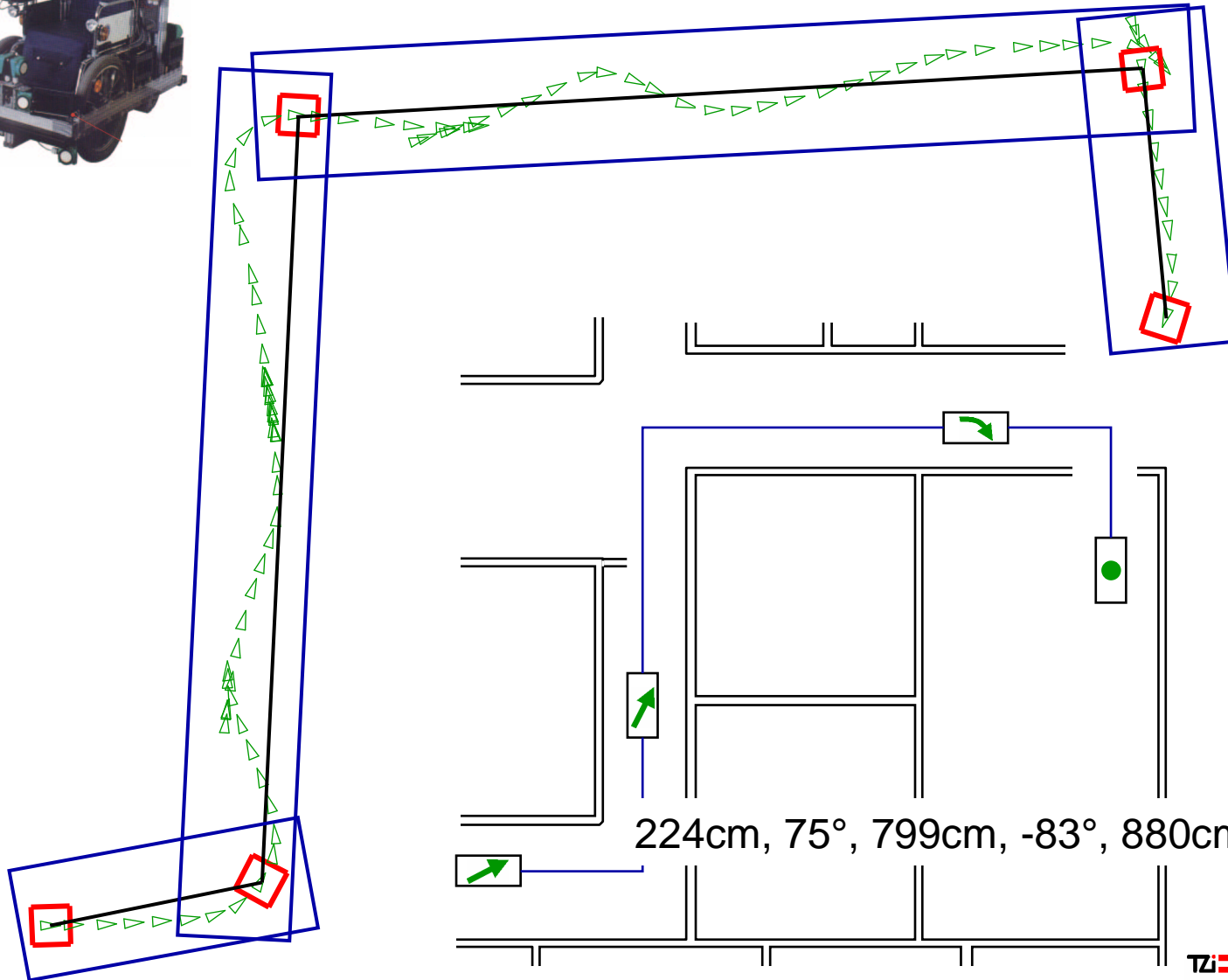
- Local Obstacle Map
- Virtual Sensors

Behaviors

- Forwards and Backwards
 - *Corridor-following*
 - *Wall-following left/right*
- Only Forwards
 - *Turning into the left/right door*
- Automatic
 - *Turning round*
- Miscellaneous
 - *Stop*

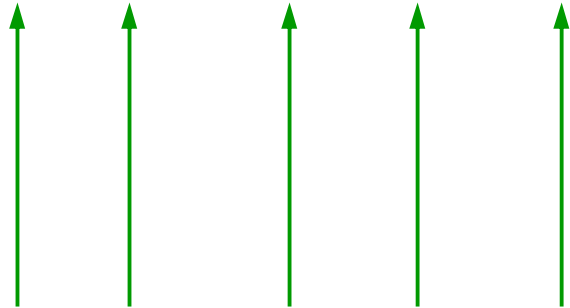


Incremental Generalization

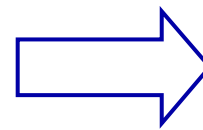


Matching Generalized Tracks

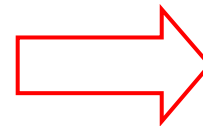
224cm, 75°, 799cm, -83°, 880cm, -87°, 260cm



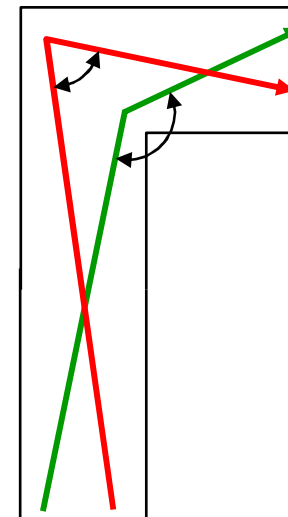
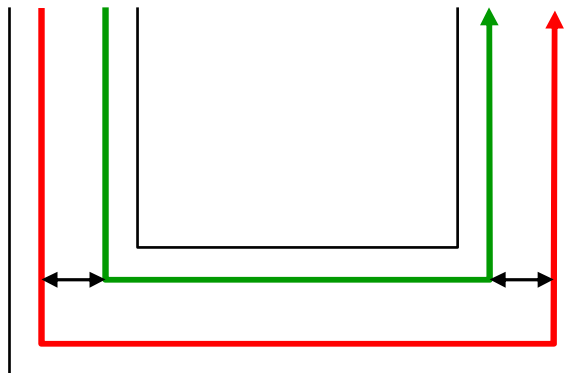
250cm, 85°, 750cm, -91°, 440cm



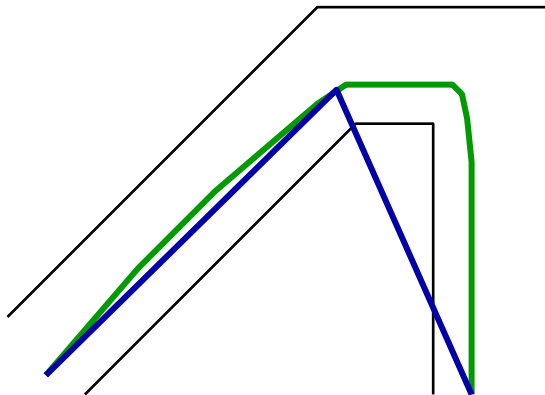
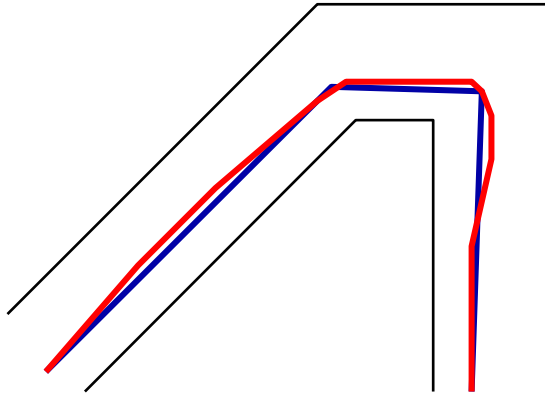
In the third segment,
440 cm from the last corner



The tracks are incompatible

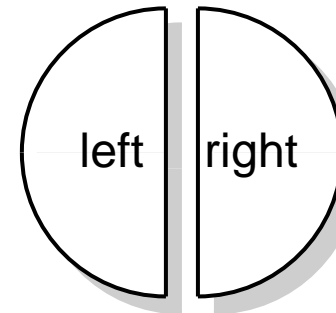
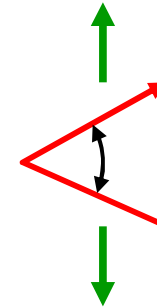
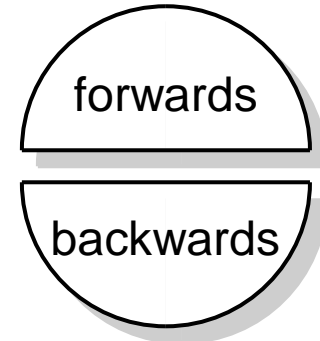


Compensating for Deviations



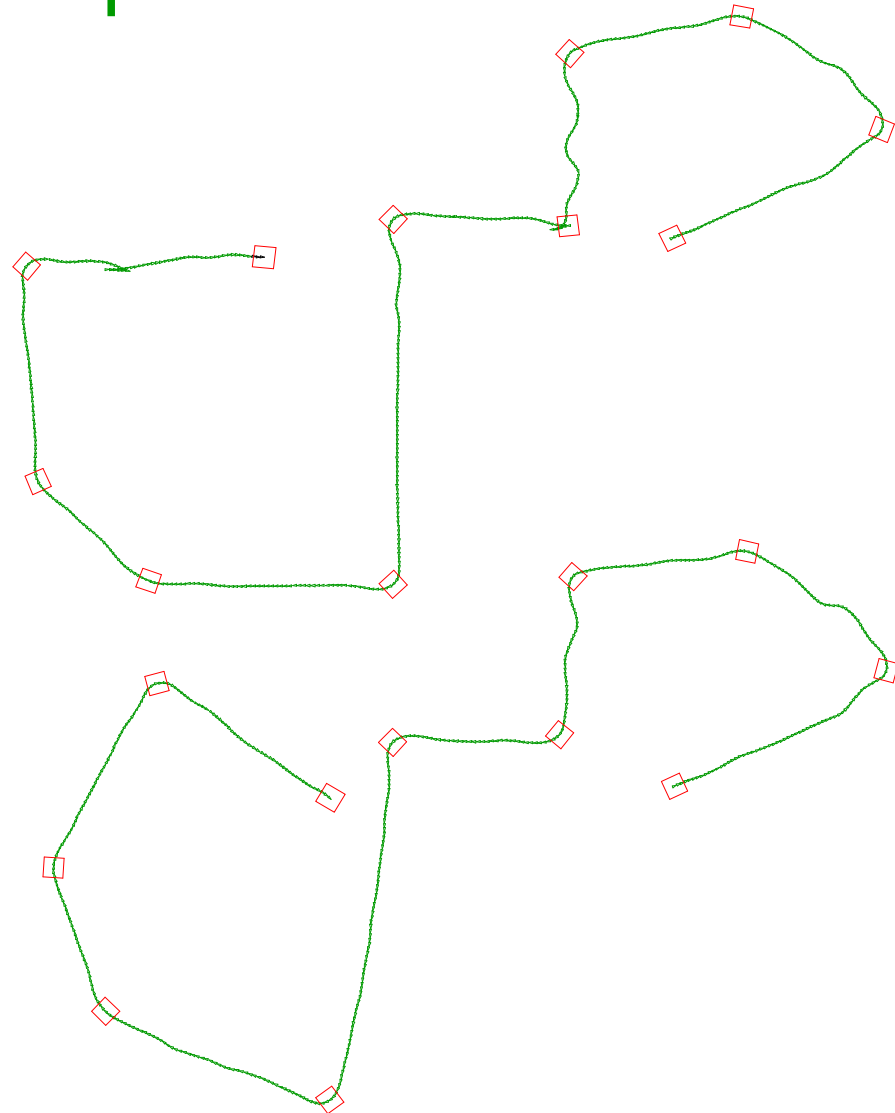
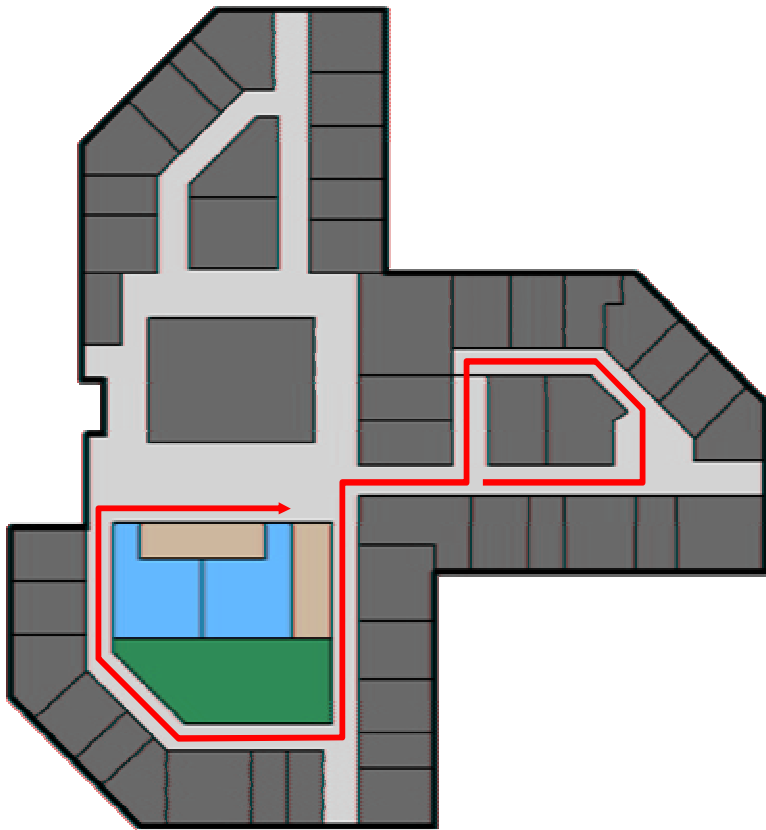
306cm, 45°, 150cm, 83°, 224cm

290cm, 130°, 520cm

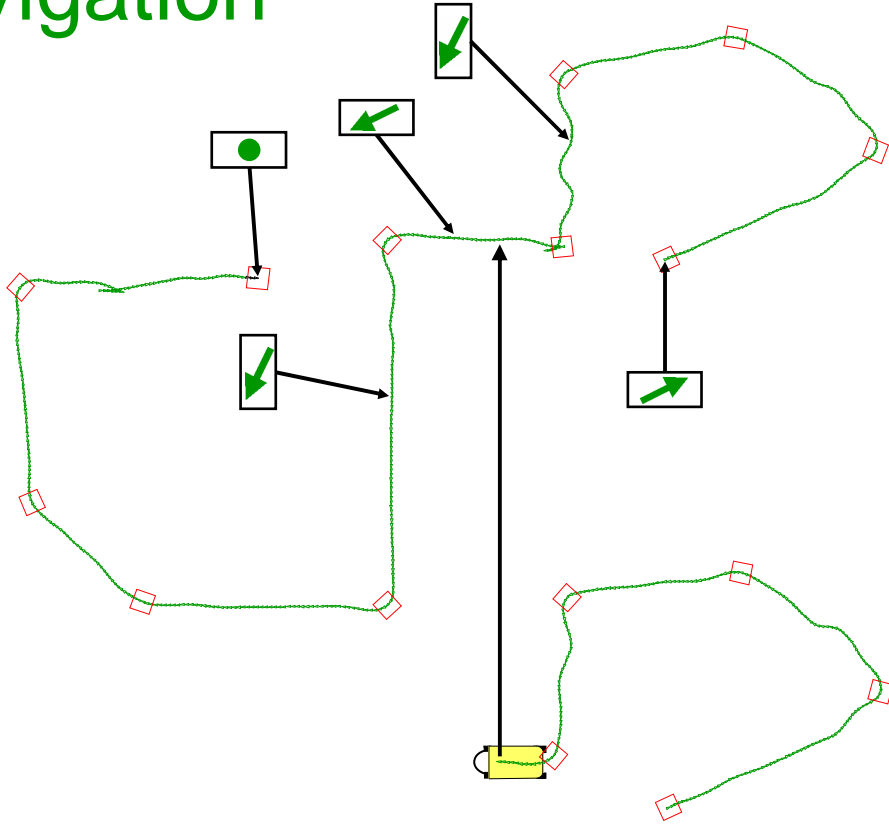
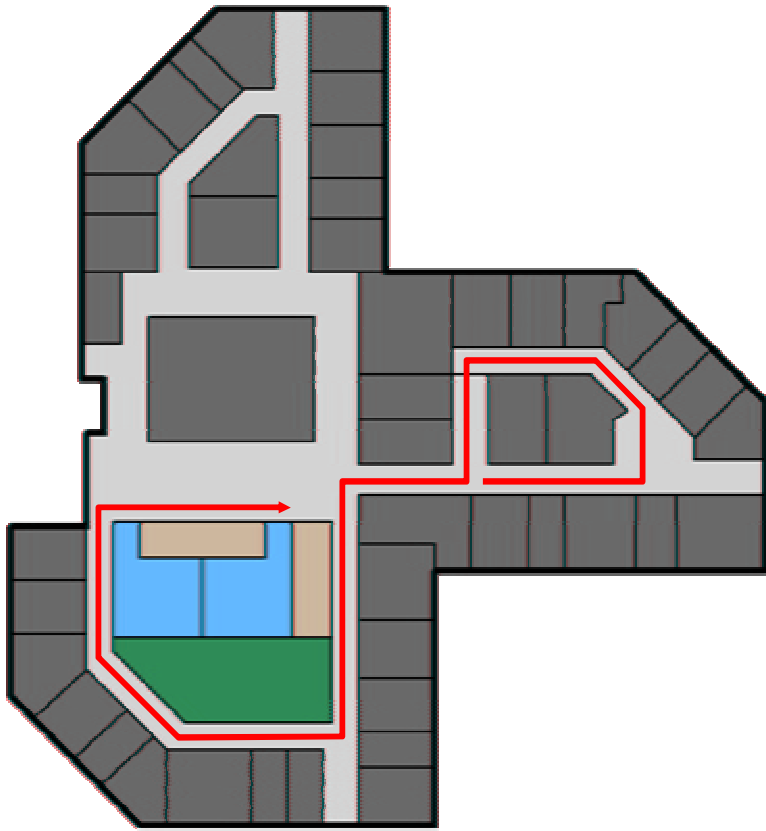




Examples

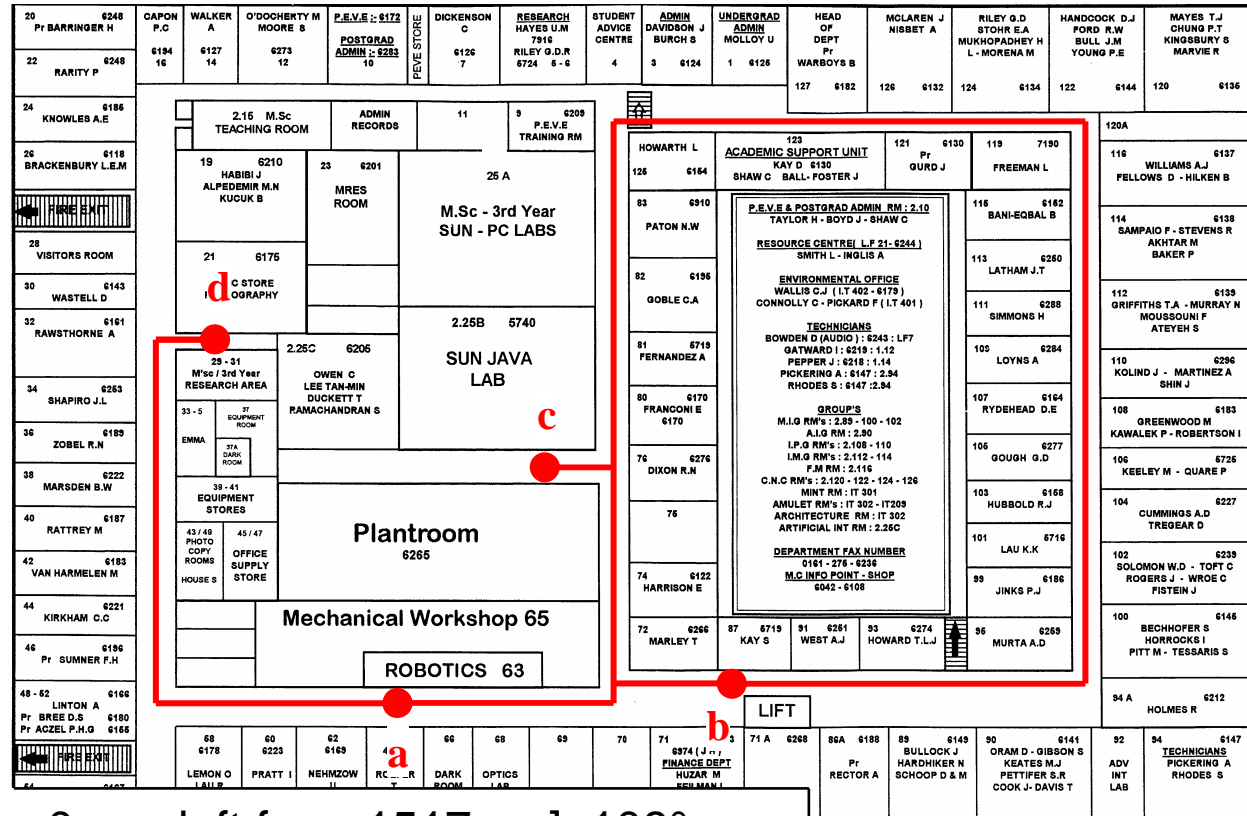


Navigation





Results



Example b-c

- 1963 cm [right from 0 cm, left from 1517 cm], 108°,
- 5474 cm [right from 2453 cm, left from 4748 cm], 102°,
- 3215 cm [right from 647 cm, left from 2895 cm], 98°,
- 2983 cm [right from 539 cm], 83°,
- 516 cm [stop at 448 cm]

Demonstration



Outlook

Self-Localization in Route Graphs

- Probabilistic Approach

Integration of Landmarks

- Visual
- Ultrasound

