4SC020 Embedded Motion Control – Initial design

Group 4

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Requirements

- PICO should be able to execute all desired tasks autonomously
- PICO should be able to execute its task independent of starting conditions
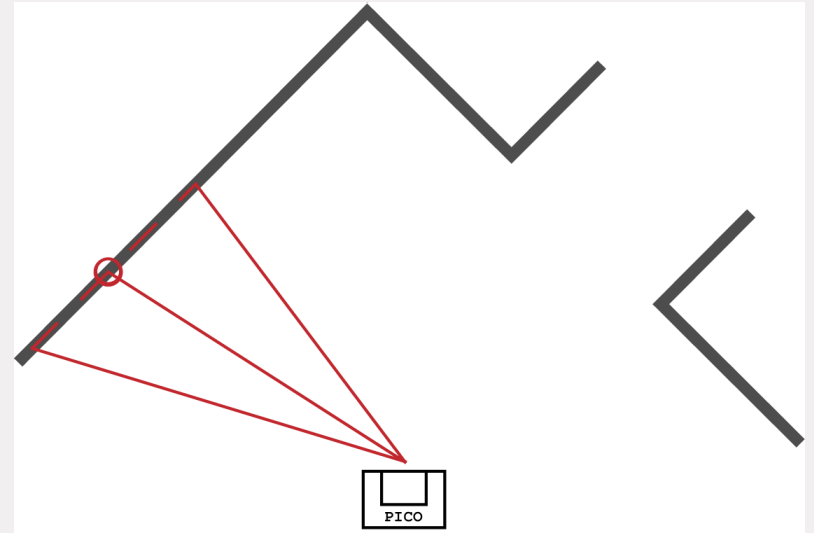- PICO should be able to recognize objects and features

Functions

- Data acquisition
- Data processing
- Target definition
- Trajectory generation
- Actuation
- Obstacle avoidance
- Data logging

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Functions

Data processing – Wall detection

- Split/merge algorithm
- Combine adjacent walls

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Functions

Data processing – Exit recognition

- Corners between walls

- Orientation

- Distance

scanning direction

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Functions

Data processing – Example

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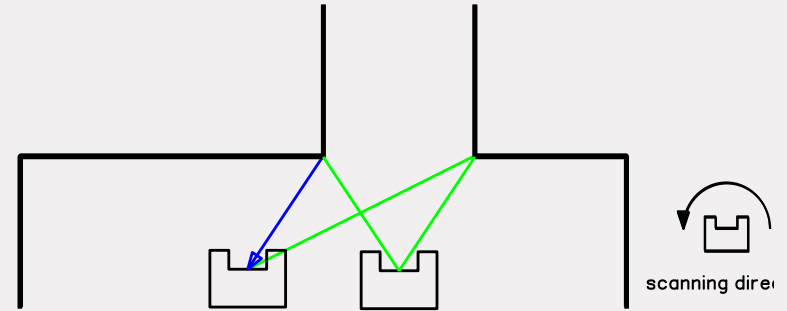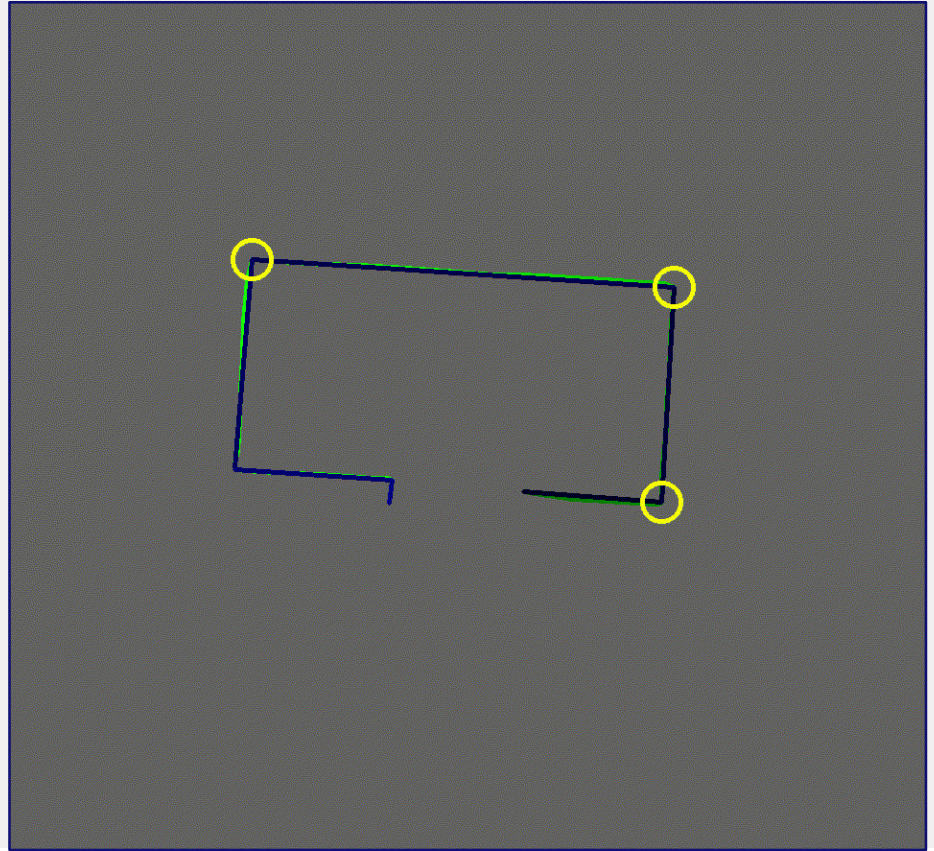
Functions

Target definition

- Input: corners of exit

- Output: target location and orientation

- 1m in front of exit

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Functions

Trajectory generation

- Input: target location and orientation
- Output: desired velocities
- Linear acceleration
- Deceleration based on distance

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Goals

- More robust robot vision
  - Identify moving objects
  - More generic
- Optimized trajectory generation
  - Automatic based on boundary conditions
  - Updating during movement
- Smooth movements
  - No step in acceleration
- Obstacle avoidance
  - Override trajectory in emergency
  - Supplement trajectory generation
- Finite state machine
  - Minimal states
  - All bases covered

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Fin.

Questions?

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