

Group 3

Ruxandra Bobiti

Royce Luo

George Rascanu

Alexandru Pustianu

Tsvetan Baliovsky



TU/e Technische Universiteit
Eindhoven
University of Technology

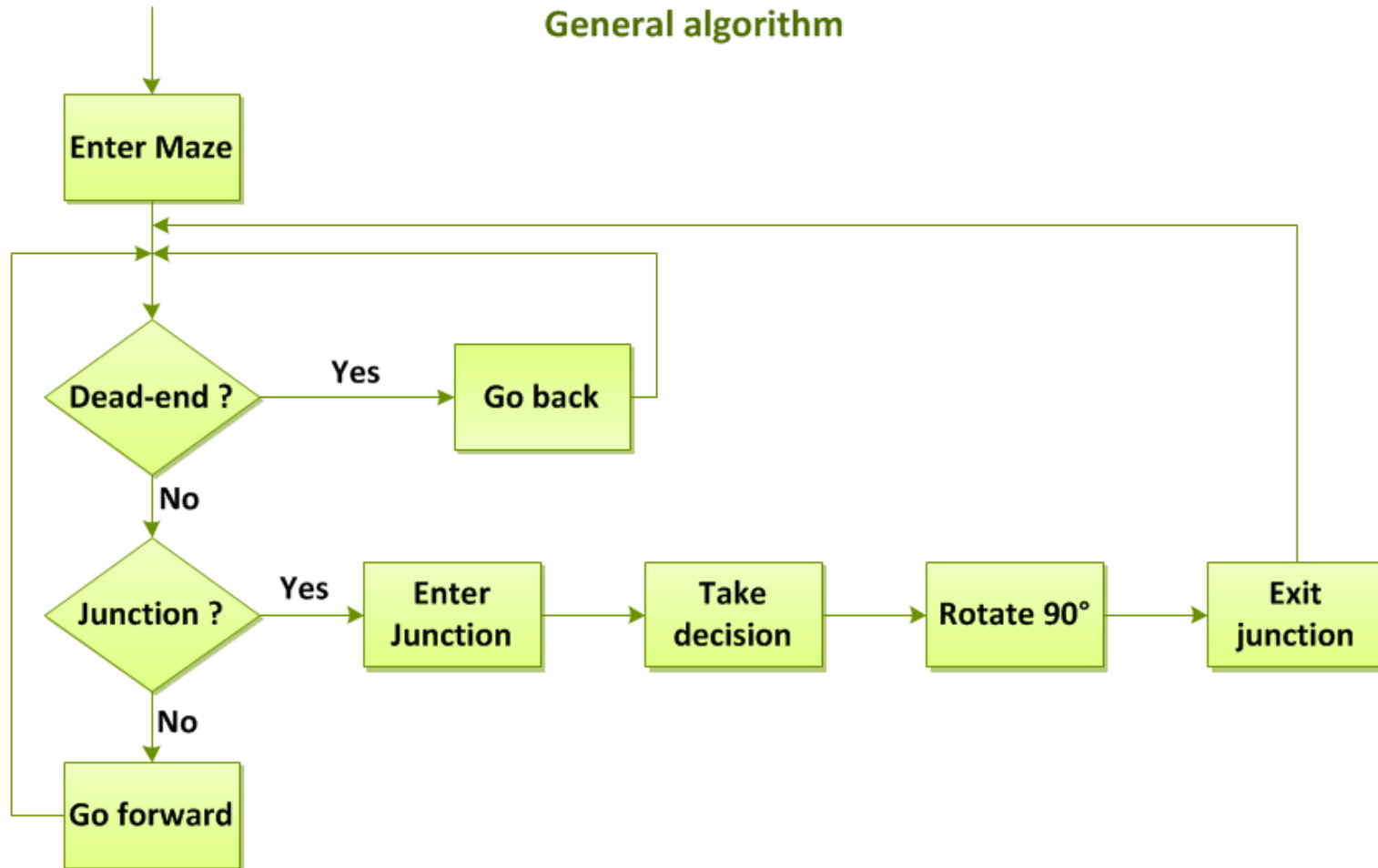
Where innovation starts

Contents

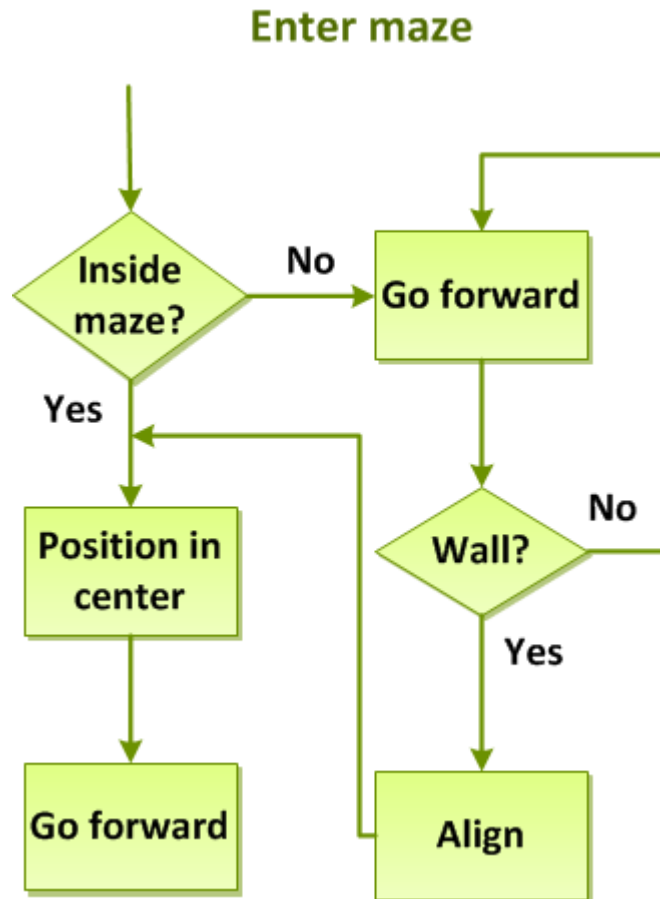
- Code structure
- Robot control
- Image recognition
- Positives and drawbacks

Code structure

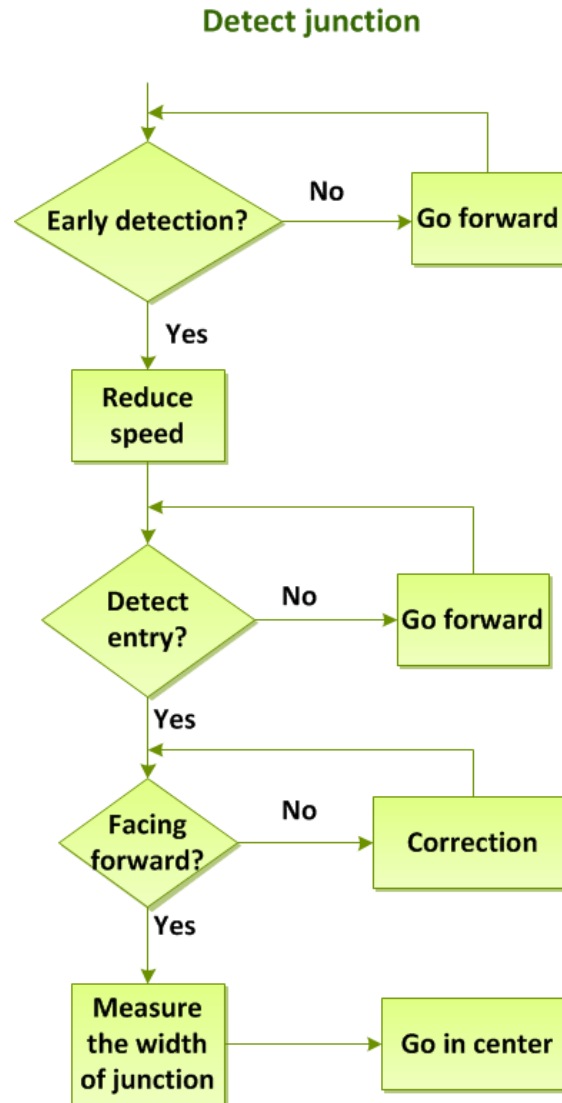
General algorithm



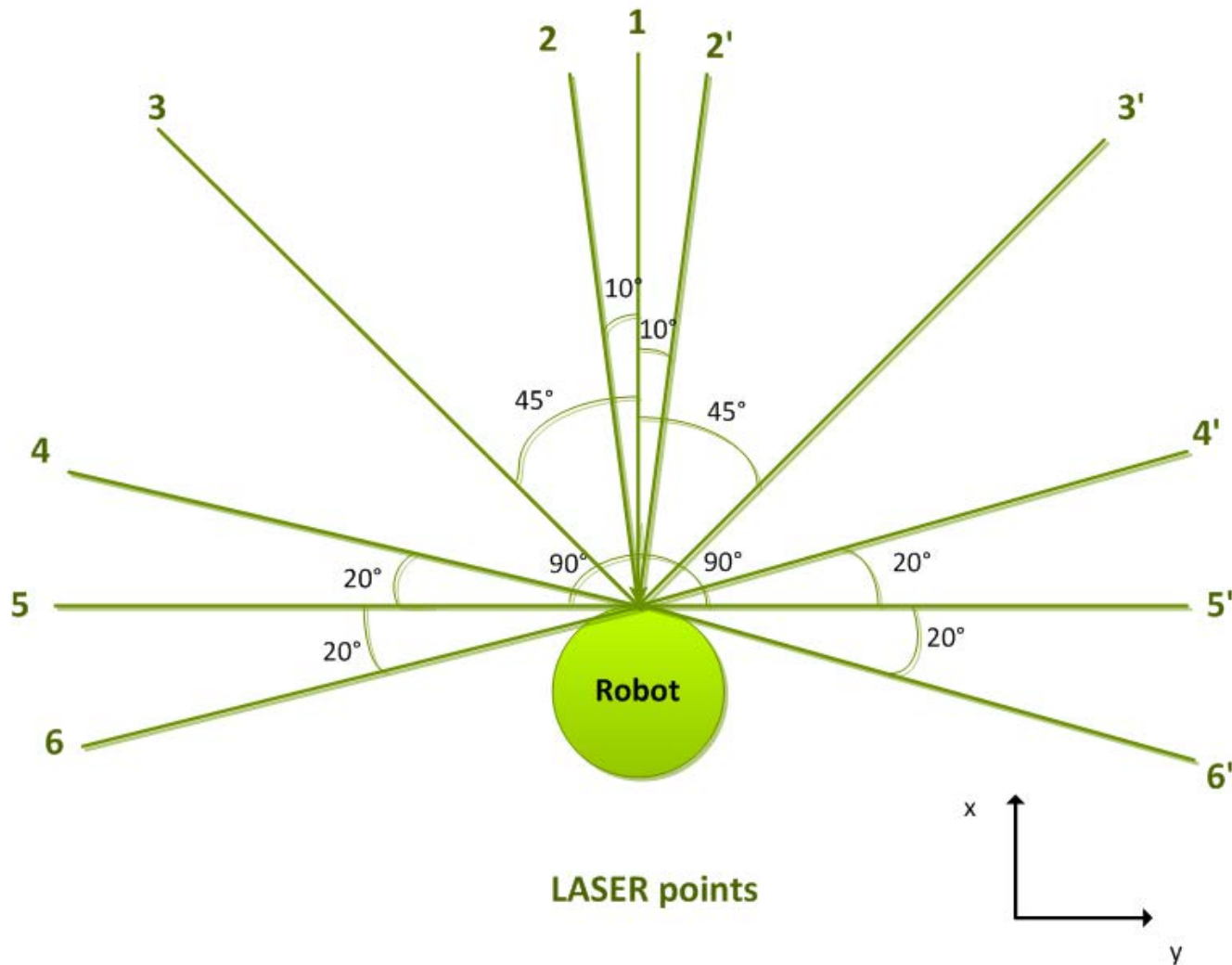
Code structure



Code structure

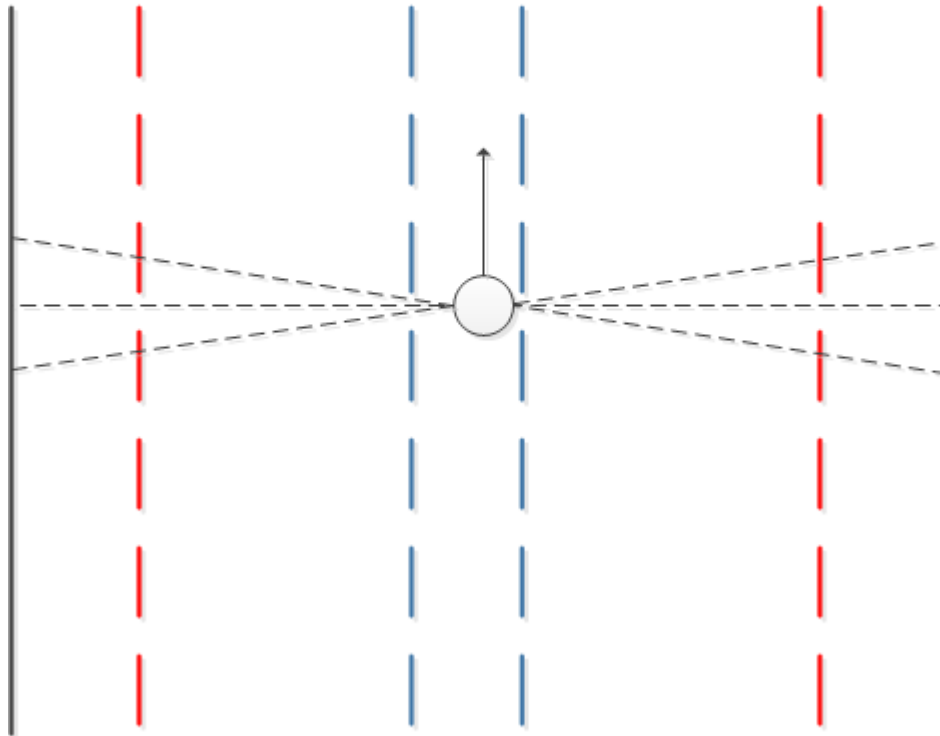


Robot Control



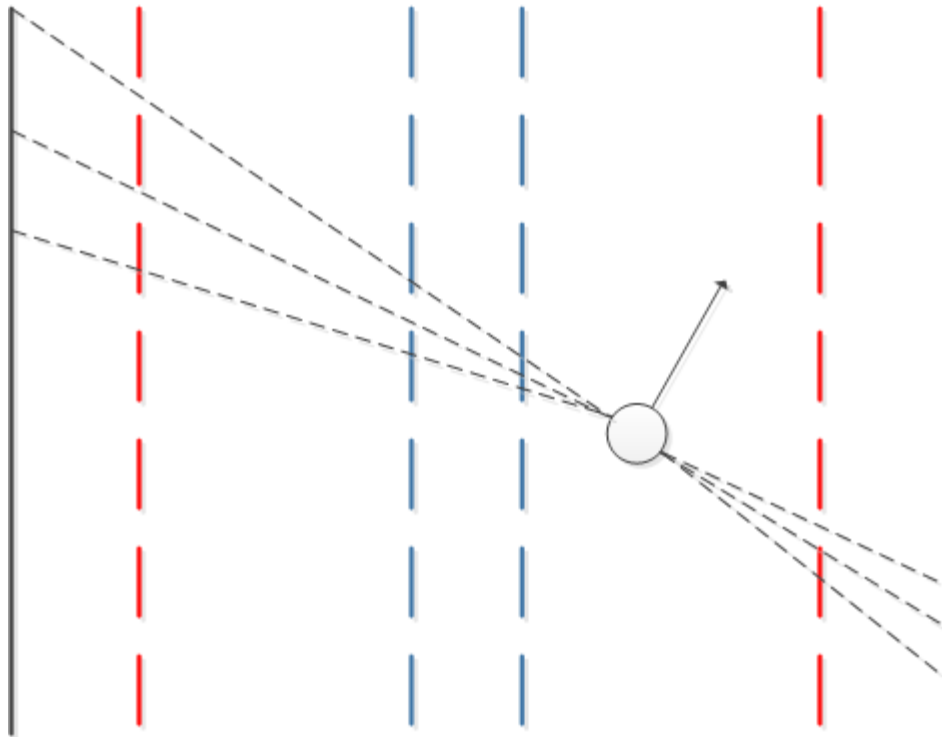
Robot Control

Go forward while in center



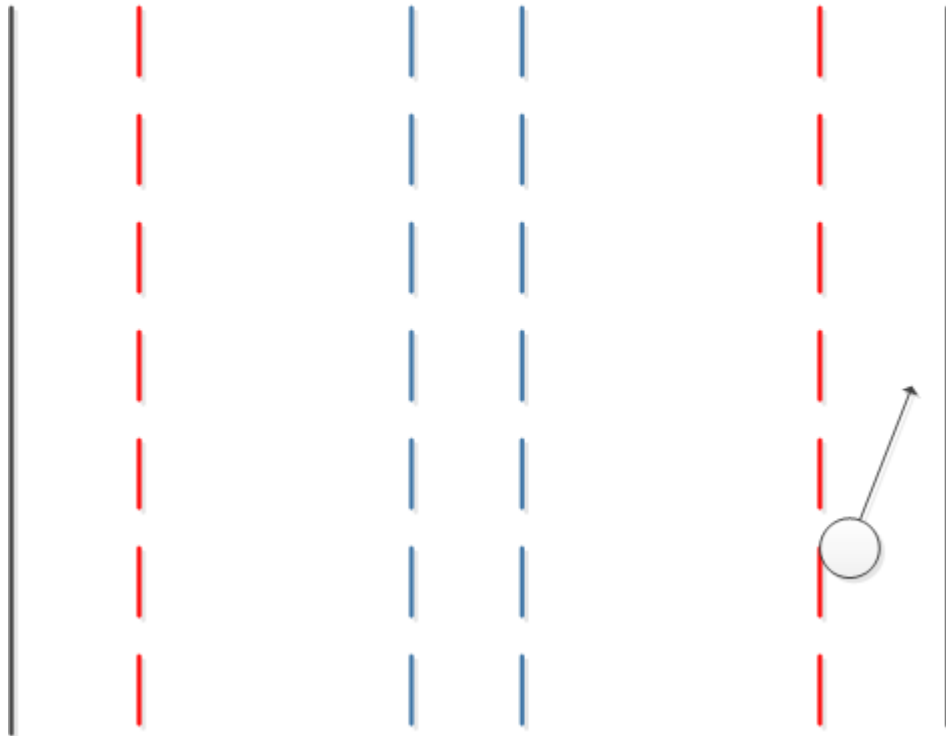
Robot Control

Go forward while in
outside center



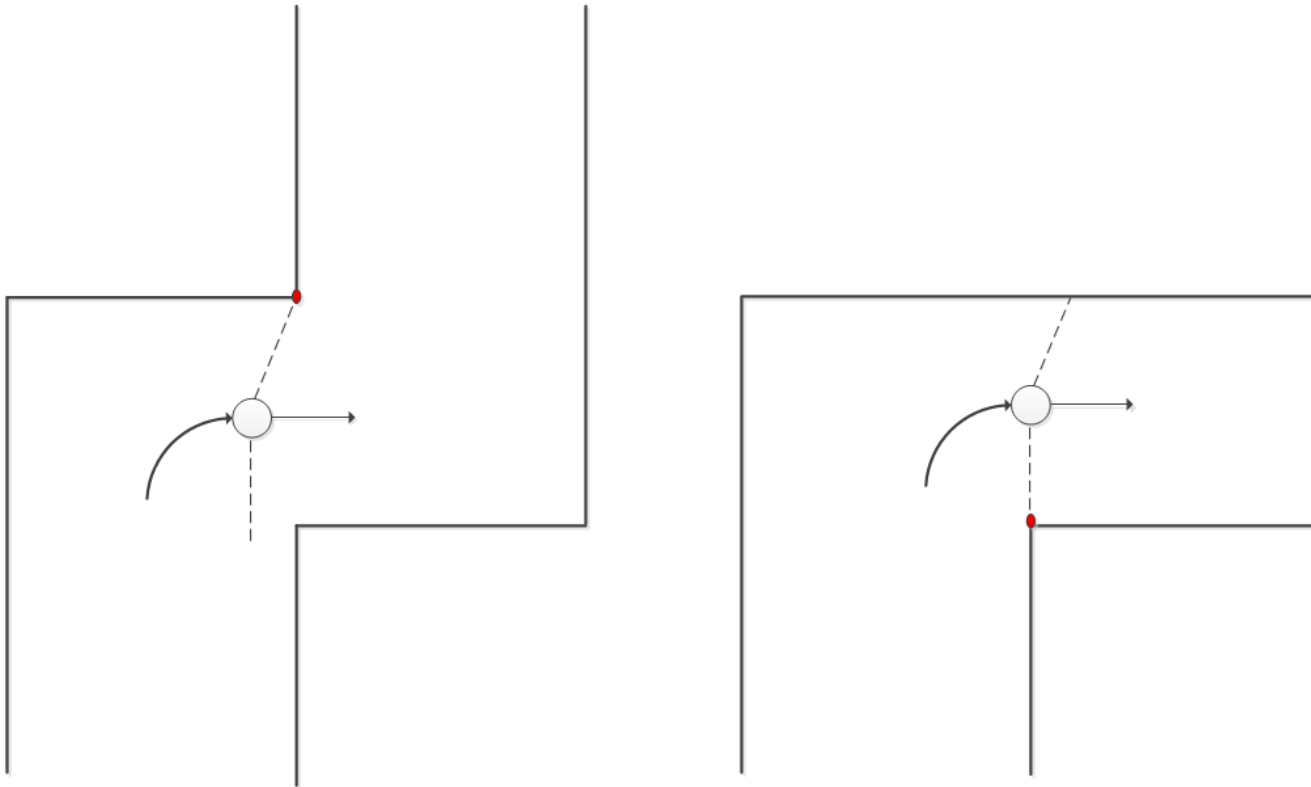
Robot Control

Go forward in critical zone



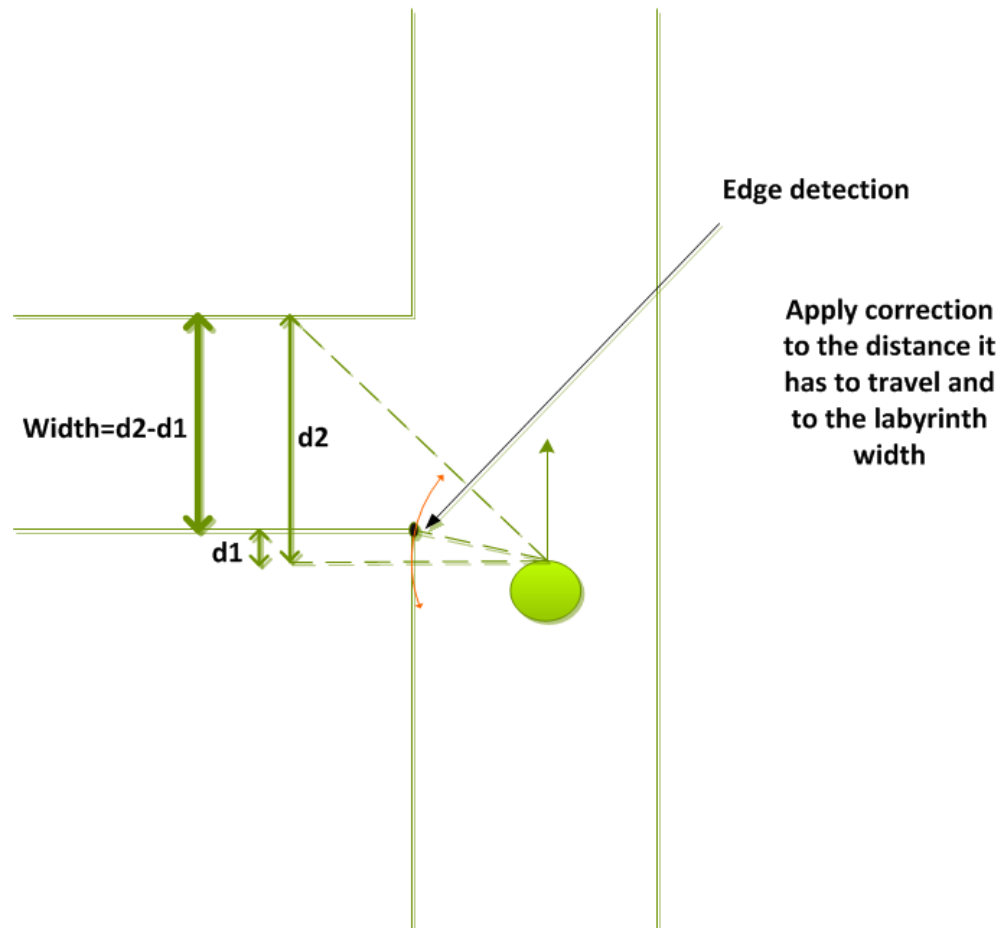
Robot Control

Detect exit of junction



Robot Control

Measure the width of the junction

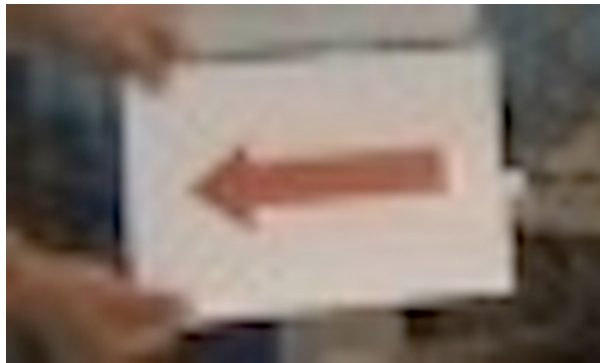


Robot Control

- **90 degrees rotation**
 - Odometry data for initial rotation
 - Lasers for applying correction
 - Smooth acceleration to eliminate the drift from the rear wheels

Image recognition

- **Binary map Vs. Contour plot**
- **Low resolution (320 X 240)**
- **Larger detection range**
- **'Fish-eye' effect**



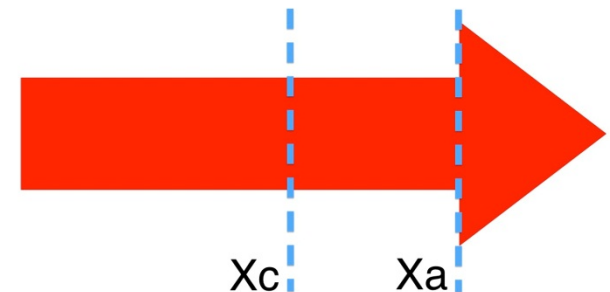
Detecting Algorithm

1. Detect red color
2. Form binary map
3. Remove noise points
4. Tell arrow's direction



$$Xc = \frac{1}{N} \sum_{i,j} P_i(x_{i,j}),$$

$$Xa = \max_i \sum_j P_i(x_{i,j})$$



Positives

- **Good forward control**
- **Robust junction entry and exit identification**
- **Smooth acceleration and deceleration**
- **Using lasers to apply correction whenever there is a reference**
- **Accurate and robust arrow detection**

Drawbacks

- **No map of the labyrinth is being created**
- **Rotation in junctions relies heavily on odometry- source of error if no laser reference is available**

Questions?