# MRC Hospital challenge – Group 6

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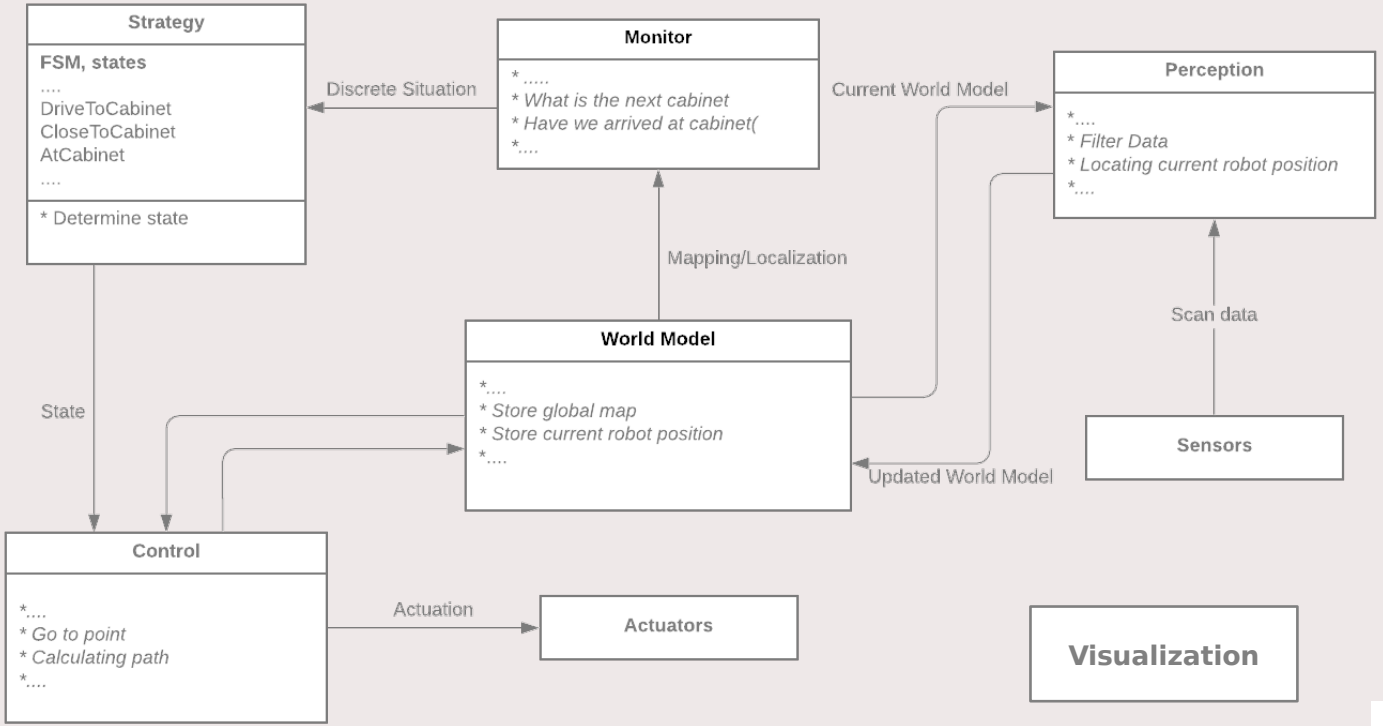
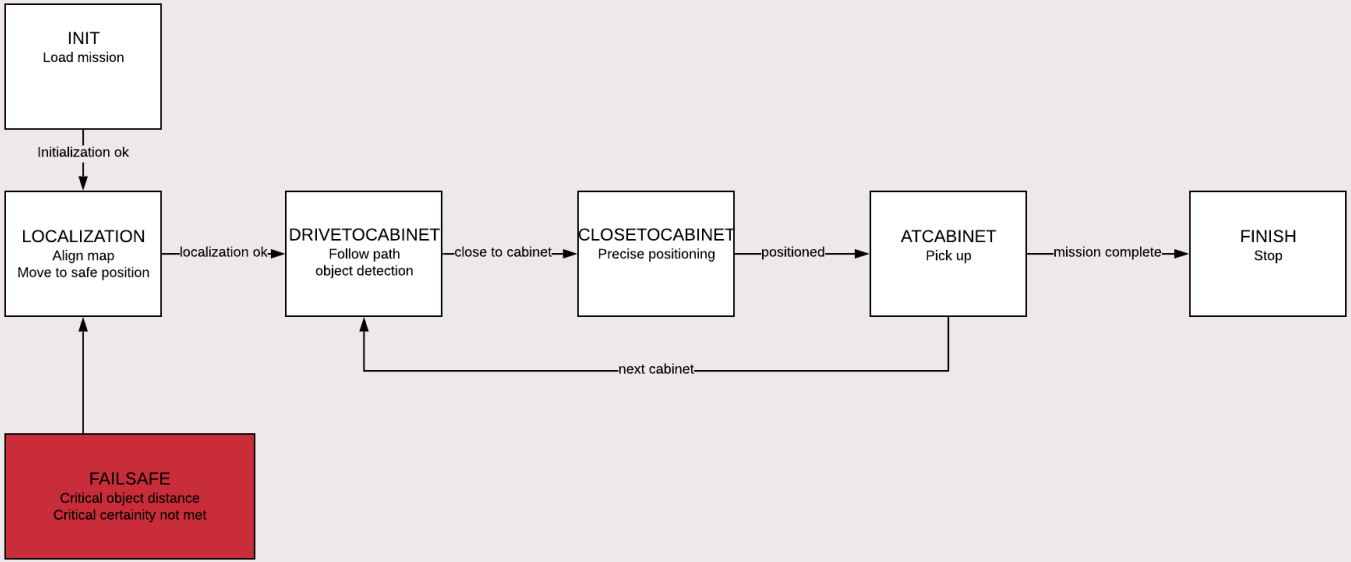
# Information Architecture



# Monitor and Strategy

- State machine to distribute tasks
- Guards are determined in monitor



# Perception

Global localisation using **Monte Carlo Particle filter**

- Not limited to parametric distributions
- Outperforms histogramfilter and is more easy to implement
- Update with odometry data and adding more uncertainty to account for drift

**Feature-based** sensor model

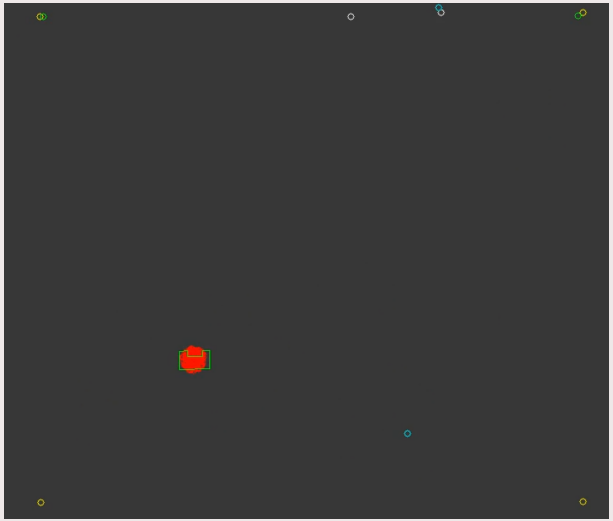
- Convex and concave corners as features

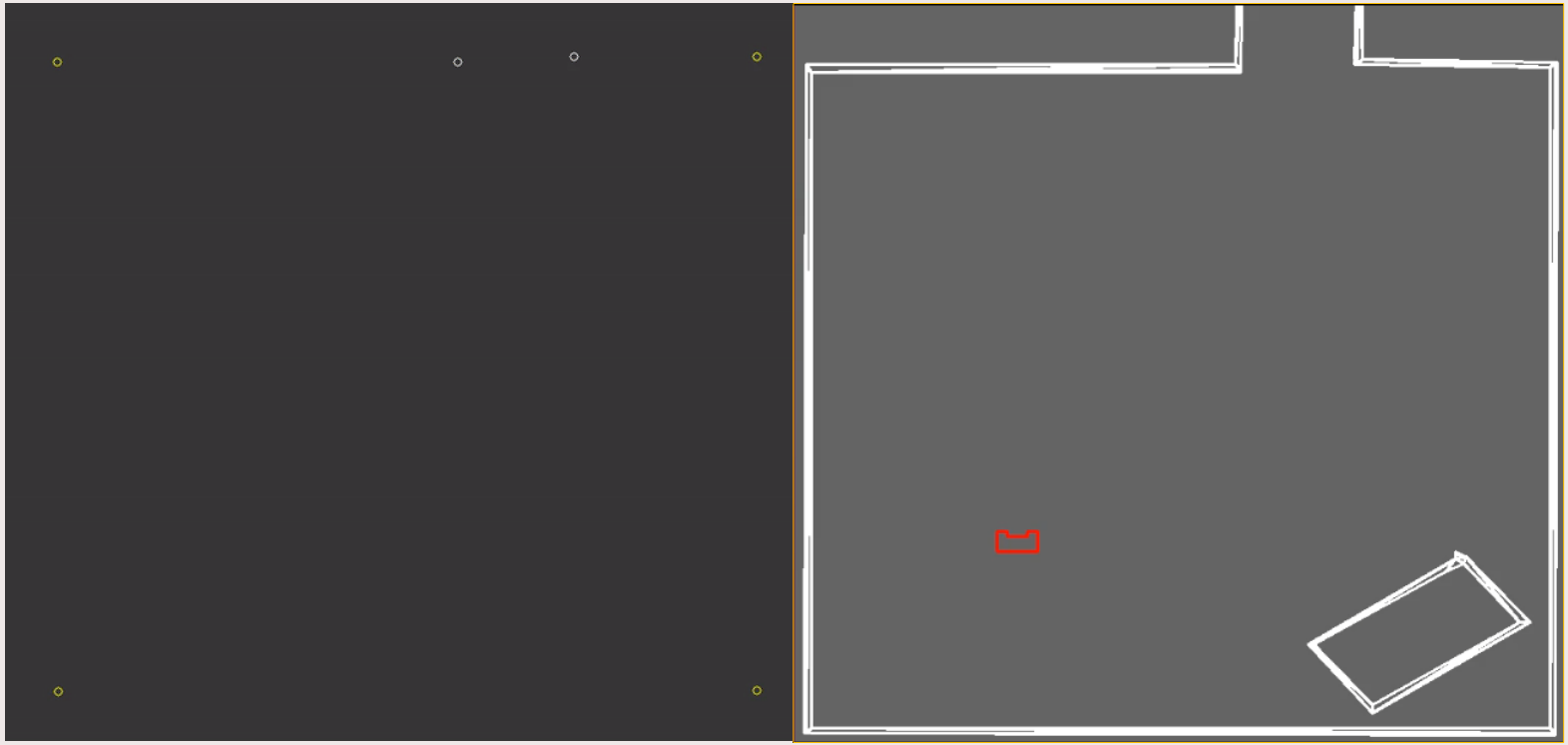
*Observed convex* corner

*Observed concave* corner

*Mapped convex* corner

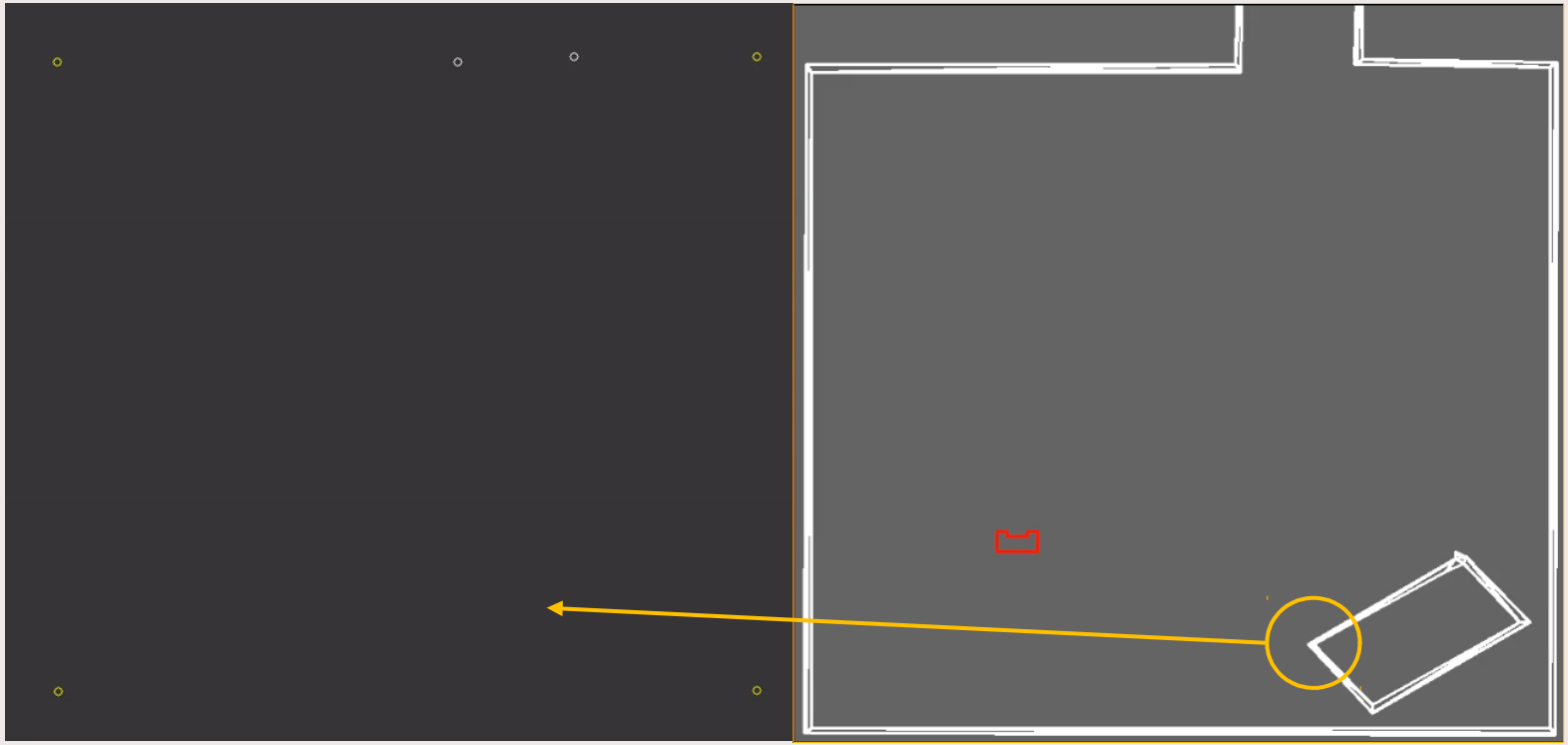
*Mapped concave* corner





*PlotGlobalWorld()*

*emc-sim*



*PlotGlobalWorld()*

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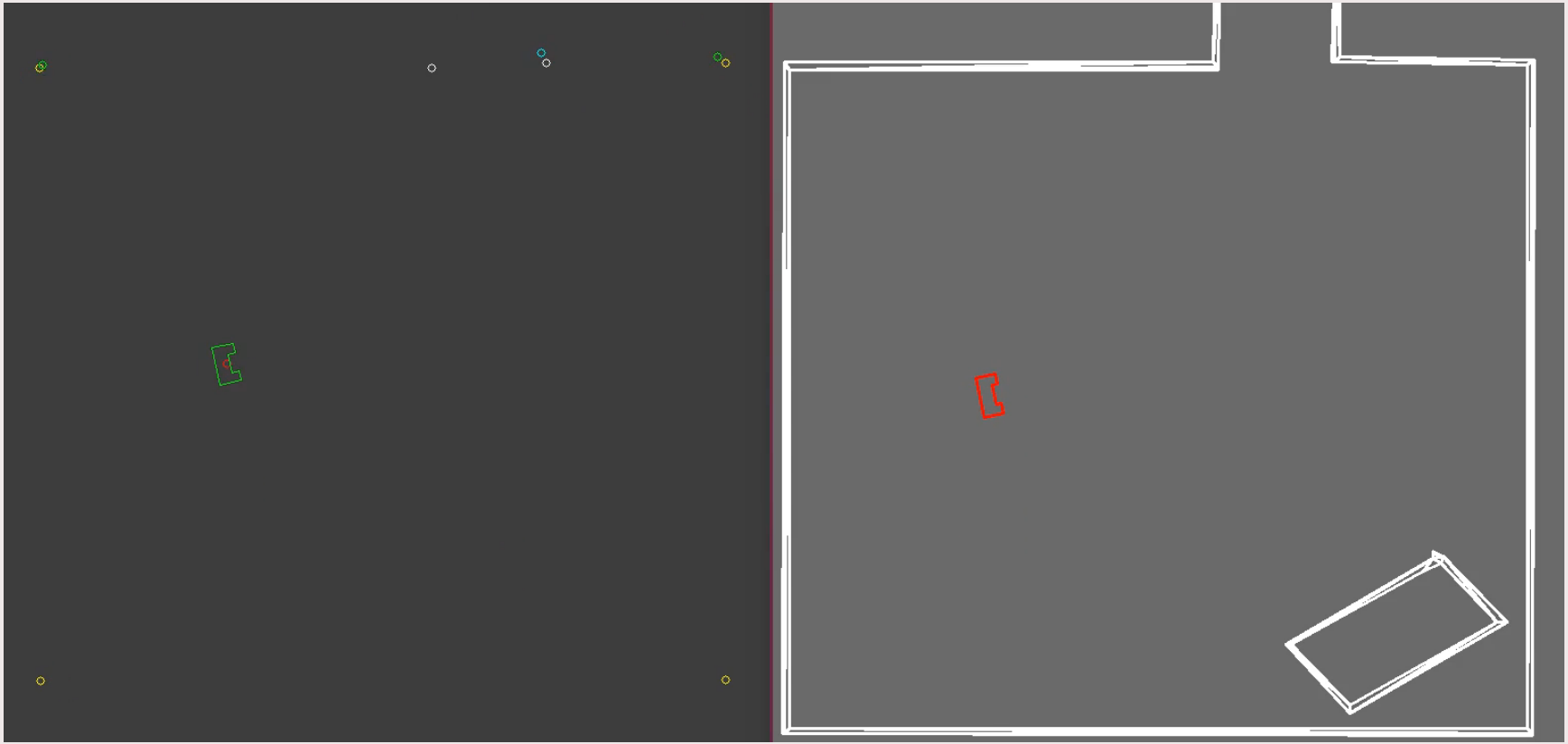


*PlotGlobalWorld()*

*emc-sim*

# Worldmodel

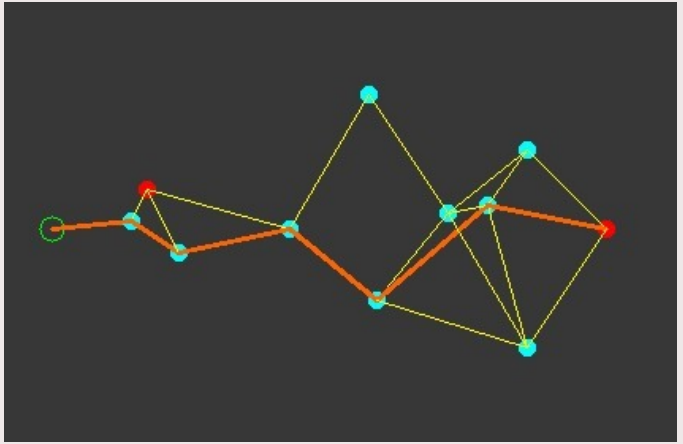
- Stores global and local world models

*plotLocalWorld()* *emc-viz*

# Control

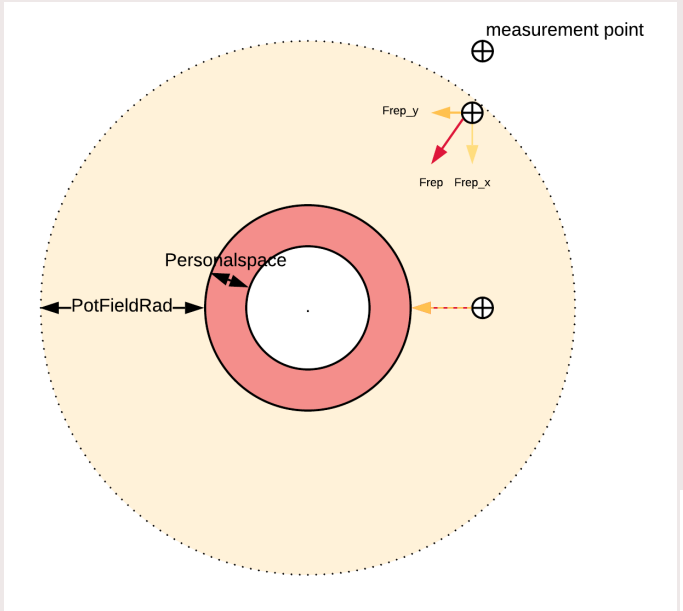
## Global path planning - A*

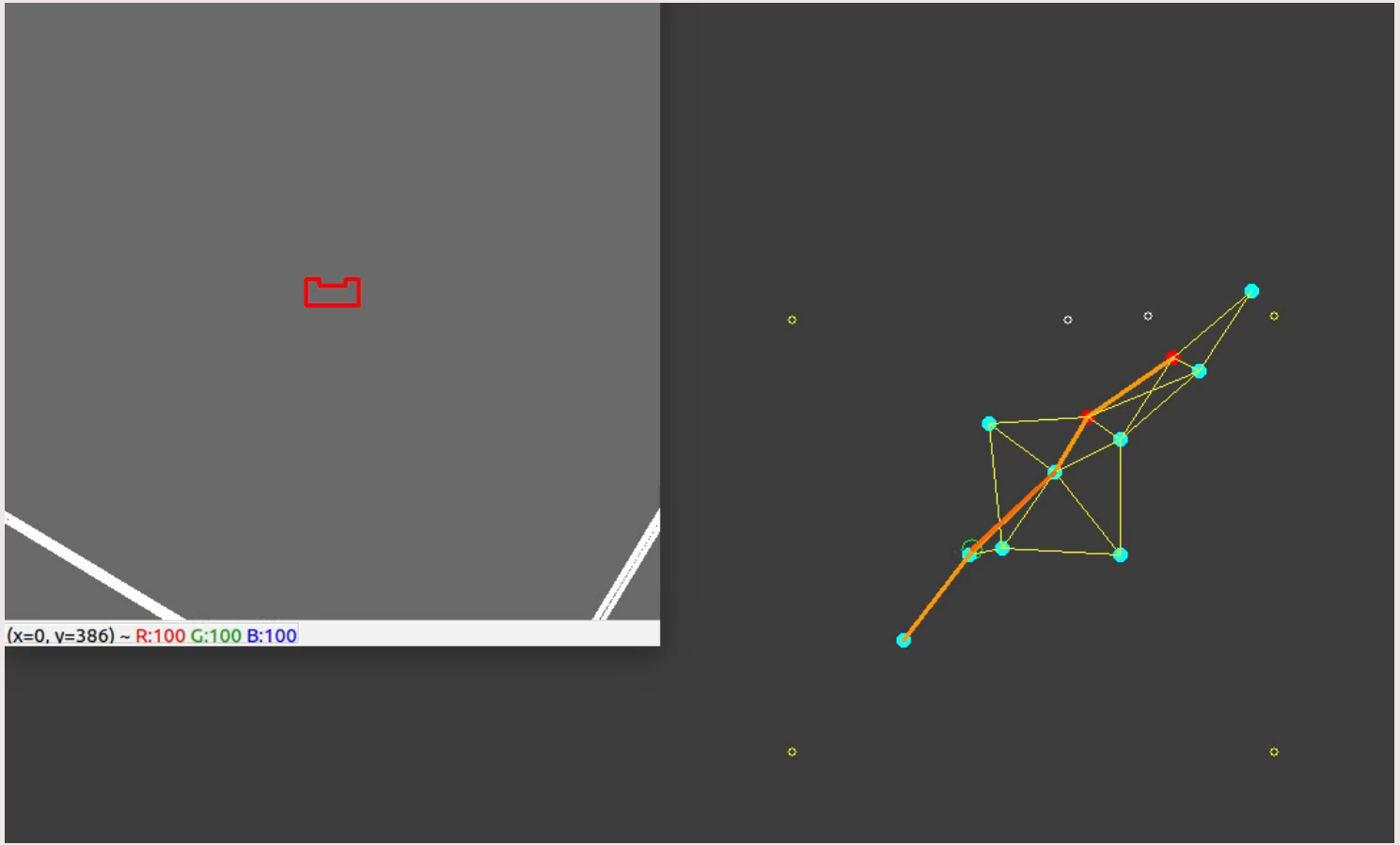
- Strategically placed waypoints.
- A* algorithm
- Breaking Links.
- Recalculation of path.



## Local path planning – Potential field

- To avoid cutting corners or hitting objects with inaccurate localization.
- Local minima not expected due to waypoints.




(x=0, y=386) ~ R:100 G:100 B:100

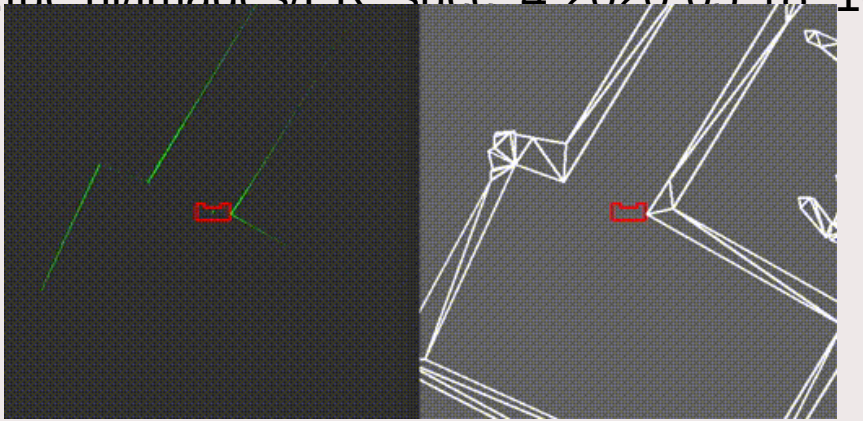
# Discussion

- Object detection
- Validated individual components
- Testing for robustness
- Combining components

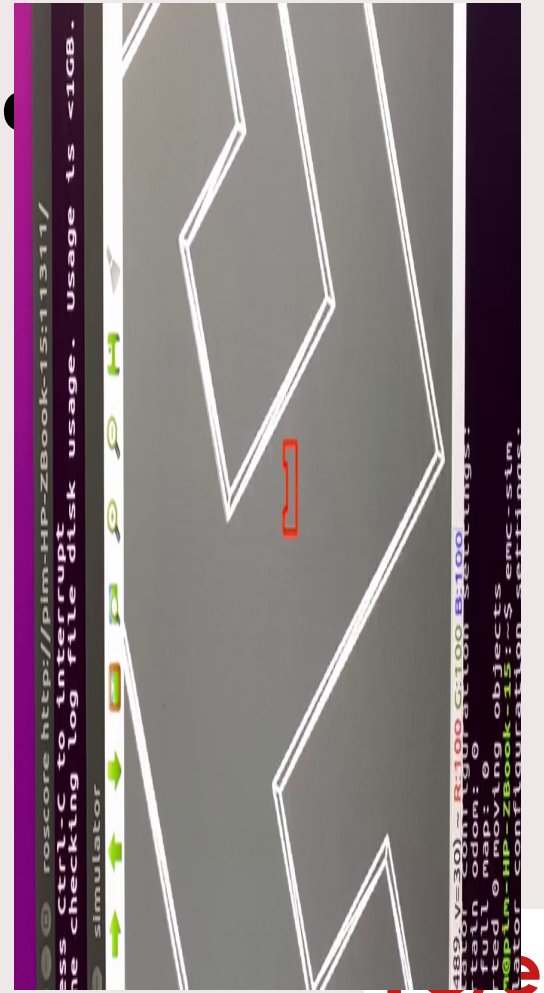
# Appendix slide 1 – Potential field

+ Cutting the corner, found in escaperoom challenge, will be avoided by potential field.
+ Without localization, the robot will not bump into walls or objects.
+ Combination with A* will provide very little local minima and these are thus not to be taken into account.

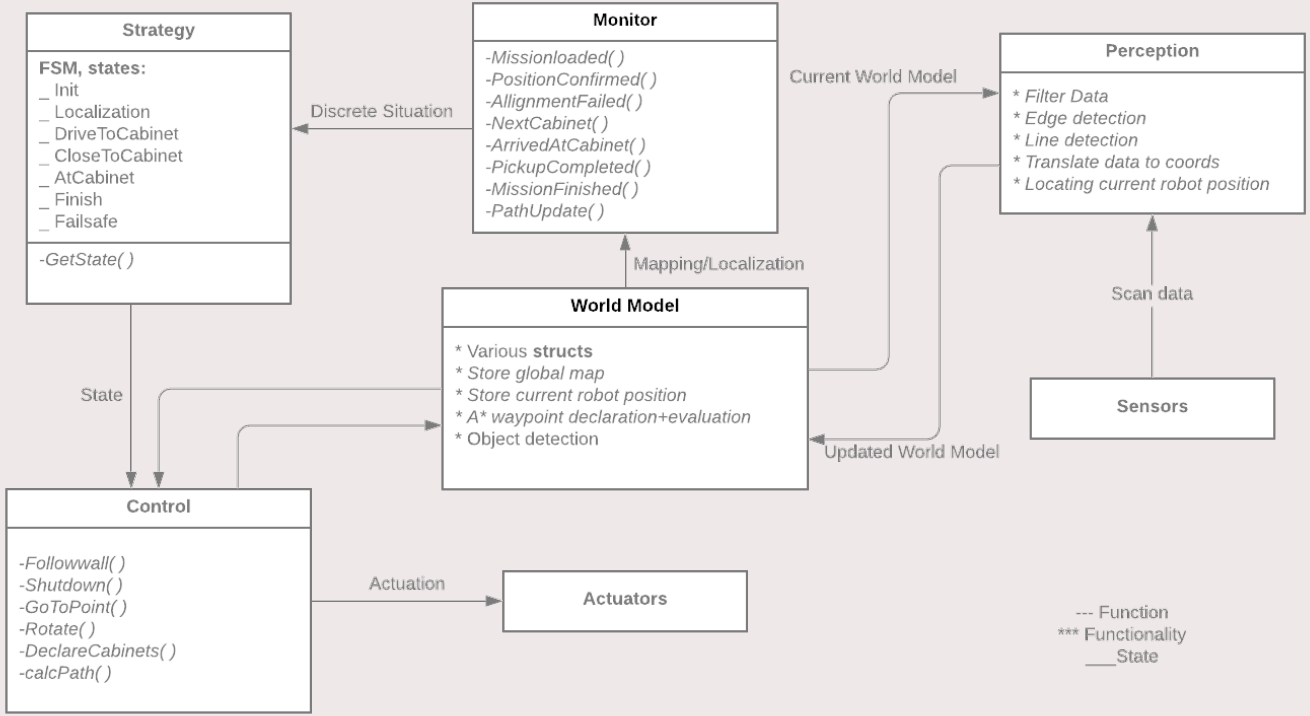
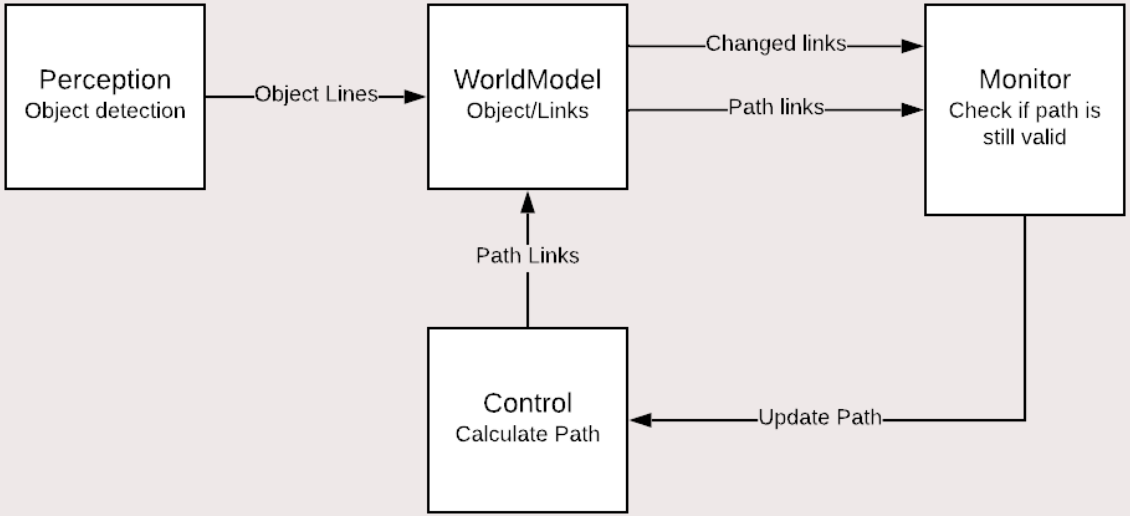
http://cstwiki.wtb.tue.nl/images/ER_succ_4-2020-05-18_10.36.58.gif



# Appendix slide 1 – Potential fi



# Appendix slide 2 – Full Software Architecture



# Appendix slide 3 – object detection