Universität Bamberg

Innovationslabor „Living Lab Bamberg“

Ein Verbundprojekt mit der HOCHSCHULE COBURG

Architecture

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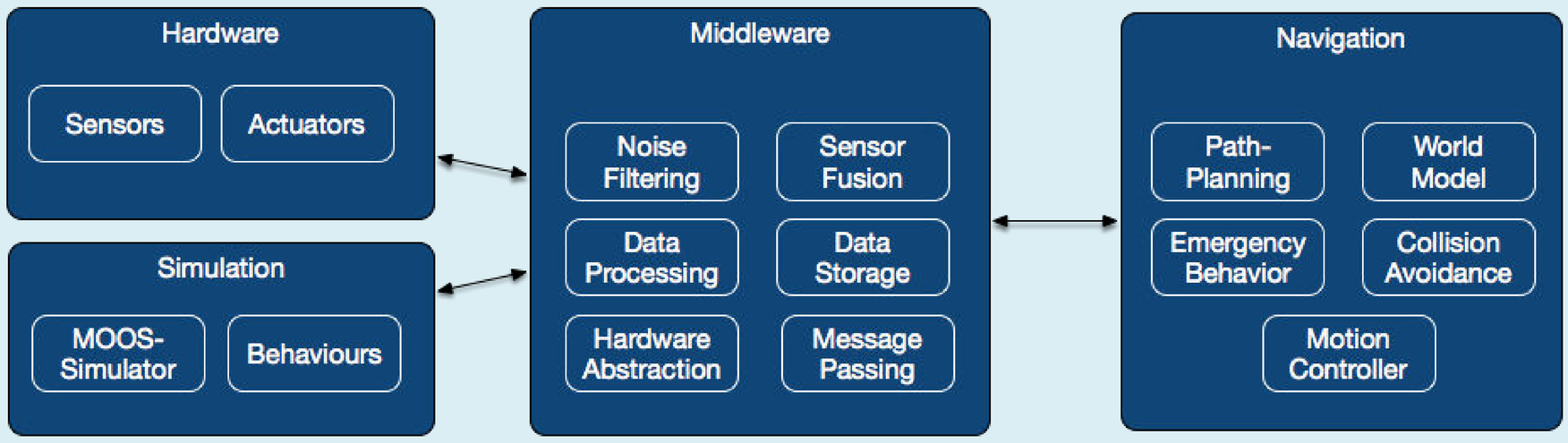


Middleware

Tasks

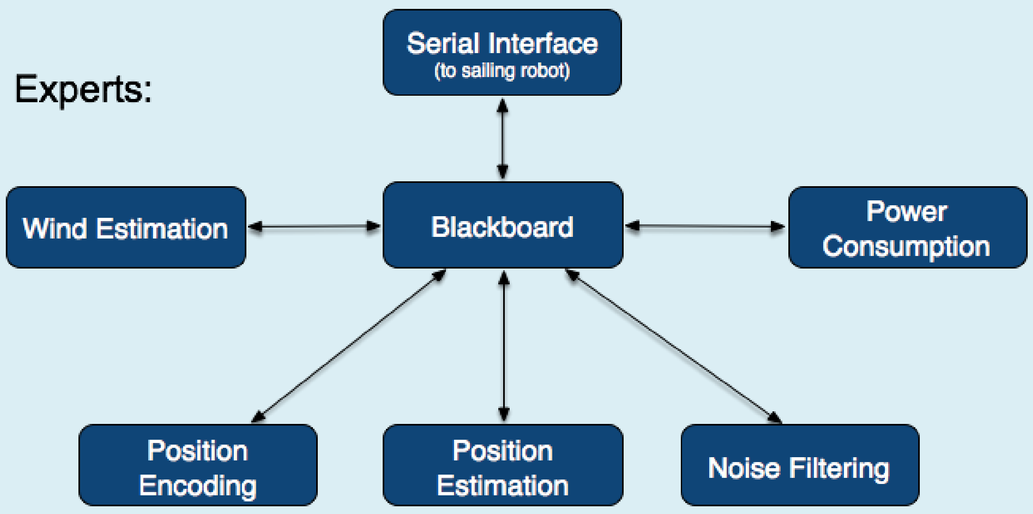
- hardware abstraction
- data processing
- data storage
- sensor fusion
- noise filtering

Approach

- distributed architecture
- network of experts
- central data storage (Blackboard)

UDP Messaging

Experts:



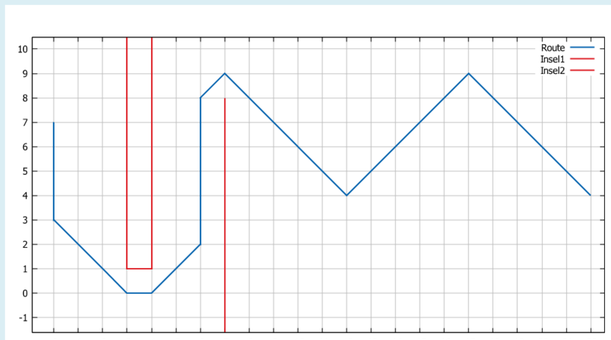
Path-Planning

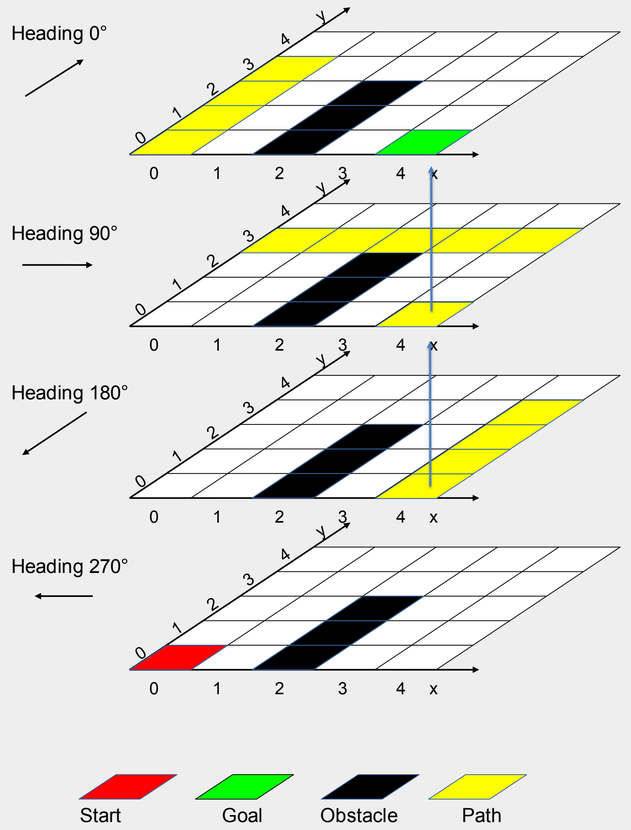
Task

Implementation of a Navigation algorithm that fits the special needs of a sailing boat, i. e. being capable of including wind and sailing maneuvers.

Approach

- map is rasterized into a 2D grid
- cost between nodes in the map is dependent on wind direction and current heading of the boat, e.g. sailing against the wind is not possible and therefore has very high costs
- shortest path is calculated with the D* algorithm in a 3D configuration space (x, y, heading of the boat)





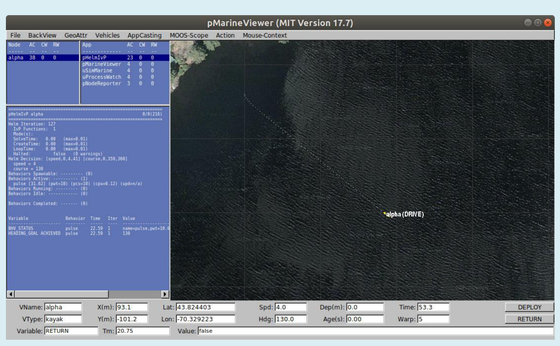
Simulation

Task

Provide physical simulation for testing and evaluation

Approach

Extension of marine simulation environment MOOS



Motion Controllers

tighten sail, set rudder

set sail according to wind

Wind

tack: bow passes through wind

Task

- Actuate rudder and sail to reach next waypoint
- monitor path execution

Approach

- reactive motion controller
- specialized behaviors e.g. turning

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