3D laser from RGBD projections in robot local navigation

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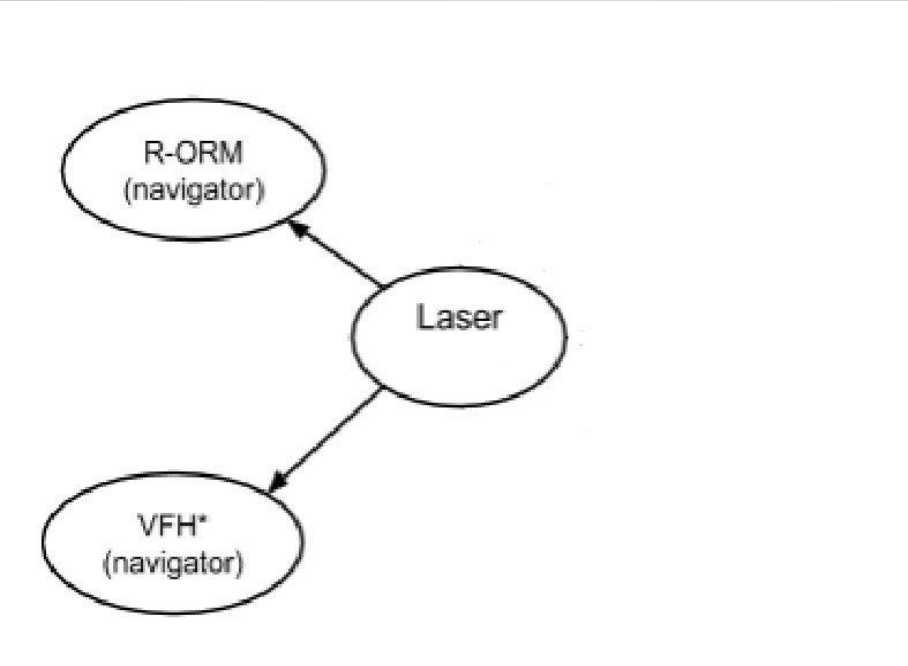
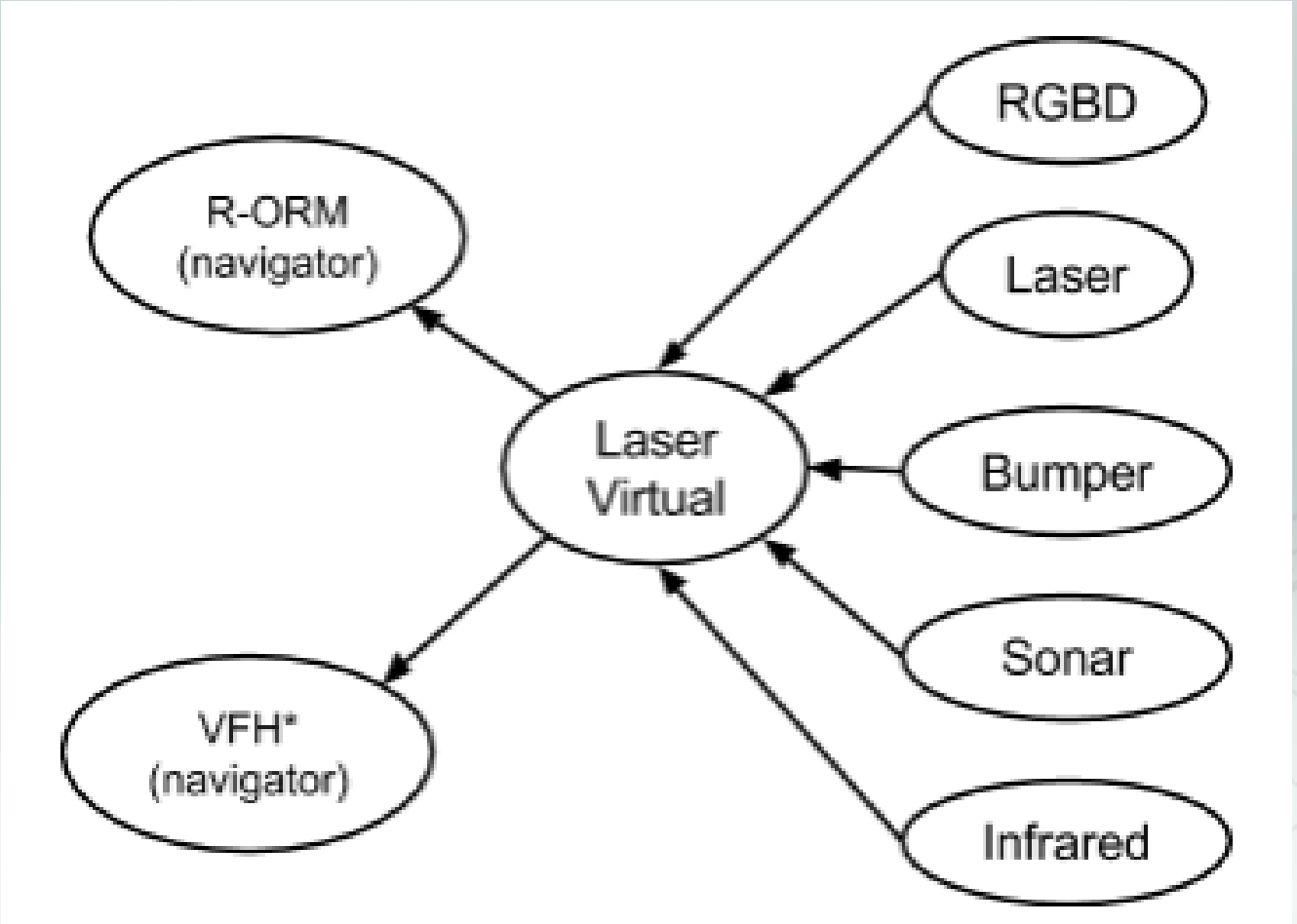
Proposed Architecture

- Laser data:
  - Most navigation algorithms use them.
  - Useful to move in flat environments (2D).



Proposed Architecture

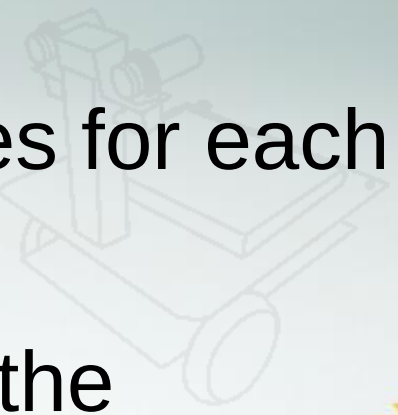


Generating synthetic Laser from RGBDs

- RGBD cameras provide depth maps
- If two sensors are measuring the same position, then the minimum distance is chosen for that position
- A laser reading can be represented as an array of angle-distance tuples
- Any sensor data that can be represented as a sequence of 2D or 3D position-distance vectors, could be incorporated

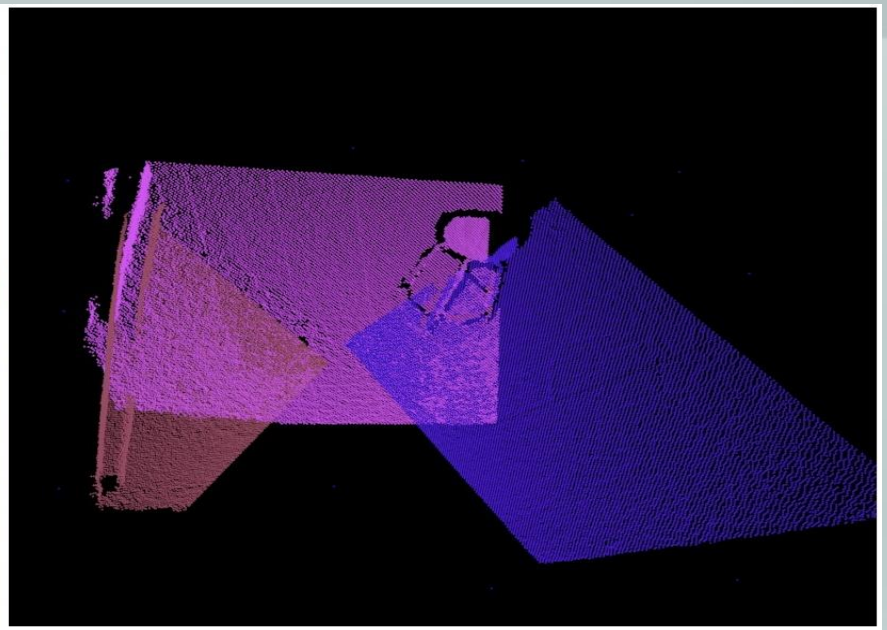
Innermodel. Emulated Laser

- The inner representation of the robot is described in a kinematic hierarchical tree called *InnerModel*
- We need an emulated laser device into the InnerModel tree
- We need to know the relatives poses for each sensor
- We should project all real data into the emulated laser for each frame



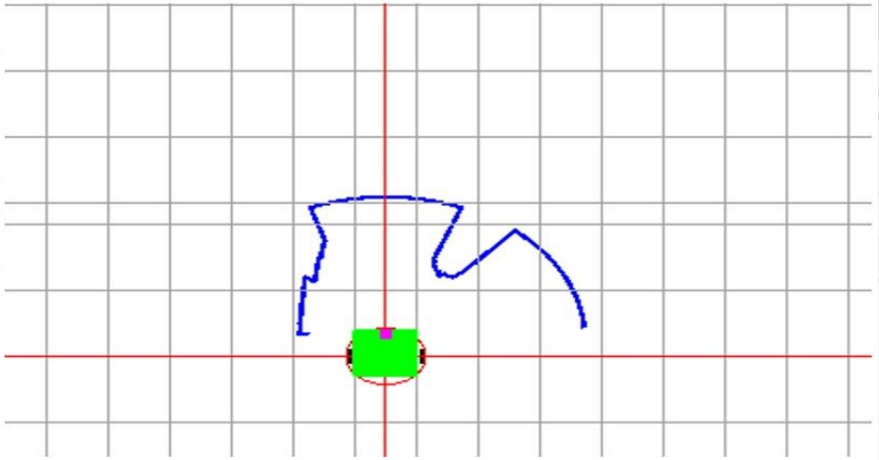
Virtual Laser projection

(a)



(b)

(c)



(d)

Experimental results

- Compare two well-known algorithms
  - VFH (Vector Field Histogram)
  - R-ORM (Relaxed Obstacle Restriction Method)

- The experiments showed that the algorithms work as well as using a conventional laser

Conclusions

- Maybe a powerfull tool
- We want to fuse more sensors
- Actually the RGB-D sensors is calibrated manually
- Finally, it was discarded since Gualzru should be pretty (but the improves were added)