Human-Inspired Long-Term Indoor Localization in Human-Oriented Environment

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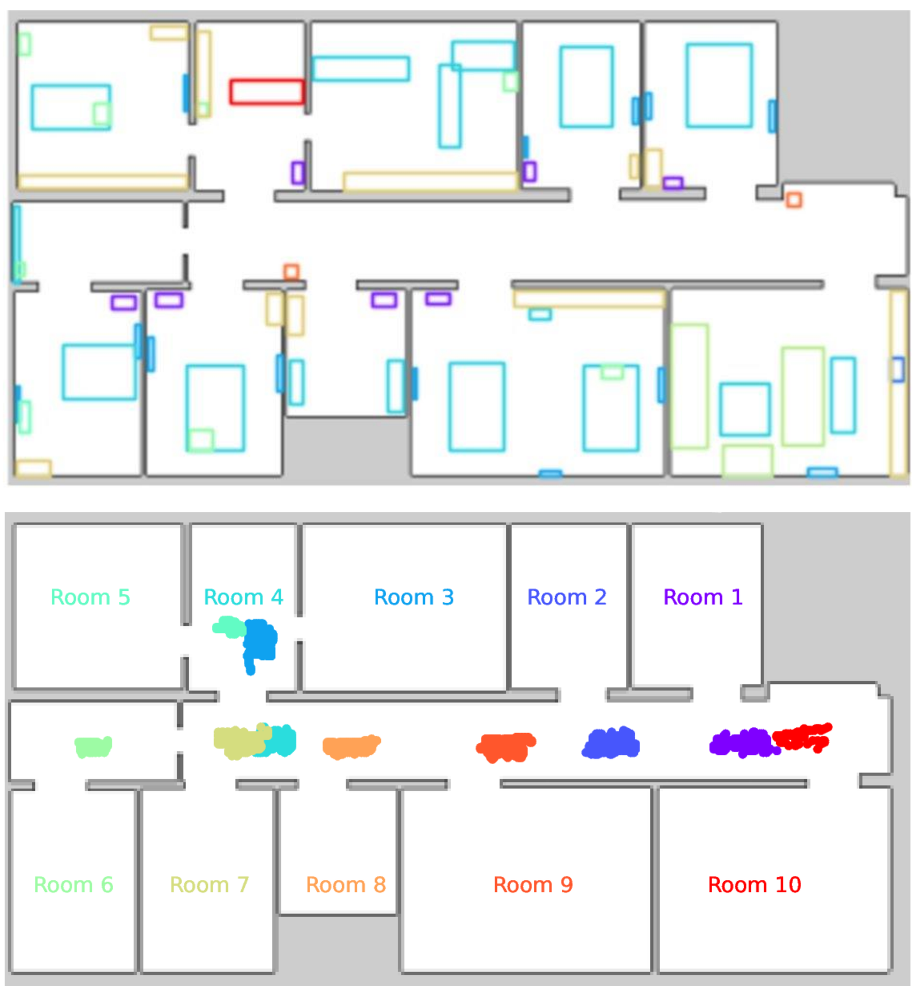
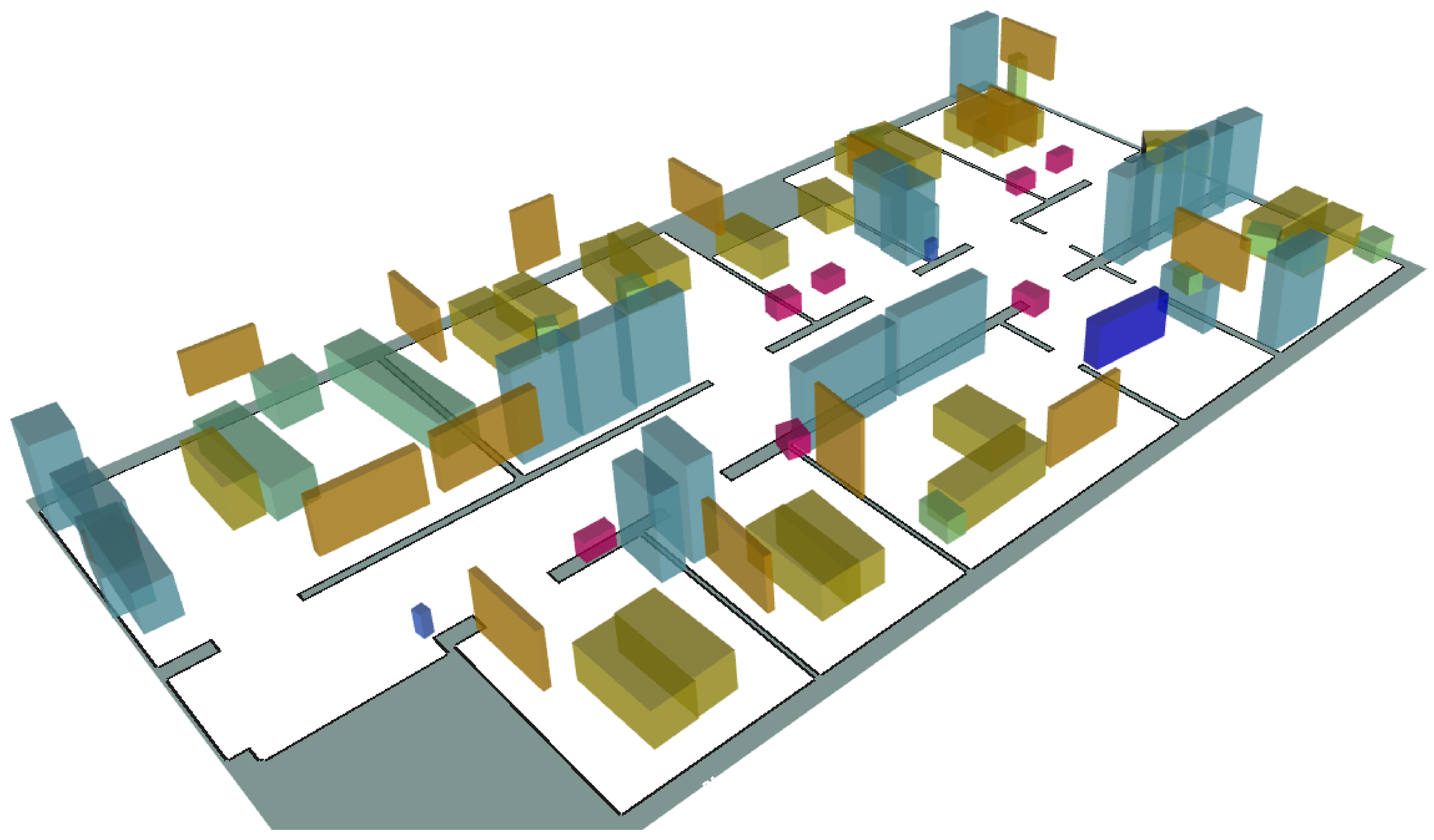
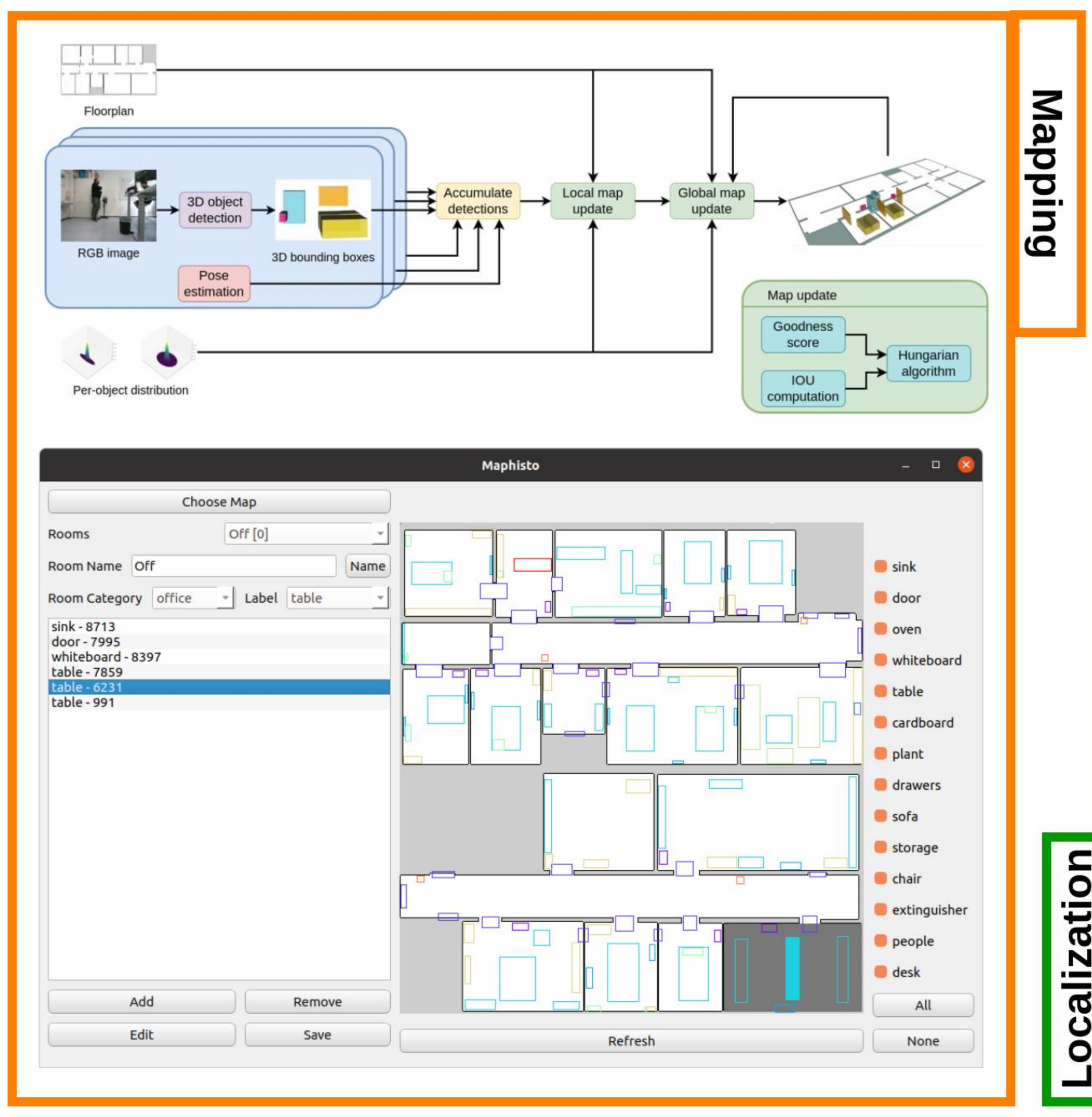
Abstract

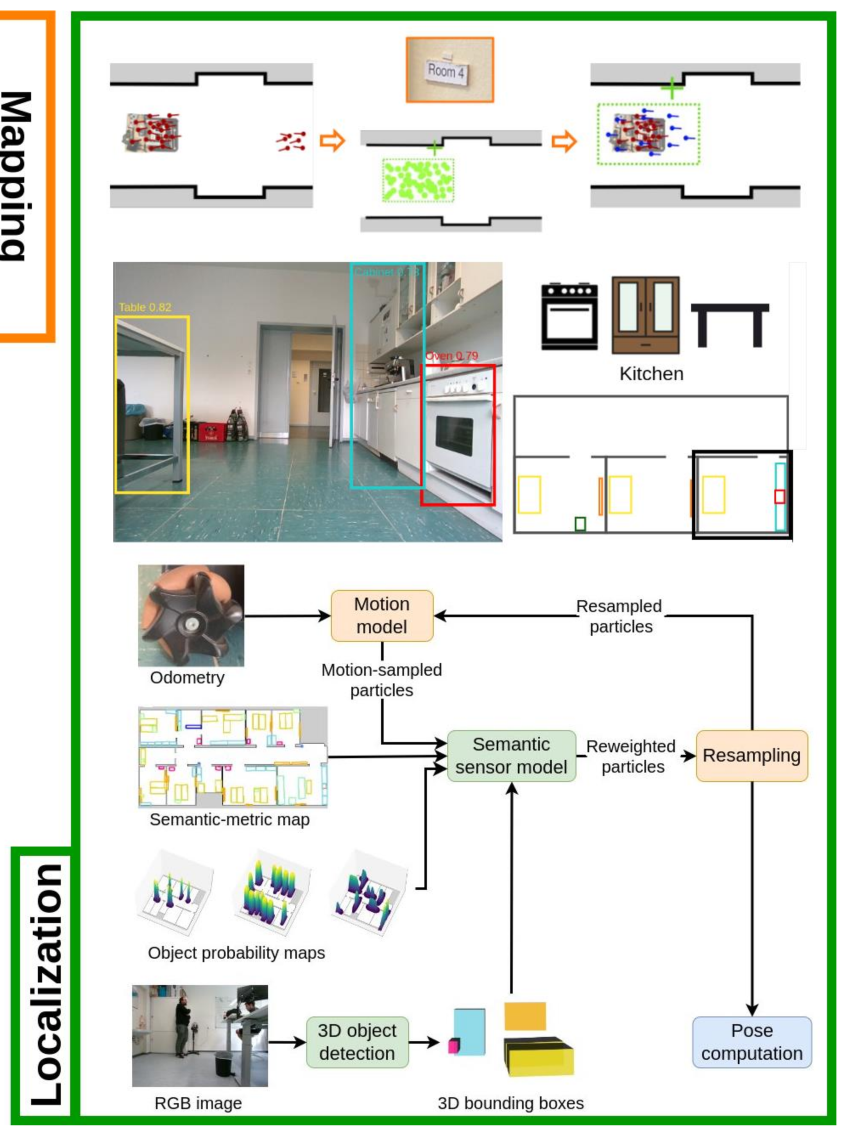
- Mapping and Localization are two key tasks for service robots
- Map format must support long-term localization in changing environments
- Robust localization integrating geometric, textual and semantic cues





Approach





- Floor plan prior exploiting static geometric features
- Stable semantic classes are chosen based on statistical analysis
- Abstract semantic maps can be automatically constructed or annotated by hand
- Monte Carlo Localization using RGB camera and LiDARs (optional)

Experiments and Results

- Global localization in large indoor spaces (400m^2)
- 9 months of recording in changing environments
- Outperforming the baselines with over 90% success rate in long-term localization, with 0.15m ATE
- Abstract semantic maps verified for supporting long-term localization
- Online and onboard, tested on multiple platforms