

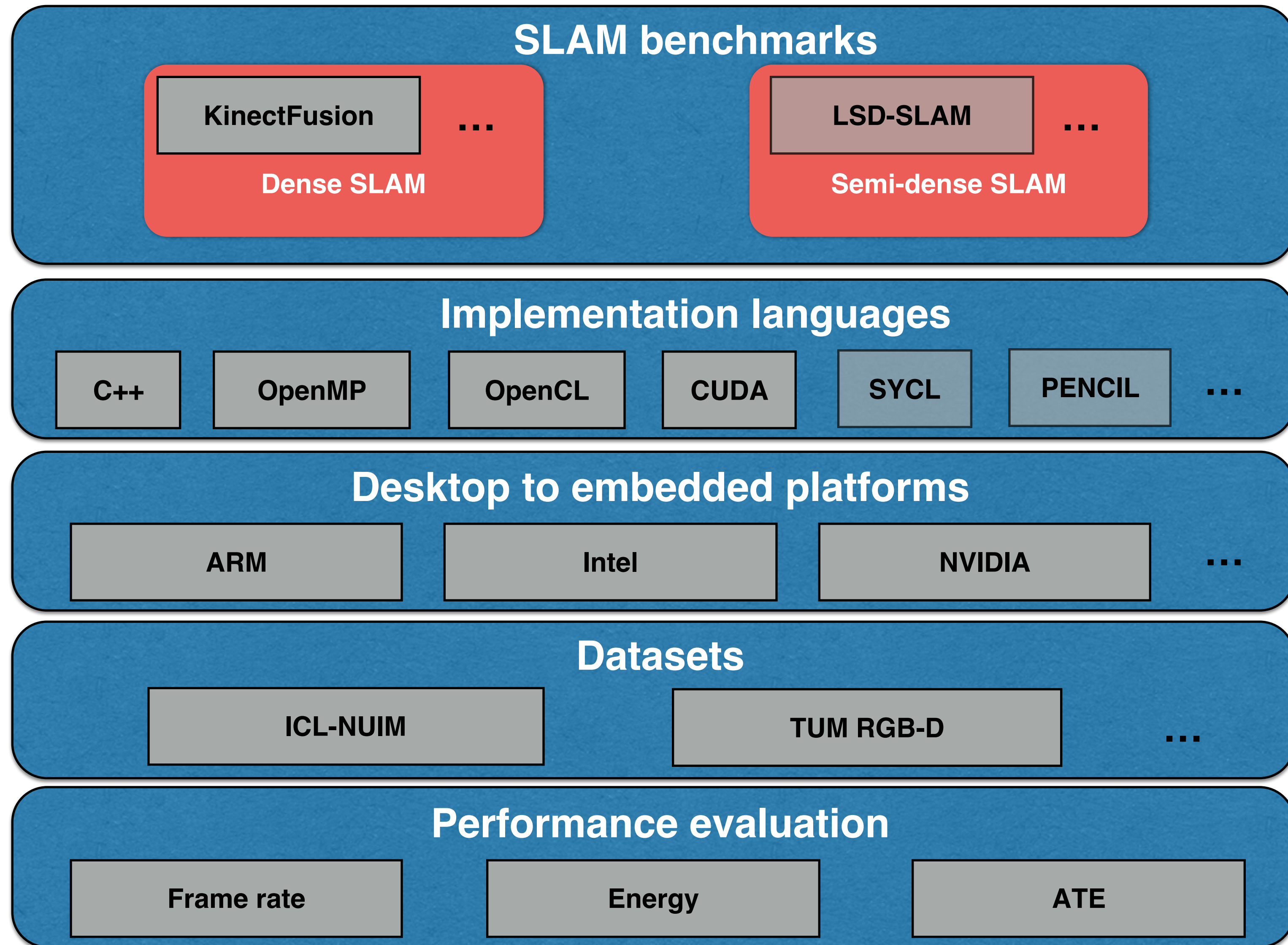
Comparative design space exploration of dense and semi-dense SLAM

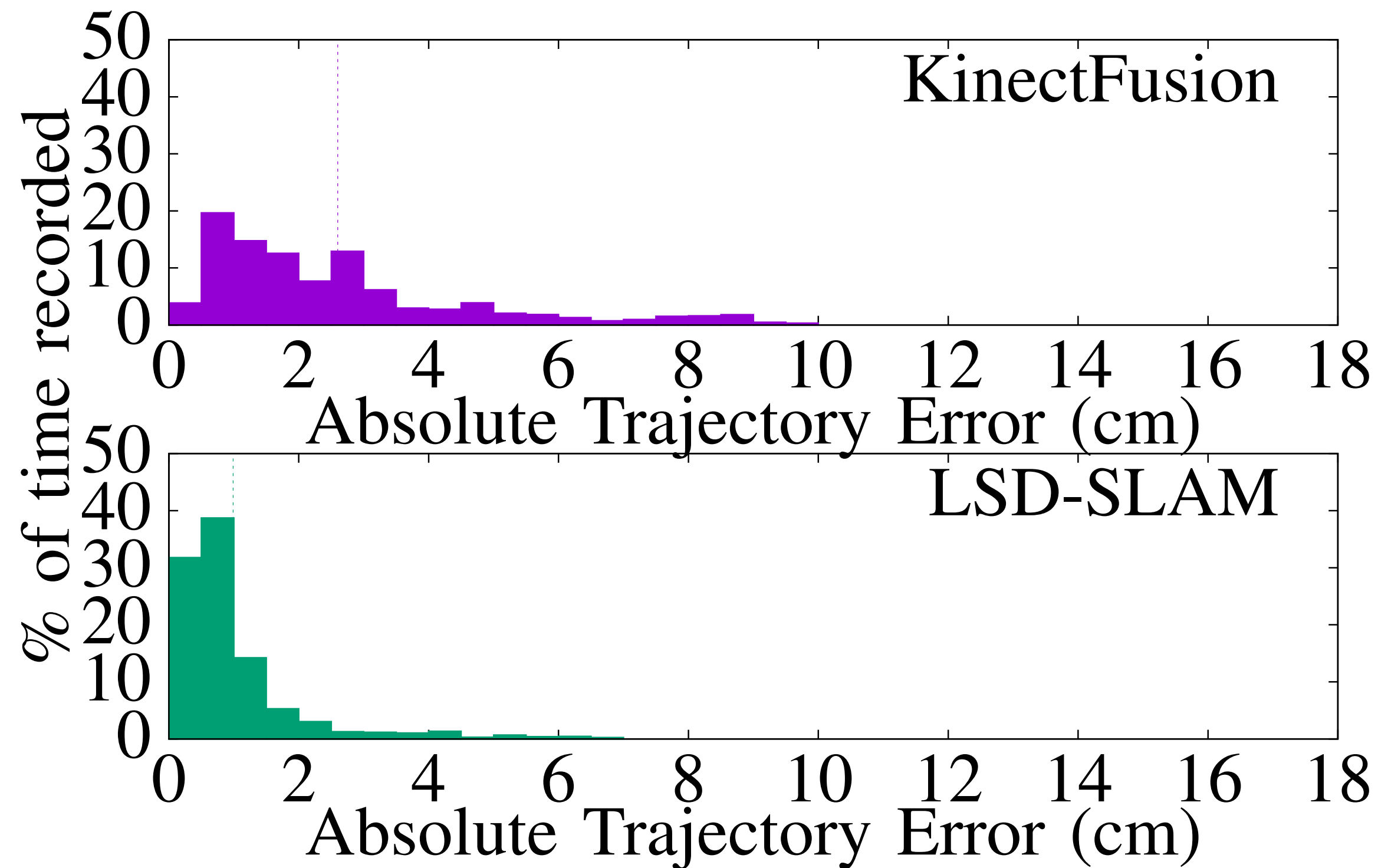
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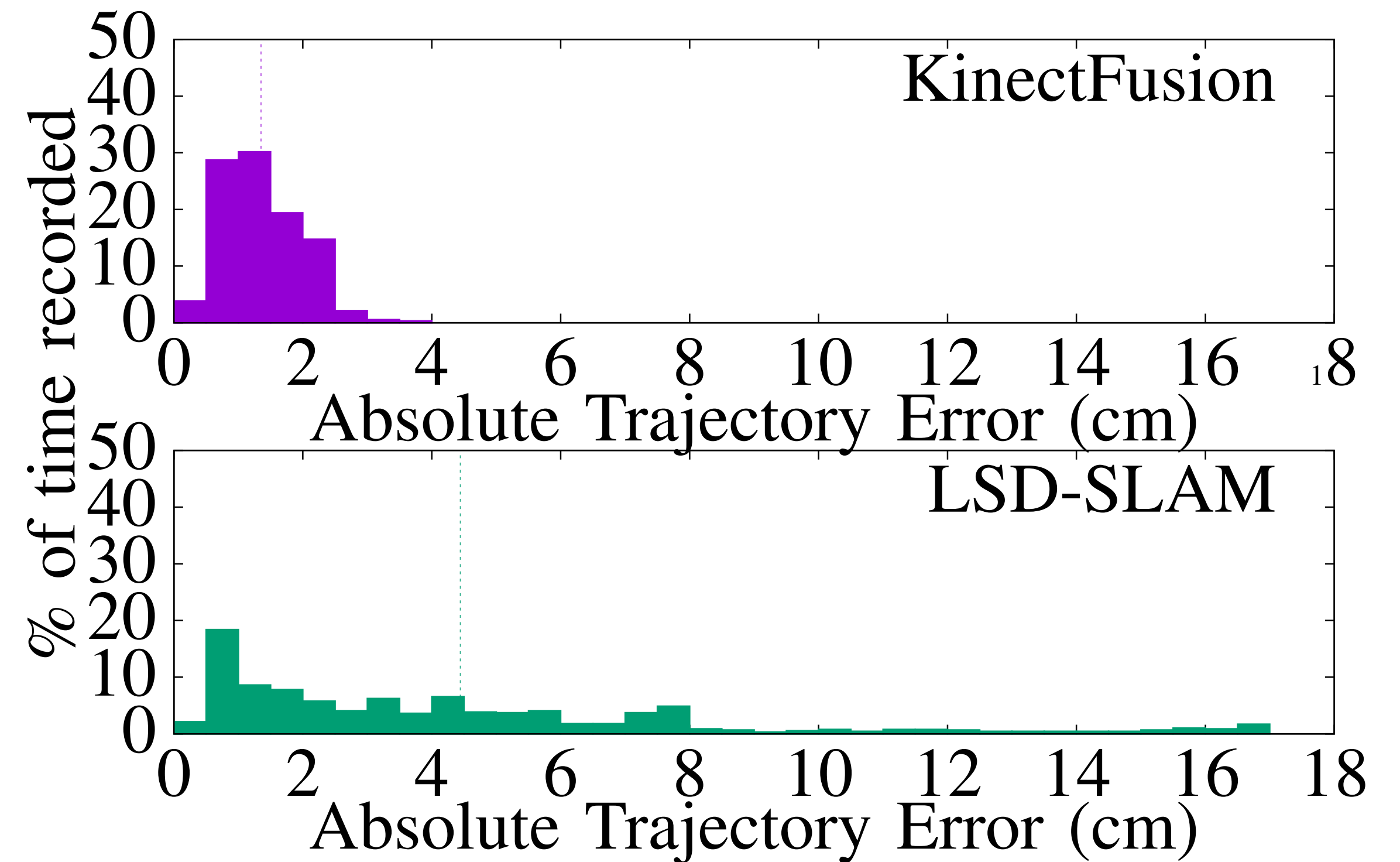


- ▶ Enabling end-to-end quantitative and reproducible benchmarking of SLAM pipelines
- ▶ SLAM as a multi-objective optimisation problem
 - Absolute Trajectory Error (ATE)
 - Relative Pose Error (RPE)
 - Frame rate
 - Energy per frame
 - Reconstruction accuracy (coming...)





(a) Real Scene

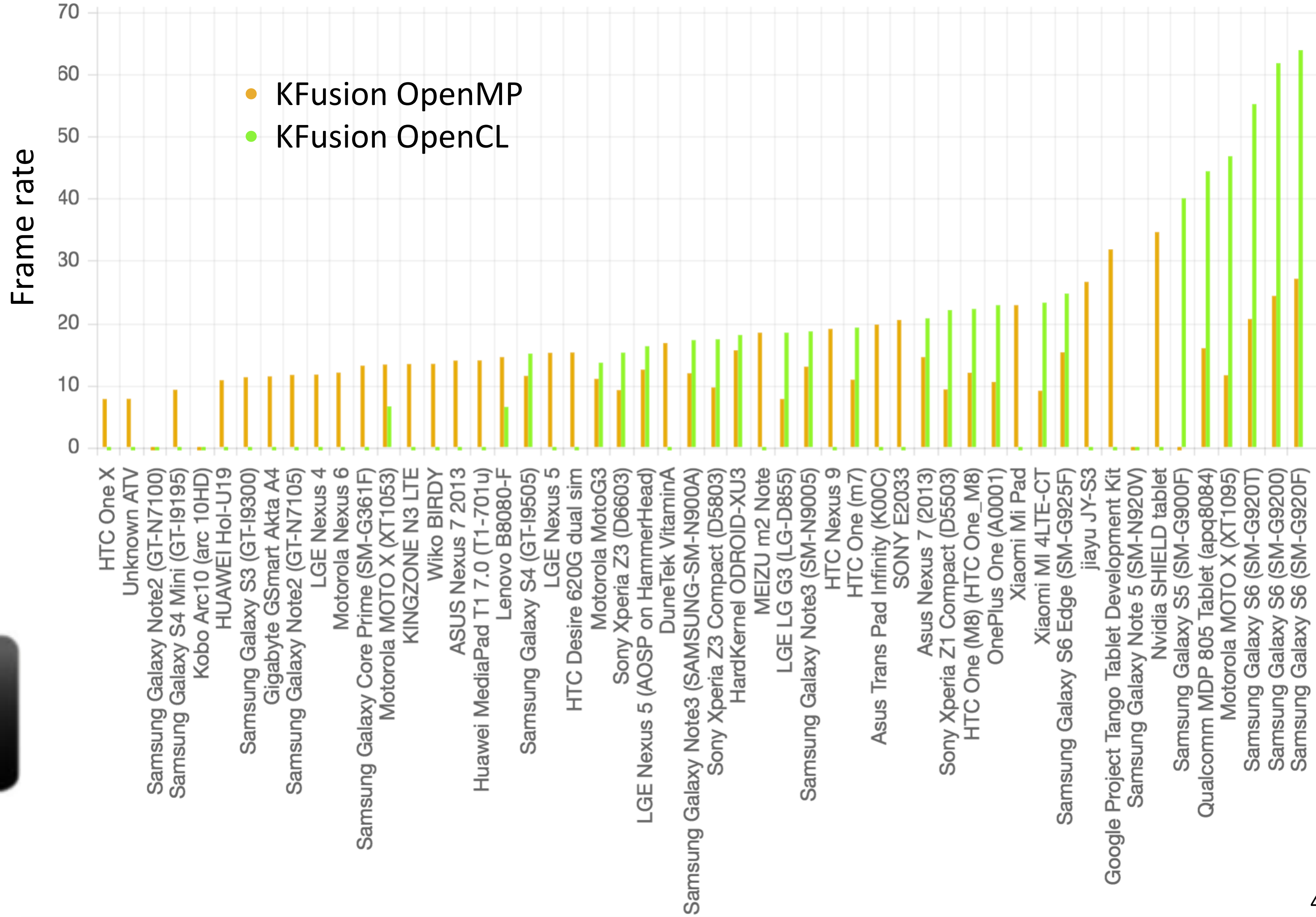


(b) Synthetic Scene

- ▶ Comparing KinectFusion and LSD-SLAM
 - Absolute trajectory error distribution over entire trajectory
 - Real scene vs synthetic scene

Crowdsourcing benchmarking with the SLAMBench app

- ▶ The SLAMBench app runs KinectFusion with a set of configurations on the available languages on your device
- ▶ Returns the best achievable frame-rate on your platform
- ▶ Optimal configurations chosen via automated design space exploration



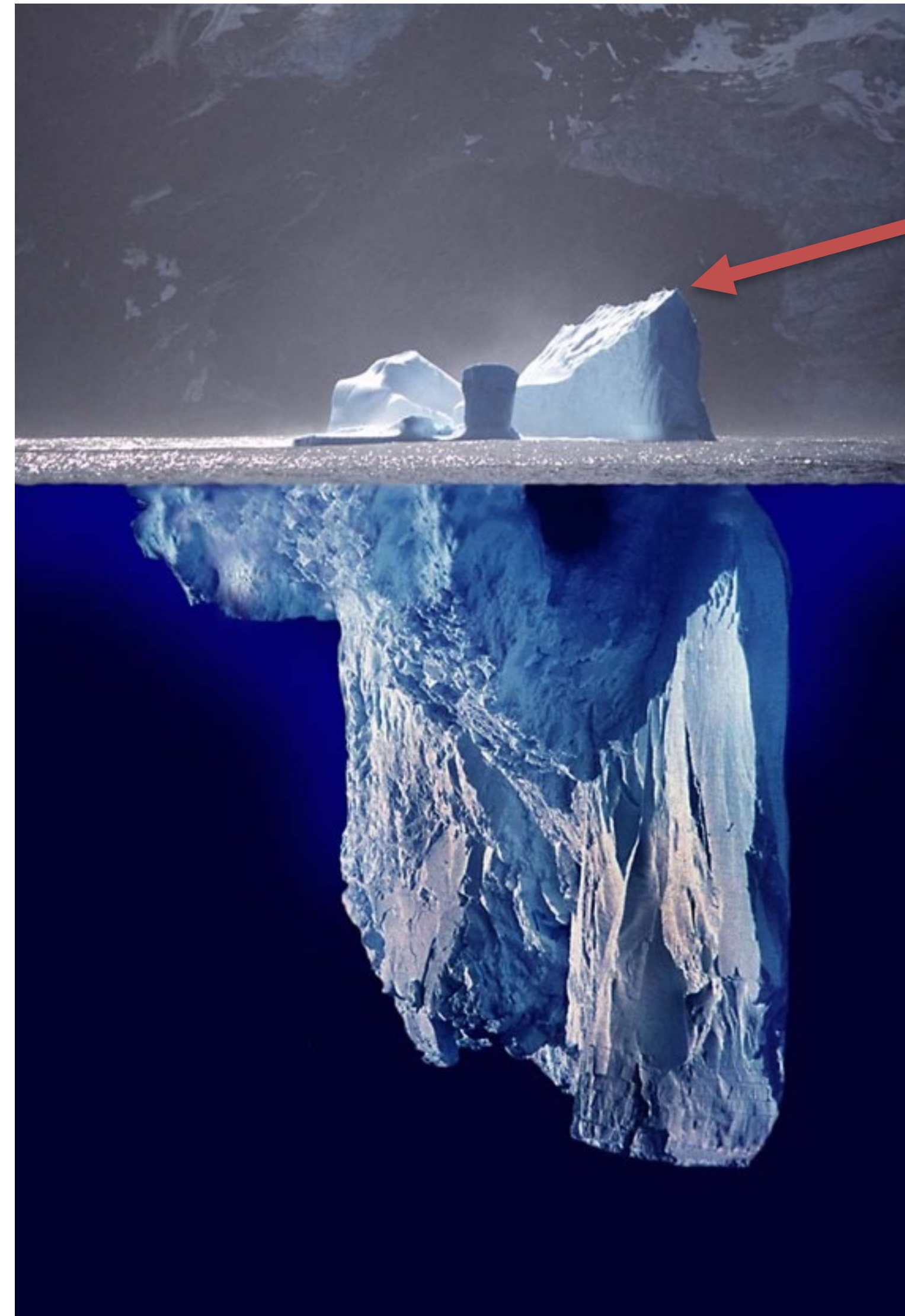
- ▶ SLAMBench enables you to easily explore your algorithm's design-space
- ▶ Often we look at the tip of the iceberg, we should be considering the whole story
- ▶ Icebergs do flip over!



Iceberg from Argentinian Uppsala glacier flipping over
<https://youtu.be/Sh271FAVZ0o>

- ▶ We would like to thank EPSRC for funding this research, PAMELA grant EP/K008730.
- ▶ Jacob Engel for useful discussion and feedback on LSD-SLAM
- ▶ Andy Nisbet and John Mawyer of University of Manchester for their contributions to the SLAMBench framework

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Static configuration that works fine for some sequences.

Rest of the story!