

Joint surface detection and depth estimation from single-photon Lidar data using ensemble estimators.

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- What have we done?

Propose a novel method of joint surface detection and depth estimation from single-photon Lidar (SPL) data

- The prior art

Traditional 3D ranging methods for SPL perform surface detection and range estimation sequentially to alleviate computational burden

- What does our method do that sets it apart from the prior art?

- Joint detection/estimation problem is formulated as a single inference problem, where discrete variables considered to avoid the intractable integrals usually involved with variable marginalization
- Resulting problem recast as a model selection/averaging problem

- Benefits of this new proposed method?

- Framework can be adapted to more complex problems where target depth can be obtained combining several arbitrary estimators
- Pixel-wise Method: GPU implementation possible to enable reliable depth estimation and uncertainty quantification at real-time speeds
- Provides a conservative approach to uncertainty quantification of the calculated depth estimates: can be used for real time analysis

