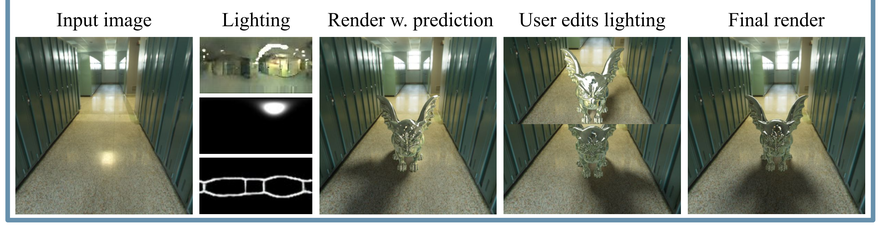
Editable Indoor Lighting Estimation

Henrique Weber[1], Mathieu Garon[2], Jean-François Lalonde[1]
henrique.weber.1@ulaval.ca, mathieu@depix.ai, jflalonde@gel.ulaval.ca, [1]Université Laval, [2]Depix

lvsn.github.io/EditableIndoorLight/

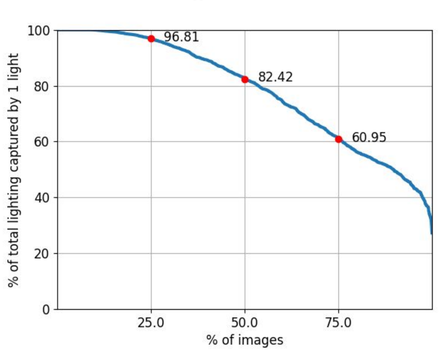
1. Motivation

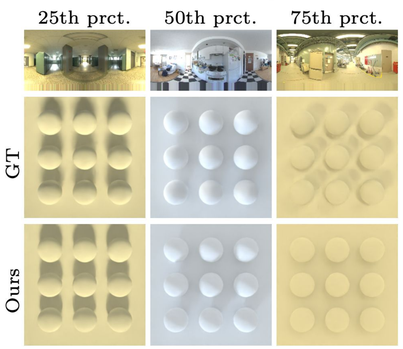
- We need lighting estimation for realistic renderings.
- Current methods output realistic light estimations, however they are hard to edit for a casual user.
- We propose a hybrid approach that combines parametric and non-parametric lighting that is **realistic** and **easy to edit**.



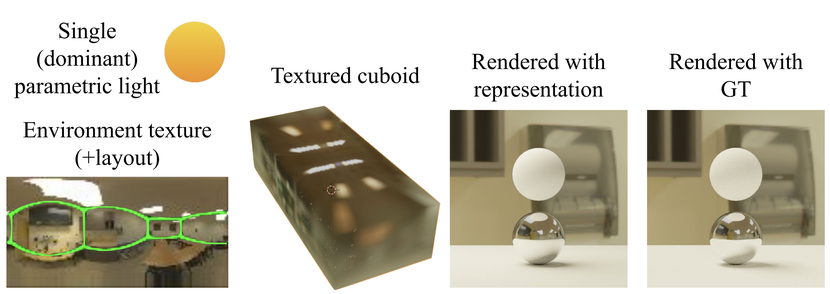
2. Lighting Representation

- Most indoor scenes can accurately be modeled by a **single HDR dominant light source** and an **LDR environment map.**

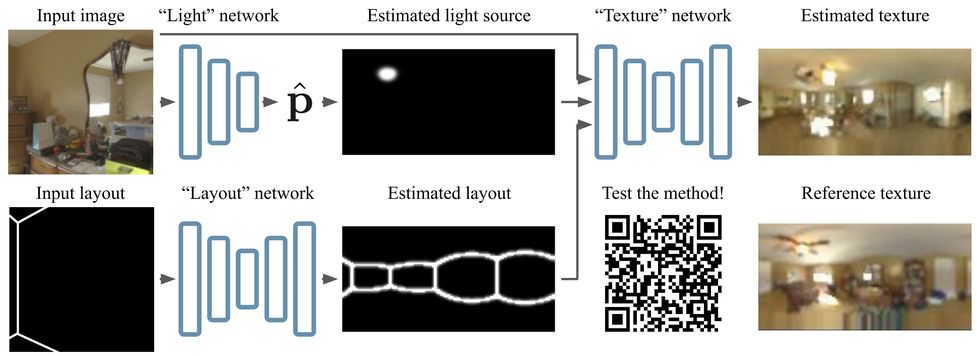




- This single light source is represented as $\mathbf{p} = \{\mathbf{l}, d, s, \mathbf{c}, \mathbf{a}\}$, where $\mathbf{l}$ is the light direction, d distance, s radius, $\mathbf{c}$ light color, and $\mathbf{a}$ ambient color.
- The cuboid C is represented by a texture T: an RGB spherical image in equirectangular format. The scene layout indicates the intersections of the main planar surfaces in the room.



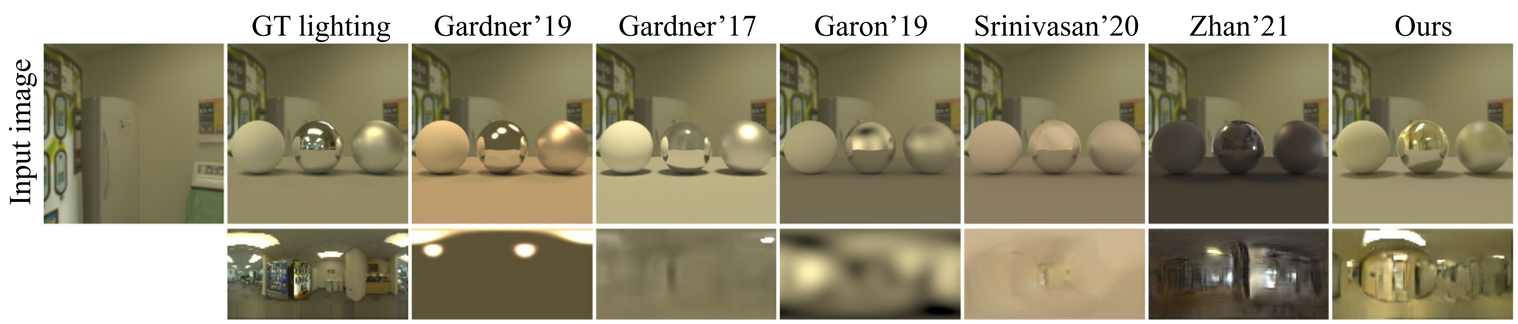
3. Approach



- The light network outputs an **editable parametric light source**, which is converted to a spherical gaussian panorama.
- We assume that the input layout image is available (in practice it is obtained with an off-the-shelf solution [1]).
- **Key: environment map conditioned on the parametric light and layout.**

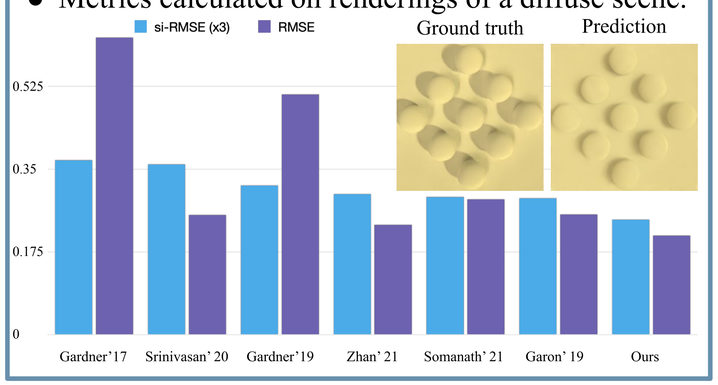
4. Qualitative results

5. Qualitative comparison



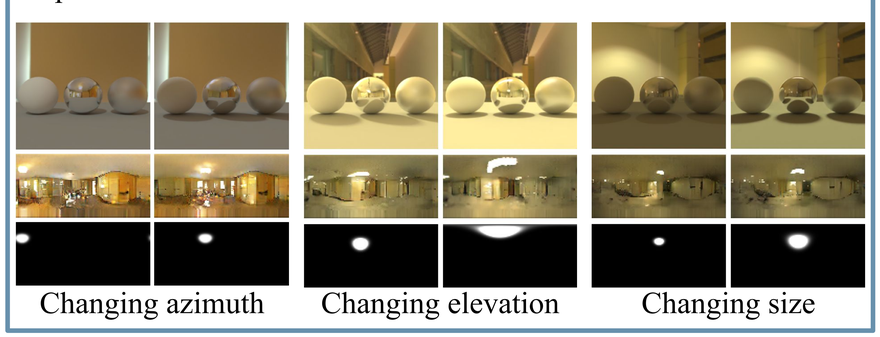
6. Quantitative comparison

- Metrics calculated on renderings of a diffuse scene.



7. Estimated lighting editing

- By employing our representation, the user can easily edit the light parameters and obtain results consistent with their edits.



Research supported by MITACS and the NSERC grant RGPIN-2020-04799. [1] Lee, C.Y., *et al*: Roomnet: End-to-end room layout estimation, ICCV 2017