Illumination-driven Light Probe Placement

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Light Probes

- Light probes **help encode** and **represent global illumination** for **real-time rendering.**
- **Placement** is typically performed as either an automatically laid-out **grid** or **manually…** ☹

Observations

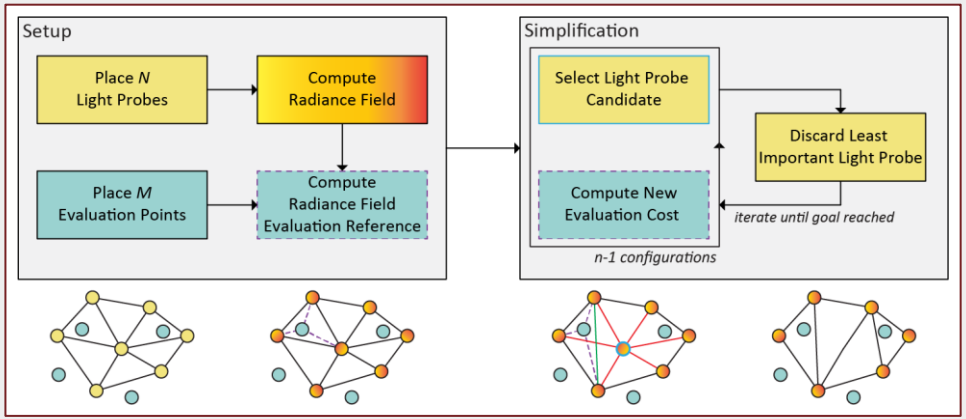
- Placement should depend on the lighting distribution itself!
- Colour bleeding dominated by **chrominance**
- Indirect shadows translate to mostly **luminance** transitions

Our Method

Goal
- Lighting-driven probe placement
- A simple and generic method

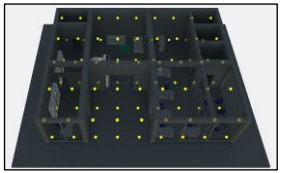
Two-step algorithm
- **Setup:** Generate dense reference probes and supply light field evaluation points
- **Simplification:** Iteratively remove least important probes using mean absolute percentage error

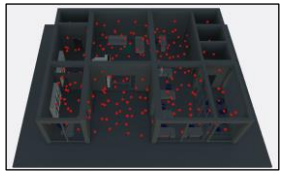
Illumination criteria
- Transform radiance to **YCoCg** and
- Guide simplification according to weighted YCoCg components for chrominance/luminance-based preference



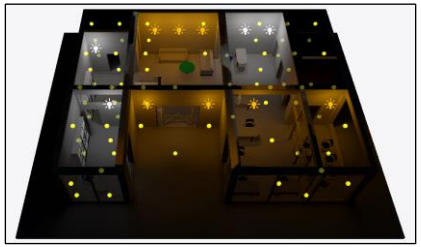
Results

Initial Light Probes | Evaluation Points



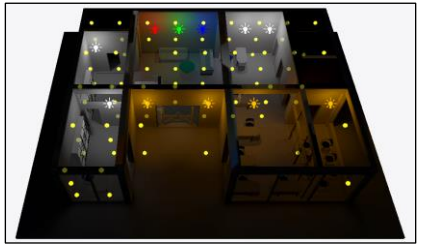


Lighting setup A: Similar light source colors



Luminance-driven: 53% probes left, 3% error

Lighting setup B: Contrasting light source colors



Chrominance-driven: 45% probes left, 3% error

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Source code: *github.com/cgaueb/light_probe_placement*
AUEB CGG: *graphics.cs.aueb.gr*