Thermal Radiance Fields
Xin-Yi Pan
Electrical Engineering, Stanford University

Motivation
Thermal Imaging
- RGB: Left, Thermal: Right
3D Radiance Field Reconstruction
- Novel view synthesis
- Limitations of the thermal regime
  - A set of input images
  - Rendered novel views
  - Improve 3D thermal reconstruction using information from the visible spectrum

Thermal-NeRF
Calibrate
Intrinsics
Relative Extrinsics
- RGB camera
- Thermal camera

Experimental Results
- RGB
- Thermal
- RGB Depth
- Thermal Depth
- PSNR: 22.08 | 21.23; SSIM: 0.89 | 0.95; LPIPS: 0.41 | 0.12
- PSNR: 24.26 | 20.98; SSIM: 0.87 | 0.73; LPIPS: 0.34 | 0.13
- PSNR: 18.42 | 26.33; SSIM: 0.39 | 0.97; LPIPS: 0.58 | 0.07

Related Work
Point Clouds
- NeRF
- X-NeRF

References

Baseline Comparisons
<table>
<thead>
<tr>
<th></th>
<th>RGB</th>
<th>Thermal</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGB only</td>
<td>22.57</td>
<td>-</td>
</tr>
<tr>
<td>Thermal only</td>
<td>-</td>
<td>18.09</td>
</tr>
<tr>
<td>Shared Density</td>
<td>21.53</td>
<td>20.78</td>
</tr>
<tr>
<td>Lower Density</td>
<td>21.23</td>
<td>21.37</td>
</tr>
<tr>
<td>X-NeRF</td>
<td>21.54</td>
<td>29.26</td>
</tr>
<tr>
<td>Lower Density (RGB)</td>
<td>X-NeRF</td>
<td></td>
</tr>
</tbody>
</table>