Continuous Levels of Detail for Light Field Networks
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**INTRODUCTION**
- Neural fields enable a compact photo-realistic representation of 3D scenes by encoding them into neural networks.
- Light Field Networks (LFNs), proposed by Sitzmann et al. in 2021, can represent 3D objects and render them in real-time without volume rendering by directly predicting the color for each ray or pixel.

- For computer graphics applications, levels of detail (LODs) provide anti-aliasing and more efficient rendering of objects at different scales.
- In prior work, discrete LODs enable LFNs to be progressively streamed and to render at four scales: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$.

**METHOD**
We propose to combine the following techniques to achieve continuous levels of detail:

**NeRF**
- Position $x$
- Direction $d$

**LFN**
- Color $c$

- Summed-area tables allow for arbitrary scale and position sampling at training time.
- Variable-size layers enable arbitrary size execution with hundreds of performance levels.

Neuron masking is used to continuously interpolate between neural network sizes.
Saliency-based importance sampling helps salient regions resolve at earlier LODs.

**EXPERIMENTAL RESULTS**
We can now render at any arbitrary LOD.
Face details resolve at lower LODs with saliency-based sampling.
Details emerge gradually with fractional LODs.
We observe smaller model delta sizes and less flickering during transitions.
We observe smoother scaling between available data, performance, and quality.