Deep Image-Based Adaptive BRDF Measure

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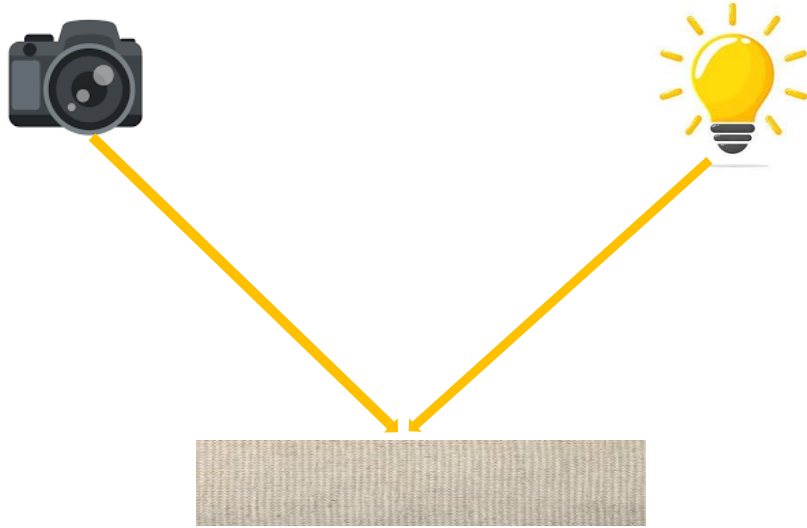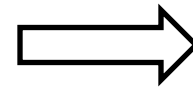**Linköping University, Sweden**

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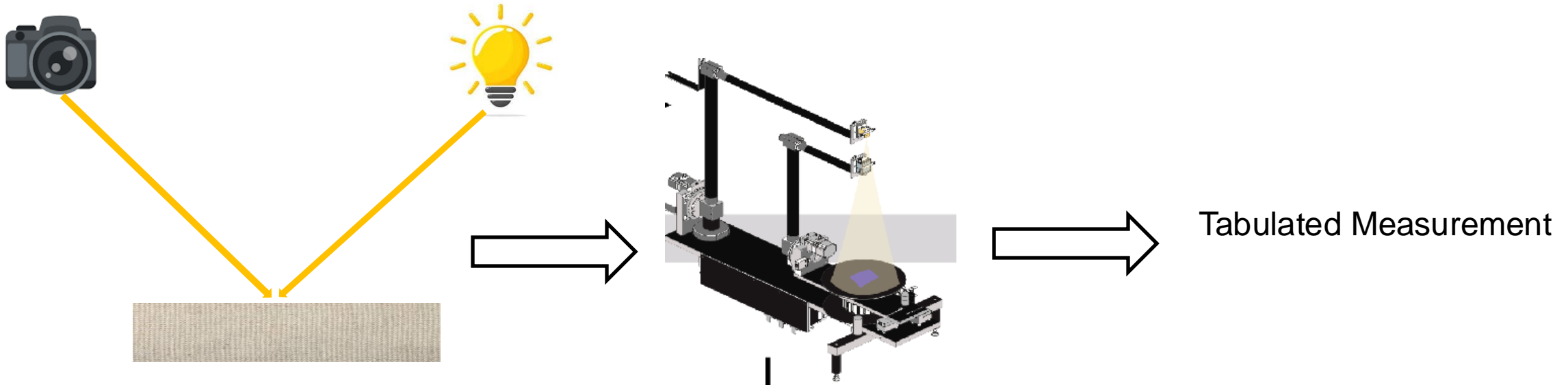
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Material Representation ---BRDF

BRDF: $f(x, \omega_i, \omega_o) = \dfrac{dL_0(x, \omega_o)}{L_i(x, \omega_i) \cos \theta_i \, d\omega_i}$ $\Longrightarrow$
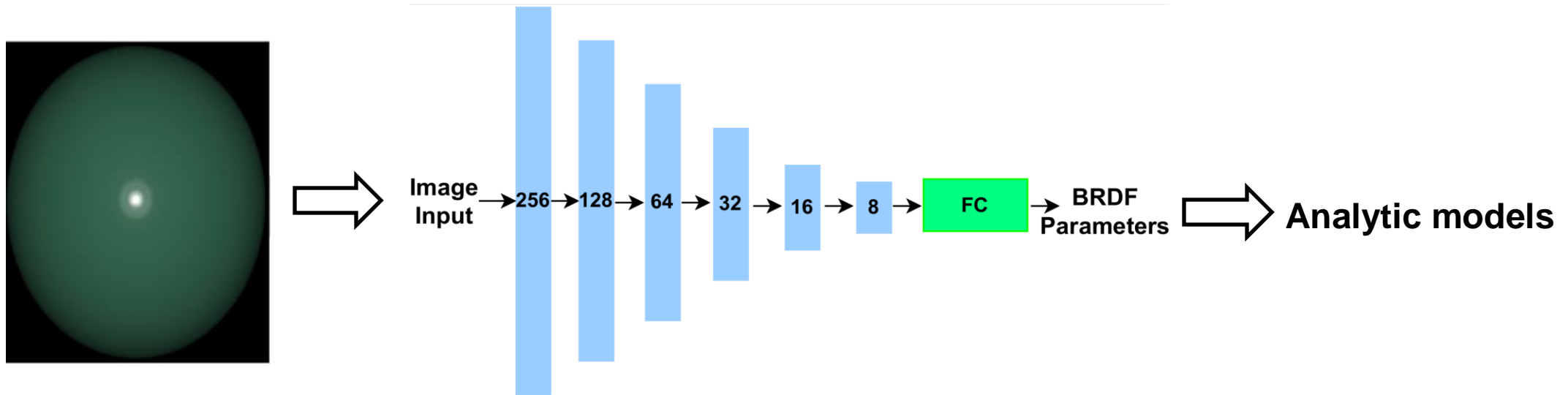
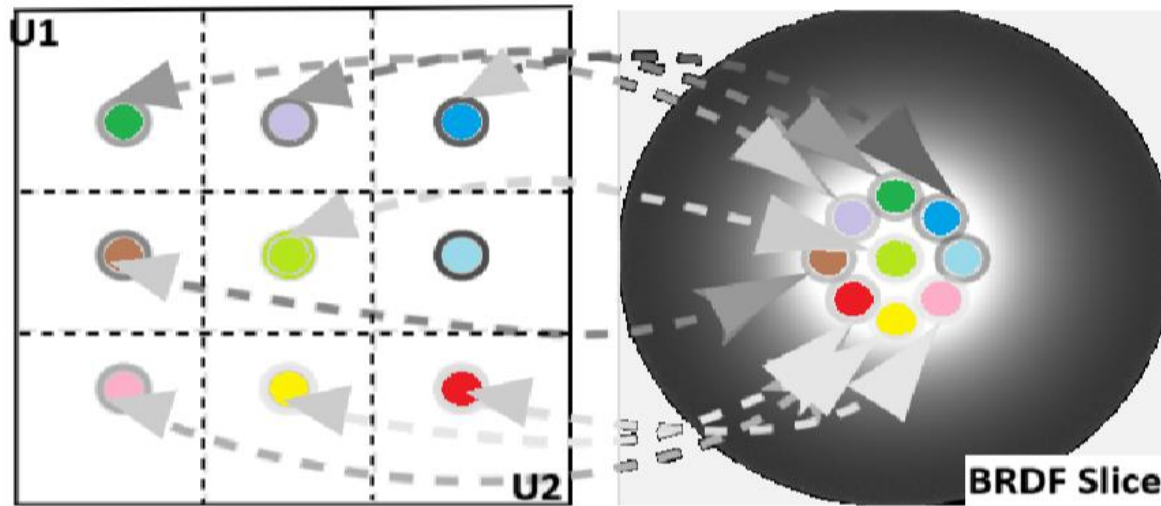Analytic models

Tabulated measurement

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BRDF Measure

About 3 days

Tabulated Measurement

BRDF Estimation from CNN

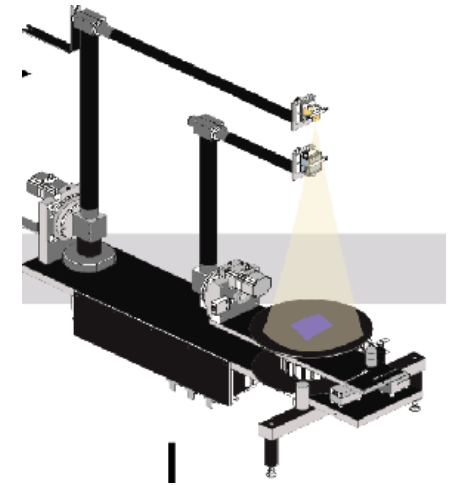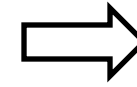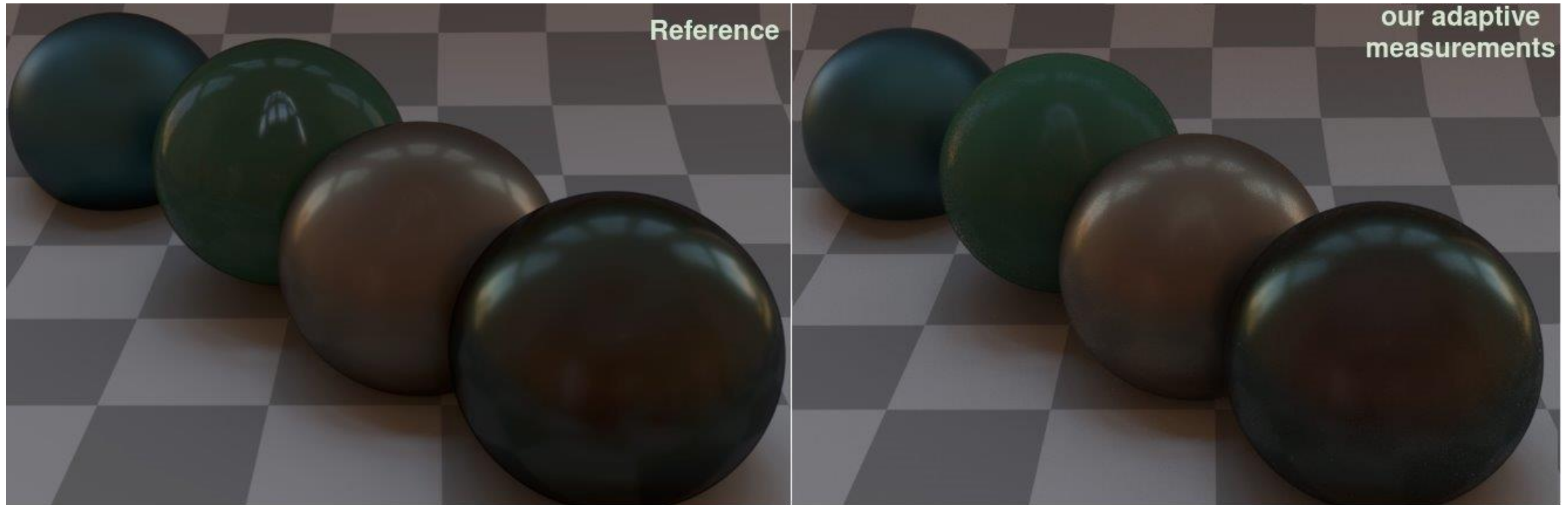# Adaptive Reflectance Sampling

Analytic models

Adaptive Sample
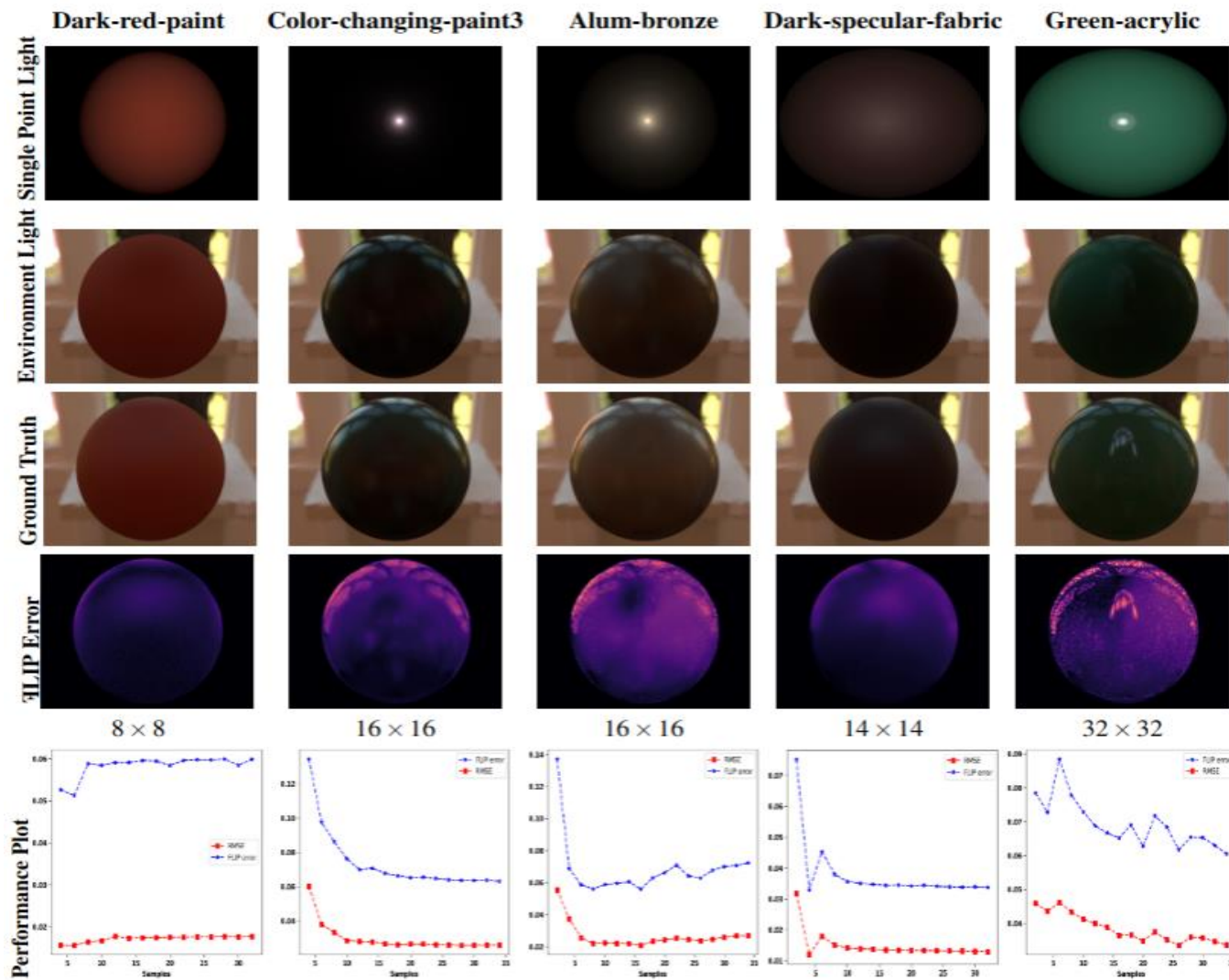
BRDF Measure

Results

Figure 5: Rendered sphere of Five Different Materials from the MERL Dataset. The first row shows our measurements rendered under single-point lighting. The second row shows our measurements rendered under environmental lighting. The third row shows the ground truth rendered under the same environmental lighting conditions. The fourth row shows the $\exists LIP$ error images between the second and third rows. The final row presents a plot of error metric values versus the number of samples for each material. The Y-axis of final row represents the RMSE and $\exists LIP$ error values, while the X-axis indicates the sample counts, ranging from 2×2 to 32×32 of outgoing directions.

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Conclusion

➢ We propose an image-based adaptive BRDF sampling method that significantly reduces BRDF measurement time while maintaining high accuracy and fidelity.

➢ We use a lightweight neural network and show that it can accurately estimate BRDF parameters and that this, in turn, can be used to importance sam- pling new directions for taking measurements.

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Thank you for Listening

This research is a part of PRIME which is funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska Curie grant agreement No 956585.