Path Guiding using Spatio-Directional Mixture Models
Supplementary Material

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Additional Comparisons Against Directional Mixtures

In Figure 1 we provide results on additional scenes to validate the claim that spatio-directional mixtures provide a benefit over using directional mixture models.

Since the directional mixtures learn worse distributions, they generally result in fewer non-zero samples. This means that the spatial tree data-structure does not subdivide nearly as much as in the spatio-directional case, resulting in very few sampling distributions. This effect compounds, creating very few, very poor guiding distributions in the purely directional case. In order to remove the influence of the number of mixture components from the comparison, when rendering using directional mixtures we fine-tuned the tree splitting threshold for each scene individually such that the final number of mixture components is approximately the same in the end. This procedure improved the DMM results in all of the cases.

Note that while there is a large improvement in the BOOKSHELF , GLOSSY KITCHEN , and YET ANOTHER BOX scenes, the improvement on the BEDROOM scene is marginal. This is explained by the fact that the BEDROOM scene has very large emitters, which can be approximated well by purely directional distributions. On the other hand, BOOKSHELF , GLOSSY KITCHEN , and YET ANOTHER BOX all have highly correlated directional distributions, resulting in a large MAPE reduction when path-guiding spatio-directional mixtures. These results corroborate the hypothesis that spatio-directional mixtures significantly improve results in scenes with large spatio-directional correlations.

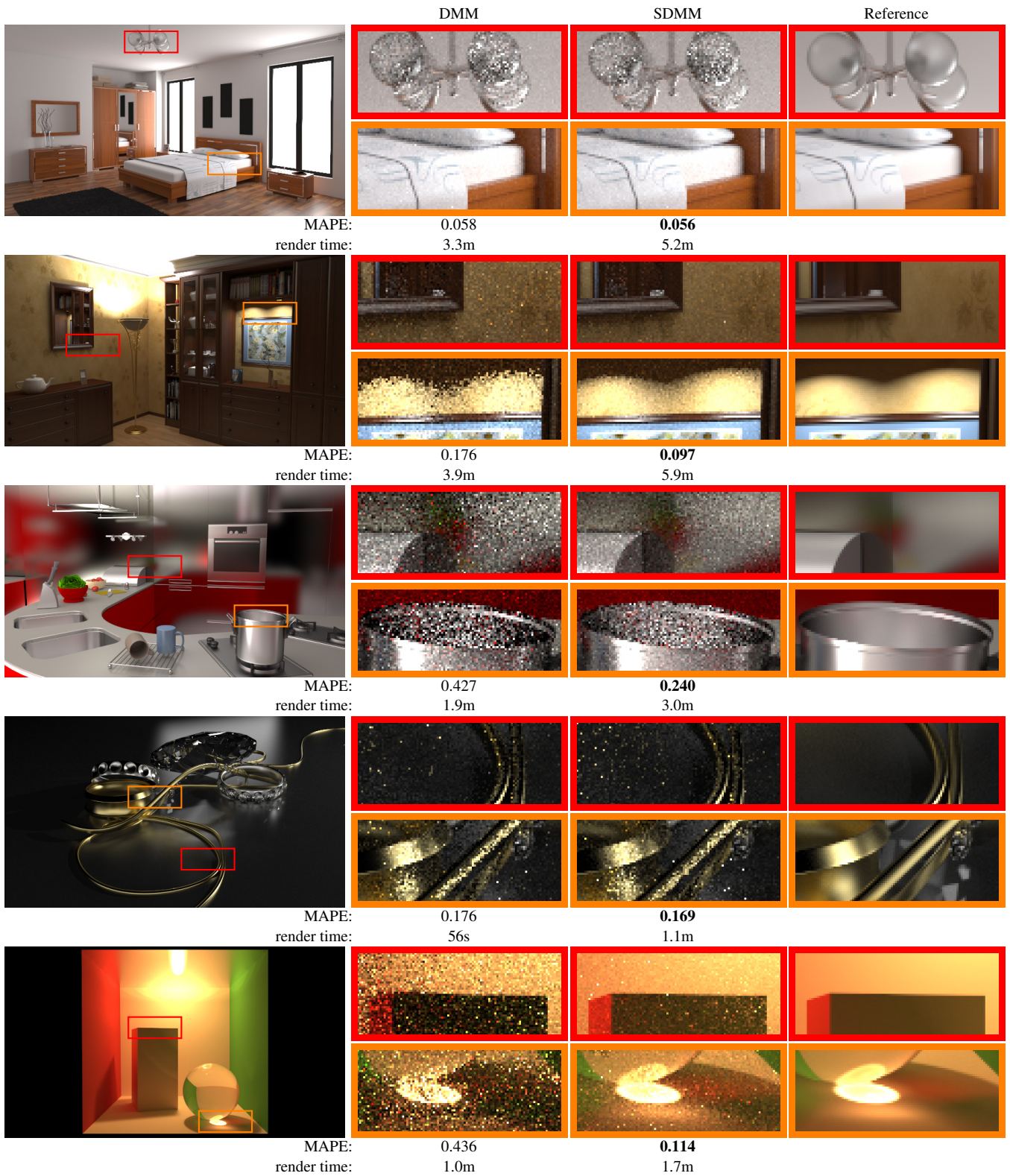|	DMM	SDMM	Reference
MAPE:	0.058	**0.056**	
render time:	3.3m	5.2m	
MAPE:	0.176	**0.097**	
render time:	3.9m	5.9m	
MAPE:	0.427	**0.240**	
render time:	1.9m	3.0m	
MAPE:	0.176	**0.169**	
render time:	56s	1.1m	
MAPE:	0.436	**0.114**	
render time:	1.0m	1.7m	

Figure 1: Comparison between spatio-directional mixture models (SDMMs) and purely directional mixture models (DMMs). The number of leaf nodes in the spatial data-structure (and therefore the total number of guiding distributions) is approximately the same in all scenes.