

Understanding the Role of Phase Function in Translucent Appearance: Image Dataset Filename Format

This is a description of the filename format used for images in the dataset released as part of [1]. The filename can be used to identify what phase function was used to render the corresponding image. The current version of the filename format only covers cases when a linear combination of at most two phase functions is used, each of which is of either Henyey-Greenstein (HG) or von-Mises Fisher (vMF) type.

HG phase functions are parametrized by one parameter, for which we use the symbol g . vMF phase functions are similarly parametrized by one parameter, which we denote k . Phase functions of both types can be either forward or backward scattering, which corresponds to positive or negative values, respectively, of the corresponding parameter.

Given the above, we use the following filename format,

$$[\text{scene}]_{-}[\text{k/g}|\text{param1}]_{-}[\text{k/g}|\text{param2}]_{-}\text{w}[\text{weight}].[\text{fileext}]$$

Fields in [] are replaced by their respective values, as explained below.

1. The first field is a keyword describing the scene, for example, “cube”, “star”, or “dragon”.
2. The second and third fields correspond to the parameters of the first and second component of a phase function. When a phase function is made of a single lobe, then the second field is the parameter of that lobe and the third can be omitted. When the phase function is a linear combination of two, then the first component is specified as follows:
 - if a forward and a backward lobe are combined, the forward is the first component;
 - if two forward lobes of different form are combined, the vMF lobe is the first component;
 - if forward lobes of the same form are combined, the one with the larger mixing weight is the first component.

The [k/g] prefixes specify the type of the corresponding lobe, (k for vMF, g for HG). Note that isotropic lobes are represented as HG lobes with $g = 0$.

3. The fourth field is the mixing weight parameter. When the phase is made of a single lobe, then this field can be omitted, or set to 1. Otherwise, the weight is equal to weight of the first component of the phase function, as defined above. Then, the weight of the second component is equal to 1 minus that of the first.
4. The sixth field is the file extension (png, exr, etc.).

Floating point values should be printed with exactly as many digits as required, without trailing zeros and without a decimal mark if one is not needed.

Here are some examples:

1. For the scene “dragon”, forward vMF with $k = 25$ and backward HG with $g = -0.9$, with the weight of the forward lobe equal to 0.25,

dragon_k25_g-0.9_w0.9.png.

2. For the scene “cube”, single HG with $g = 0.9$,

cube_g0.9.png.

3. For the scene “star”, two forward vMF lobes with $k = 25$ and $k = 75$, with the weight for the first lobe being 0.5,

star_k25_k75_w0.5.png.

4. For the scene “star”, a forward vMF with $k = 5$ and forward HG with $g = 0.95$, with the weight for the first lobe being 0.75,

star_k5_g0.95_w0.75.png.

References

- [1] GKIOULEKAS, I., XIAO, B., ZHAO, S., ADELSON, E., ZICKLER, T., AND BALA, K. Understanding the role of phase function in translucent appearance. *ACM Trans. Graph.* 32, 6 (2013). 1