

COMPUTER GRAPHICS ASSIGNMENT

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1 Phong and Gouraud shading: The differences in approach and method.

1.1 Gouraud shading

A per-vertex color calculation is used in gouraud shading, also known as smooth shading. This implies that the fragment shader will get the color that the vertex shader assigns to each vertex as an out variable. This color is interpolated across the fragments to provide the smooth shading since it is supplied to the fragment shader as an invariant variable.

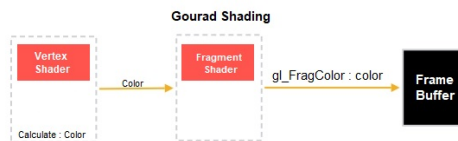


Figure 1: Gouraud Shading

1.2 Phong shading

A per-fragment color calculation is Phong shading. The fragment shader receives the normal and position information from the vertex shader as out variables. The color is subsequently calculated by the fragment shader using interpolation between these variables.

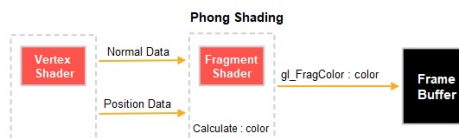


Figure 2: Phong Shading

1.3 The differences in Phong and Gouraud shading

Gouraud Shading	Phong Shading
The Gourard shading method falls somewhere in the middle of the two: like Phong shading, each polygon has a regular vector at each vertex	Each vertex of a drawn polygon has a typical vector, which is added to the surface to execute shading and determine the color for each point of interest.
This kind of shading is not expensive	This kind of shading is more expensive than Gouraud Shading
Takes a moderate amount of time and processing.	It is slower and requires complex processing. Its products are high caliber.
Gleaming surfaces	Surfaces with a polished finish.
Each vertex uses the lighting equation	Each pixel makes use of the lighting equation.
Interpolates and computes illumination at boundary verticies	Every point on the surface of the polygon is illuminated.
The methodology was initially described in 1971 by Gouraud	In 1973, Phong Shading published the method.
Henri Gouraud is the namesake of the Gouraud shading style	After Bui Tuong Phong, the Phong Shading the model was created.

Table 1: Gouraud Shading VS Phong Shading

1.4 Example of Gouraud and Phong shading

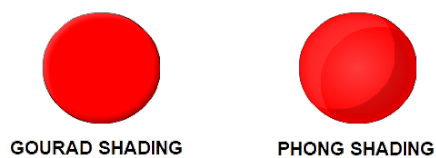


Figure 3: Gouraud Shading VS Phong Shading