



Oregon State University

Project #5: Image Manipulation

Hyuntaek Oh

ohhyun@oregonstate.edu

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1 Description

1.1 Set up

GLSL and glman are used to create a circle-shape of Magic Lens for an image display which is able to be magnified, whirled, and mosaic'ed in the project #5.

1.2 Program Description

In the fragment shader file, we need to change the fragment's (s,t) such that it is with respect to the center (uSc , uTc) of the Magic Lens. For this, we make (0,0) the center of the circle:

$$vec2 st = vST - vec2(uSc, uTc);$$

Then, we need to see if the current fragment is inside the Magic Lens circle. If it is not, do a texture lookup as normal. To check the current fragment position, if it is outside $uRad$:

$$if(length(st) > uRad);$$

, where $length(st)$ is the length of st , meaning that how far the original position is away from the center. Next, there are three different image displays and one restoring (s,t) codes. One of the image displays is magnifying. Magnifying the image needs original distance, r , and magnified one, r' :

$$float r = length(st);$$

$$float r_dot = r/uMag;$$

Another display is whirling. Whirling can be implemented by built-in function $atan()$:

$$float theta = atan(st.t, st.s);$$

$$float theta_dot = theta - uWhirl * r_dot;$$

After that, restoring (s,t) of the magic lens for Mosaic'ing:

$$st = r' * vec2(cos(theta_dot), sin(theta_dot));$$

$$st+ = vec2(uSc, uTc);$$

Lastly, mosaic'ing can be implemented:

$$float s = st.s; float t = st.t;$$

$$int numins = int(s/uMosaic); int numint = int(t/uMosaic);$$

$$float sc = (numins + 0.5) * uMosaic; float tc = (numint + 0.5) * uMosaic;$$

$$st.s = sc; st.t = tc;$$

Thus, we can move magic lens in the image and make three different image displays, magnifying, whirling, and mosaic'ing.

1.3 URL

Video Link(bitly): <https://bit.ly/41hoVFj>

Video Link(original):

https://oregonstate.zoom.us/rec/share/IJ4Ut76n4Z40IhqI2Zkjud4x8ydhEj1L7ZEIpNCBjStwid_Q80QK11YAJTqFZWc.TlWAN8kg25cZ8Nnj?startTime=1739508339000

1.4 Test Result

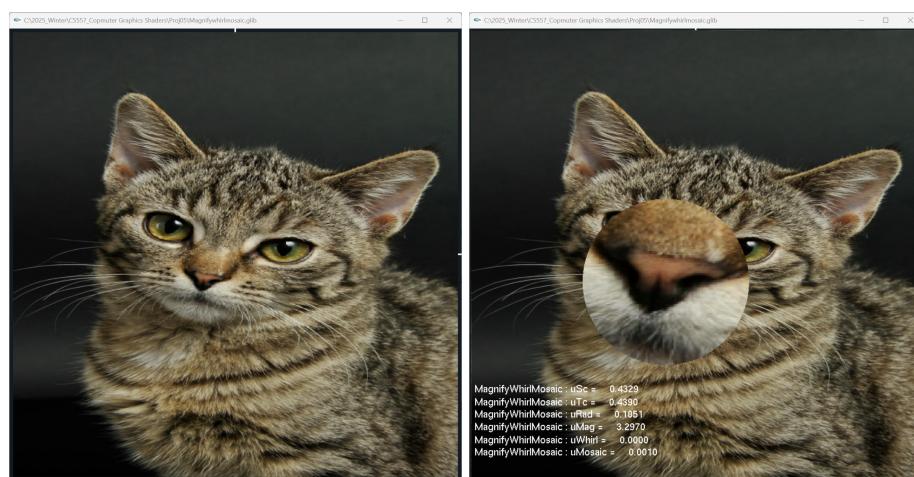


Figure 1: Original (left) and Magnify (right)

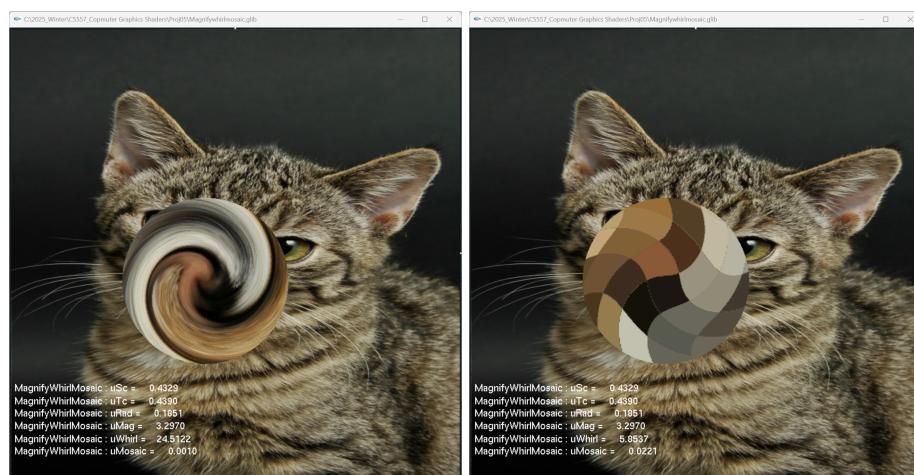


Figure 2: Whirl (left) and Mosaic (right)