Oregon State University

CS_557_X001_W2022 COMPUTER GRAPHICS SHADERS

Project #5

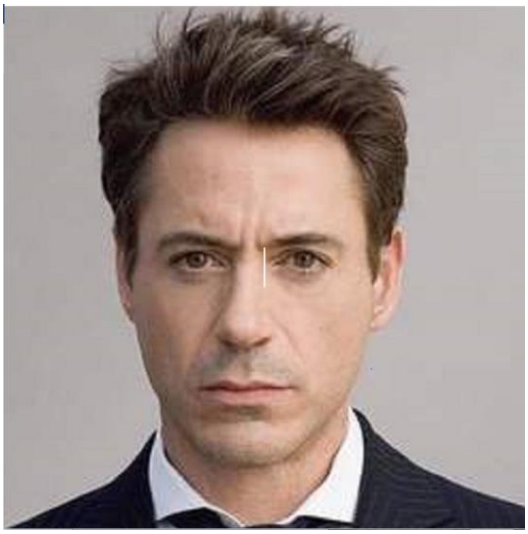
Professor: Mike Bailey
Student: Chengxu Xu
(xucheng@oregonstate.edu)

For this assignment I used glman to implement the fisheye, rotation, blending and contrast functions. The ratio of the fisheye was adjusted with uPower, the radius of the rotation with uRtheta, the ratio of the blending of the two images with uBlend, and finally the contrast parameter with uContrast

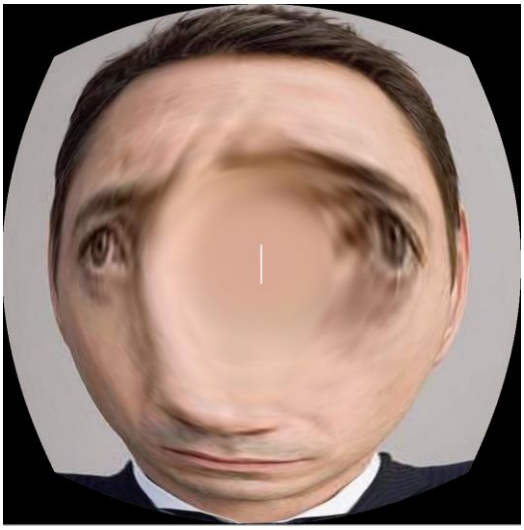
Screen Shots：

Kaltura link: https://media.oregonstate.edu/media/t/1_3xmmsoe5

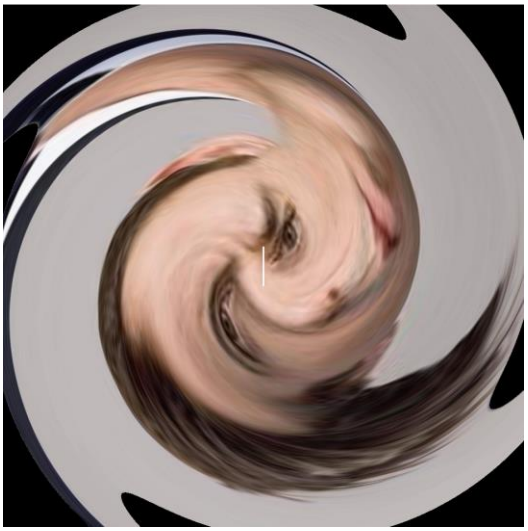
Original



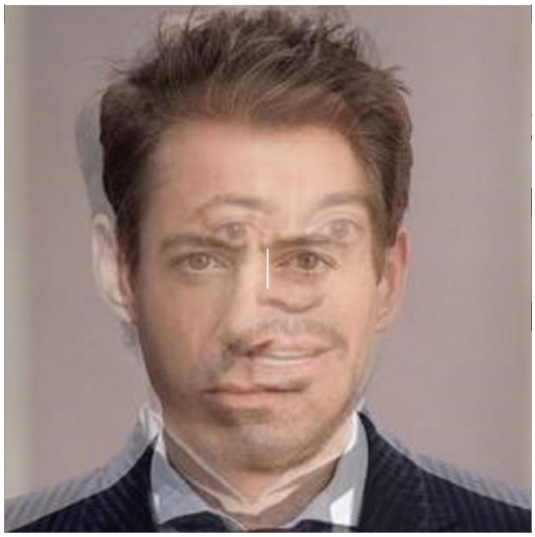
adjust uPower



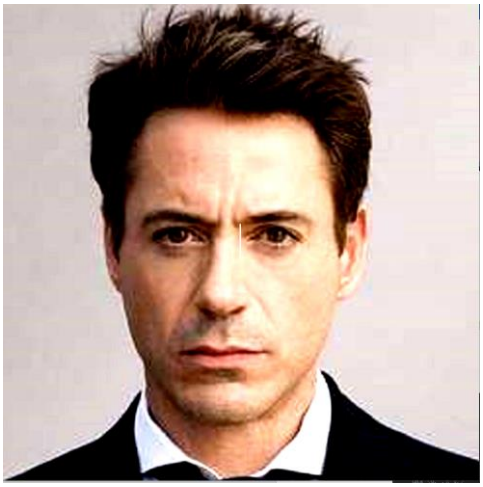
adjust uRtheta



adjust uBlend



Adjust uContrast



Key snippets:

Parameter predefined:

```
Vertex      whirlfisheye.vert
Fragment        whirlfisheye.frag
Program         WhirlFisheye                    \
        TexUnitA 5                              \
        TexUnitB 6                              \
        uPower <1. 1. 10.>                      \
        uRtheta <0. 0. 50.>                     \
        uBlend <0. 0. 1.>                       \
        uContrast <1. 1. 2.>
```

Fisheye with uPower:

```
vec2 st = vST - vec2(0.5,0.5);  // put (0,0) in the middle so that the range is -0.5 to +0.5
float r = length(st);
float r1 = pow(float (2*r), uPower);
```

Whirl with uPower:

```
float theta  = atan2( st.t, st.s );
float theta1 = theta - uRtheta * r;
```

```
st = r1 * vec2( cos(theta1),sin(theta1) );          // now in the range -1. to +1.
st += 1.0;                                  // change the range to 0. to +2.
st *= 0.5;                          // change the range to 0. to +1.
```

Blender and contrast:

```
// if s or t wander outside the range [0.,1.], paint the pixel black
if( st.s < 0 || st.t <0 ){
    gl_FragColor = BLACK;
}
else if( st.s > 1 || st.t > 1 ){
    gl_FragColor = BLACK;
}
```

```
else
{
    //sample both textures at (s,t)
    vec4 texa = texture2D( TexUnitA, st);
    vec4 texb = texture2D( TexUnitB, st);
    //mix the two samples using uBlend
    vec4 texblend = mix( texa, texb, uBlend );
    vec3 iout = (1 - uContrast) * vec3( 0.5, 0.5, 0.5 ) + uContrast * texblend.rgb;
```