Step- and Blended-edged Elliptical Dots

CS457 Shaders: Project Five

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Have you ever wanted to play I Spy but couldn't find your magnifying glass or your I Spy book? Well, do not fear! This little project utilizes the fragment shader to create a magic lens that you can move around an image, allowing you to zoom, magnify, and sharpen the image under your lens. Fragment shaders are handy for doing image manipulation and post-processing, such as adjusting contrast, saturation, sharpness, luminosity, and edge detection.

Creating the lens was very simple- for each fragment, if it is outside the bounds of the lens, do a normal texture lookup. If it's within the bounds, do this order of operations:

- Translate yourself to the origin (s,t) = (.5, .5) since rotation and magnification need to be performed in respect to the origin
- Magnify by a user-inputted magnification value (keep in mind that since we're working in terms of (s,t), not (x,y), you need to perform the inverse of what you want (e.g. multiply by 1/mag).
- Rotate the image (use cosines and sines)
- Translate back to the current (s,t) location of the fragment you left off at
- Perform image sharpening (sample nearby colors and put emphasis on a subsection of the colors to create a saturated, sharpening effect)
- Move on to the next fragment!

Some screenshots of my project are included in the next page.

Screenshots:

Circular lens, high sharpening

Circular lens, very low sharpening, rotated right

Rectangle lens, rotated left, zoomed way out to see tessellation frog!

Rectangle lens, rotated slightly right, zoomed in, straight into the frog's soul

Video link: https://youtu.be/zcXjDgqUCPY