Prism Project

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Webpage, containing a video: https://themarinam.wixsite.com/prismproj
Source code: https://github.com/theMarina/prizmaproj

How does it work?

The image to be projected is displayed on the screen, and reflected by the prism. The created effect of a floating figure that is called the Pepper's ghost illusion.
I designed the prism parts using Fusion 360, under the constraint that the angle between each face and the monitor below is 45°. The model was cut out of perspex using a laser cutter in Microsoft. The result is depicted in the figure below.
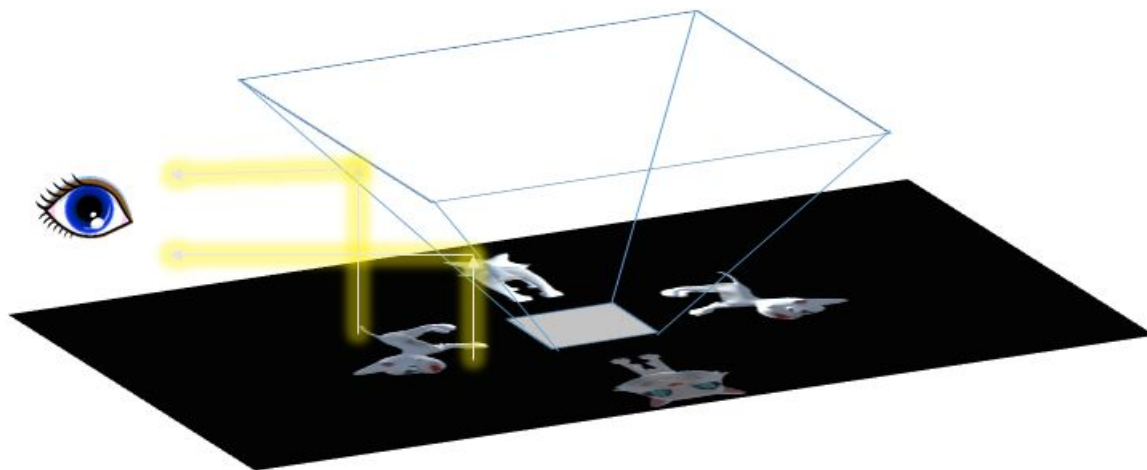
Blurriness

The light is actually reflected from both sides of the glass. As the glass it thicker, we see the image duplicated with a slight shift.
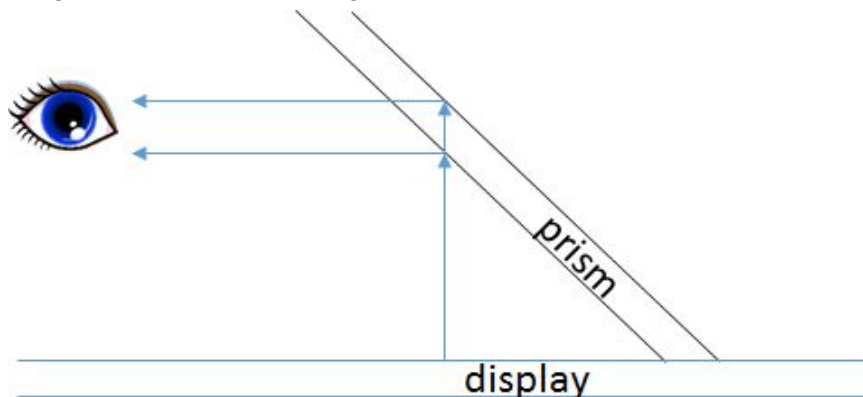
The first prototype was I built was small, and made out of CD-ROM cases. The CD-ROM case was thinner than the perspex of the final prism, thus creating a sharper image.

Input methods

My project supports 2 modes of input, live from a webcam, and from a 3D model.

Input from webcam

I am creating a live stream from the webcam, and using ffmpeg filters I rotate and position the images correctly.
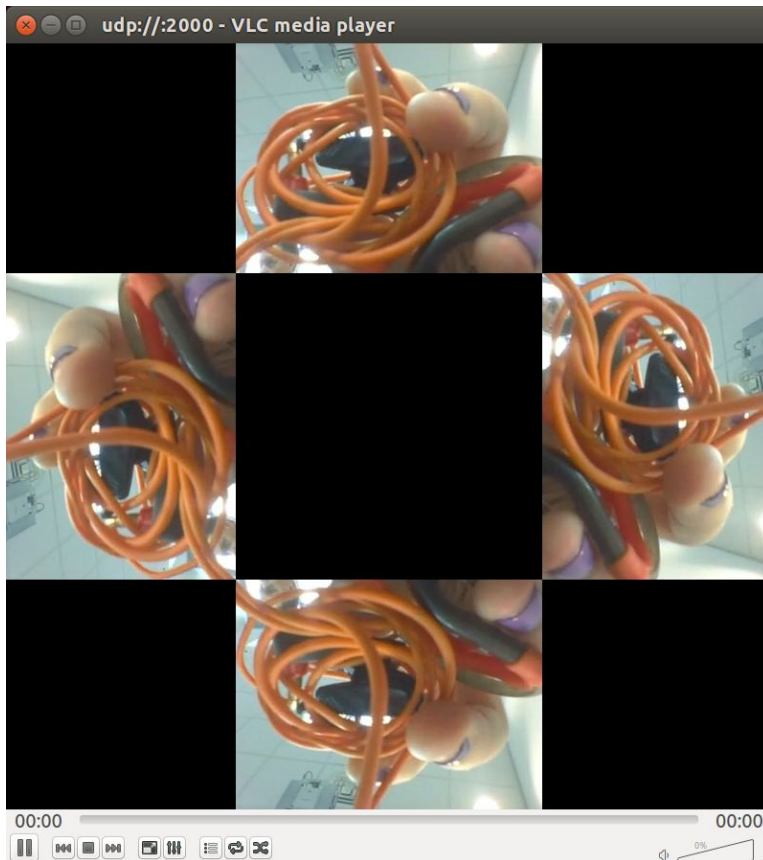
Creating a more realistic hologram, with 4 points of view has 2 main problems:
1. There is a need for a physical environment with 4 correctly positioned cameras
2. Physical cameras might capture each other

Input from a 3D model

I place 4 cameras in the unity universe, position their outputs on the screen, and mirror flip them to generate the correct output.
The rendering process begins by a 3D model. The model is rendered by 4 cameras from 4 directions. The images from each camera are mirror-flipped and placed in the display in the correct positions.

On the left we can see the camera positioning, and on the right is the output.
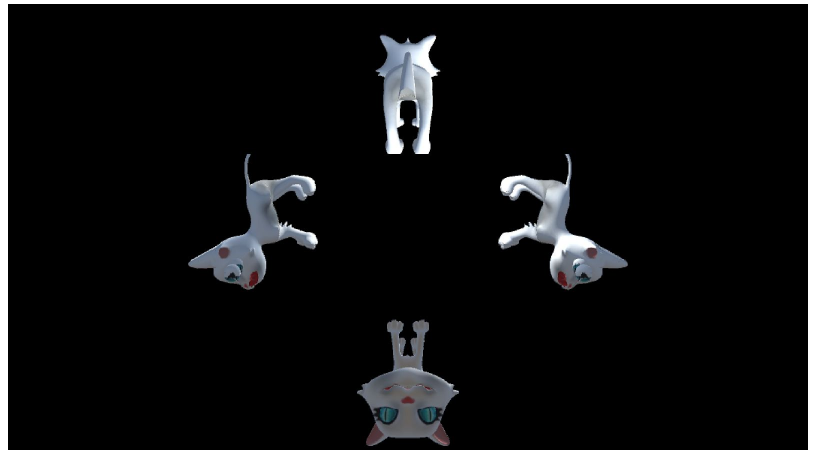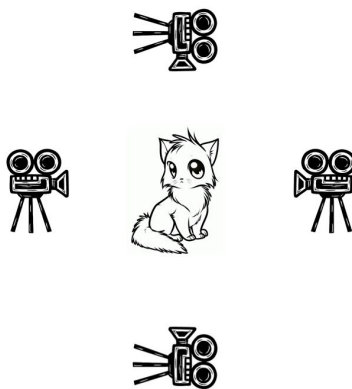
For the final display, I wrote a script that iterates over animated models of different animals.