

Monocular occlusion by a rotating shutter

Janis Intoy

Updated: July 27, 2018

An occluder is needed to accurately and independently calibrate each line of sight on a stimulus when the eyes are stimulated by the same stimulus (for example, binocular recordings during examination of a Snellen chart).

For the Binocular Snellen experiment, the occluder will be used during the manual calibration of each eye and during recalibration trials to ensure that the localization of each line of sight is done independently in each eye. There will be no occlusion during the Snellen task.

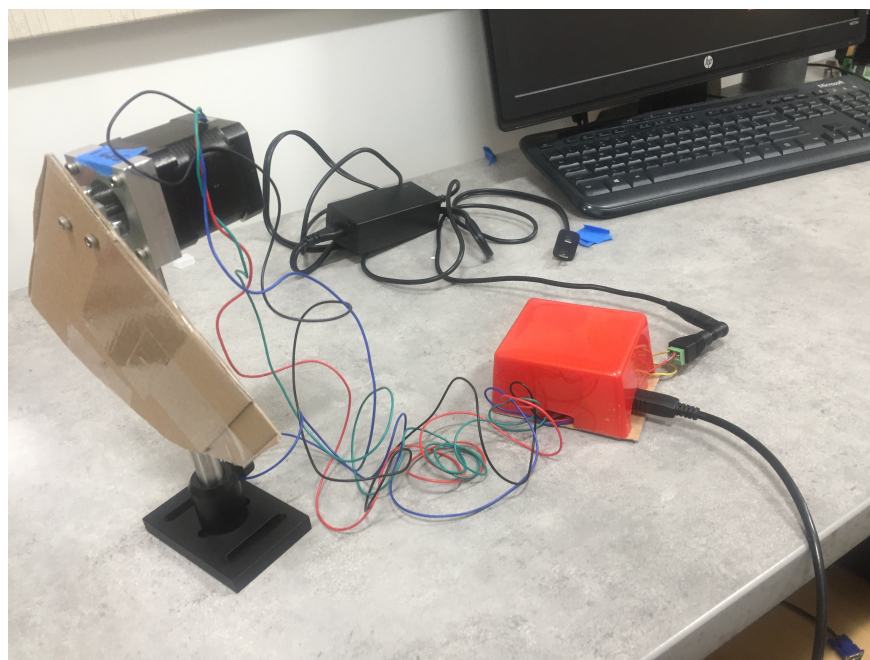


Figure 1: Motor with cardboard occluder, connected to Arduino in red box, with 12V power and usb cable.

Hardware

The hardware consists of a motor with an attached plastic or cardboard shutter piece controlled by an Arduino board (in the red box). The motor needs a power source with at least 12V that plugs into the board. The board is connected to the computer via a USB cable.

The cardboard piece in the photo can be replaced by a different piece, preferably a black opaque material and could be customized for each subject.

Software

The necessary Arduino driver and example C++ code to use can be found in:

- Link to Google Drive - compatible with Visual Studio 2013 compiler
- D:/Janis/Motor - compatible with Visual Studio 2017

Instructions:

1. Install the Arduino drivers by running the executable.
2. In Visual studio, update the following:
 - Open **Tools**→**Options**.
 - Select **Debugging**→**Symbols** in the left menu.
 - Check the box for **Microsoft Symbol Servers**.
 - Click **OK**.
3. You may need to edit the COM port in the main file to run the code. Check in **Device Manager** which Port the arduino is plugged into and modify accordingly in the .cpp file (for example, "COM6").

Usage

You can set the rotational position of the motor by sending in different values (see main.cpp for example). 90° rotations are multiples of 0.8125. However, the occluding piece attached to the motor can be moved manually independent from the motor's internal state.

You can run main.cpp so that you know the final state of the motor, and manually position the occluding piece afterwards. For Snellen, I have main.cpp end at position X1.625, then manually position the piece so that is downwards (or the mounting screw is pointing up). All of the commands sent in the Snellen experiment are based on this definition (as of July 27) in Figure 2.

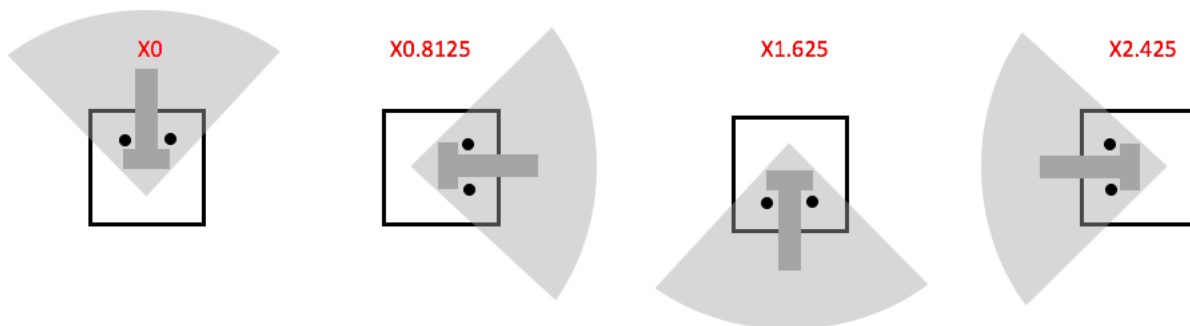


Figure 2: Example positioning of shutter as in the binocular Snellen experiment. Other positions off of the cardinal could of course be used.