# Audio Eye

This document is a description of a concept that may allow blind people to use their ears to “see”. This would be achieved using some hardware and software. A first demo of the software has been developed on 22 December 2019 and is available at <https://github.com/mth128/AudioEye>.

The idea is to convert images and video into sound. This is not an entirely new concept, as it has already been launched using the vOICe “Seeing with sound” app, proving this idea has potential. However, the philosophy and approach of Audio Eye is slightly different. The goal of the vOICe is to generate 2D images from left to right, with a sound sample of 1 second for each image. The idea of Audio Eye is to make it possible to track light sources and/or shapes in real time speed. If it works, the blind person may be able to catch a ball.

The way this is achieved, is by using a spiral shape (named the “Eyeweb”), in which the center of the spiral has the highest resolution of the image. The center of the spiral is converted to the highest frequency audio. The further away from the center, the lower the audio frequency. Every 360 revolution in the spiral the frequency is divided by a half. Hence the sound tone is fixed for each direction. The tone on the right is set to a C of a musical instrument. Every 30 degrees clockwise, the tone is one higher. Hence having all 12 tones in a single 360 revolution.

The idea of using this spiral, is in order to mimic the function of the eye. The center of the eyes retina has the highest pixel density, while the outer edges of the retina are mostly to provide context. If anything prominent happens in these edges, the person would move their eyes toward that prominent event. The same would be required for this spiral shaped EyeWeb: in order to get more detail, the camera must be aimed at the point of interest.

## Software

For this audio Eye software is available at <https://github.com/mth128/AudioEye>.

### EyeWeb

### Playing with contrasts.

## Hardware

This chapter describes the optimal hardware. A simpler version with simpler hardware should be possible for testing purposes. The minimal hardware should be a camera and a speaker, which is standard available in a mobile phone.

### (Sun)glasses mounted double Camera

### Eye Tracking device

### Headphones