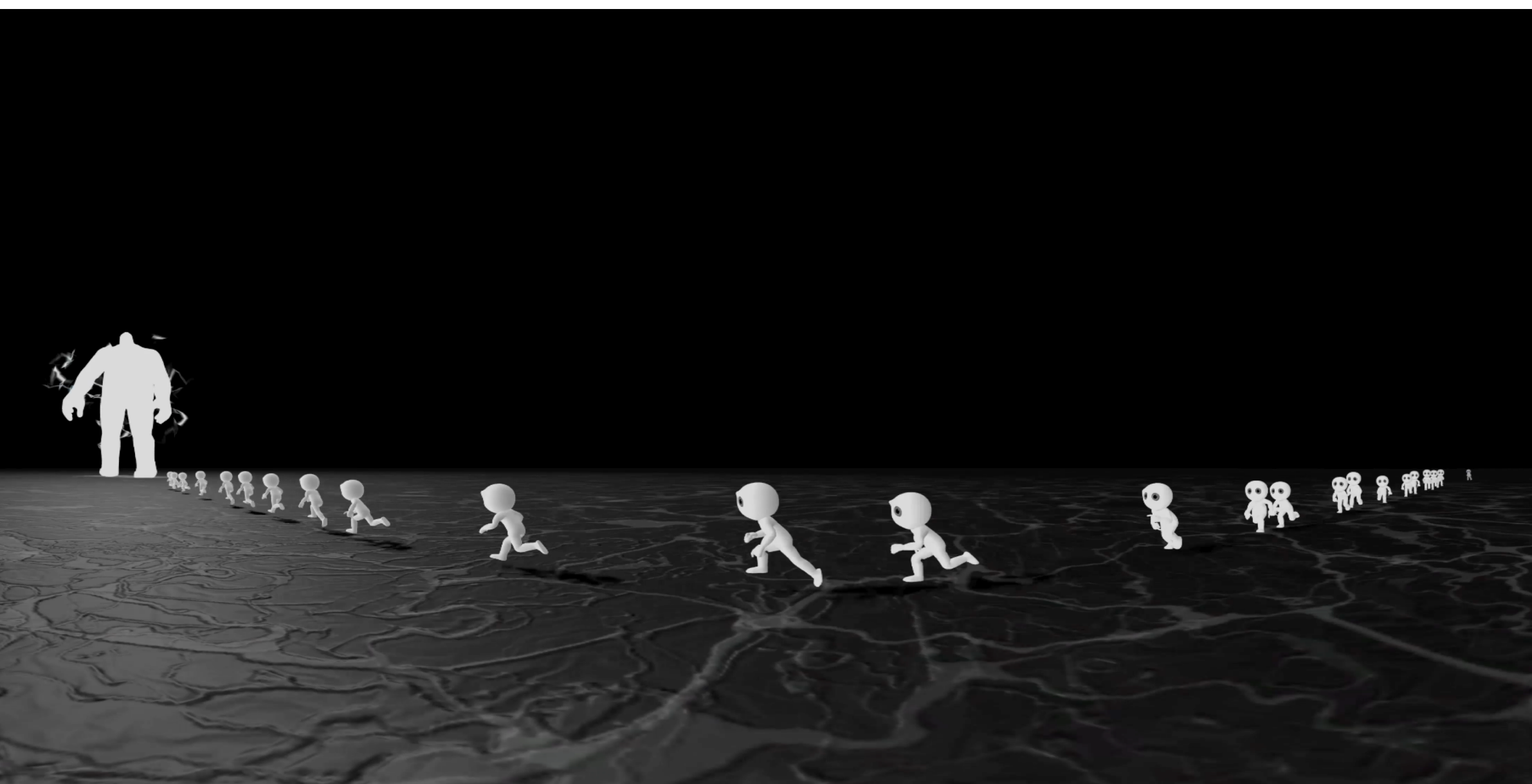


## Problem

- Unity is one of the major applications currently used for creating films in VR medium.
- Unity allows for creating both VR visuals and spatialized sound to accompany it.
- Possible to render 360 video directly from Unity using various assets publicly available.
- Currently no way to retrieve the spatialized sound constructed in Unity.
- Currently creating a spatialized soundtrack for VR films in Unity involves recreating the ambisonic soundtrack using a DAW's.



## Use Examples

- Creating footstep sound effects manually is both location specific and timing intense.
- Easy to create in Unity using collision based sound clip triggering.
- This project provides a way to export the collision based sounds with the same timings and locations.
- Check out the results in the demo shown.

## Solution

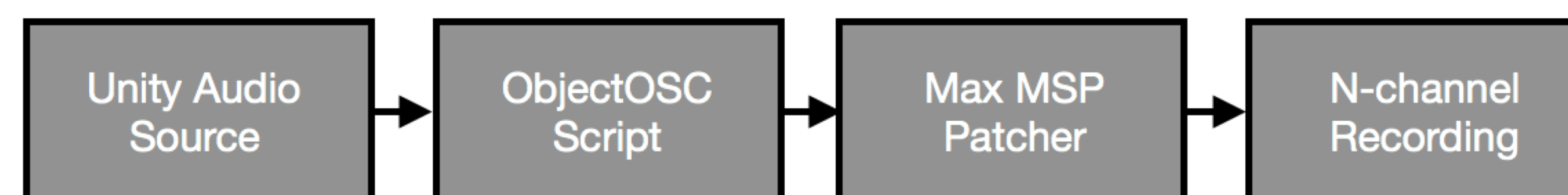


Figure 1 : High level overview of solution.

- Unity scripts allow for transfer of sound files and location/timing data of Unity AudioSources to Max MSP patcher.
- Max MSP patcher retrieves and interprets data coming over UDP in the form of OSC packages.
- Max MSP patcher uses HOAL ambisonic library to perform live ambisonic encoding and decoding into anywhere from 4 to 32 channels.
- Max MSP patcher allows for recording of the soundtrack for later stitching with the video.

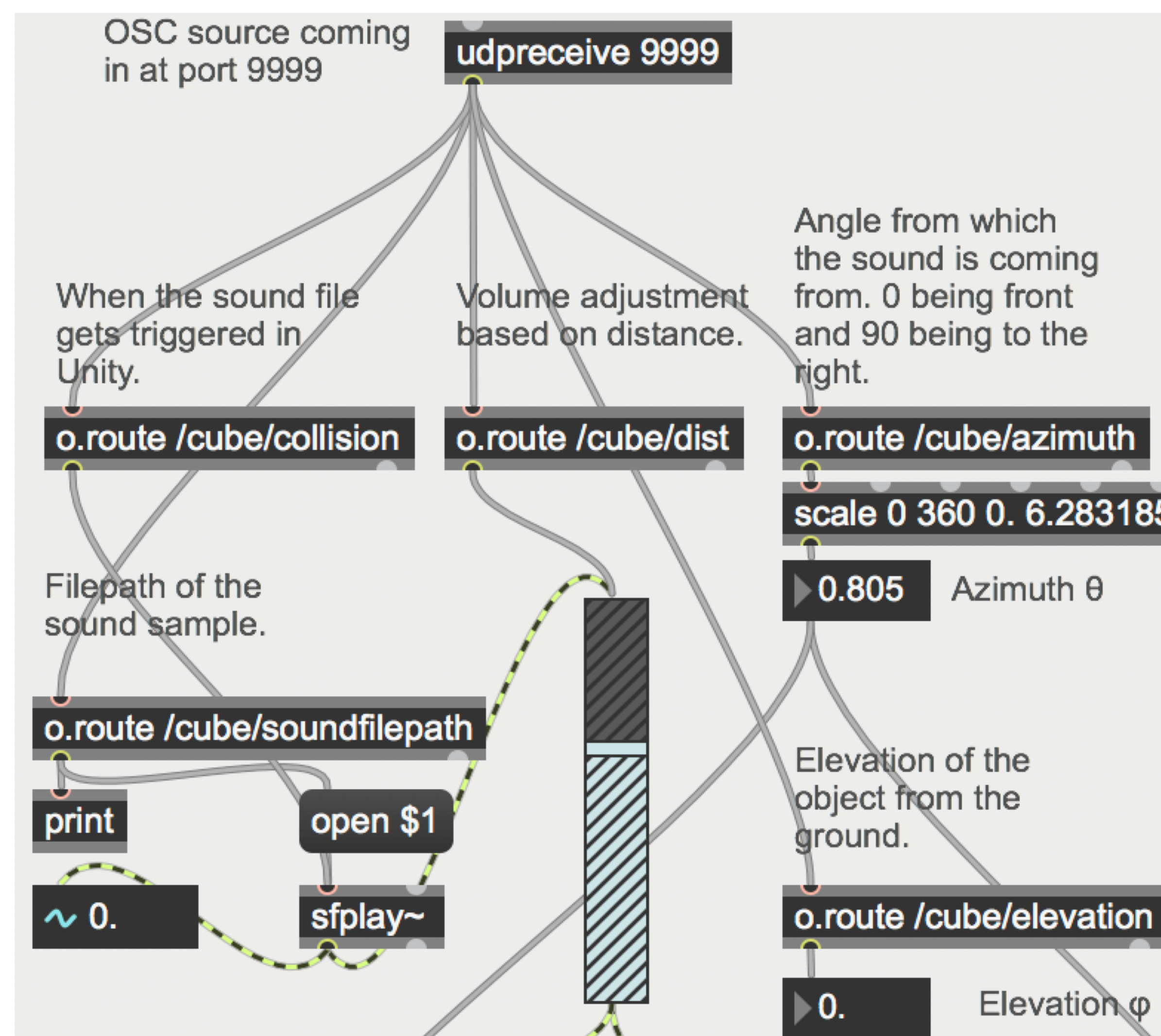


Figure 2 : OSC package retrieval and interpretation

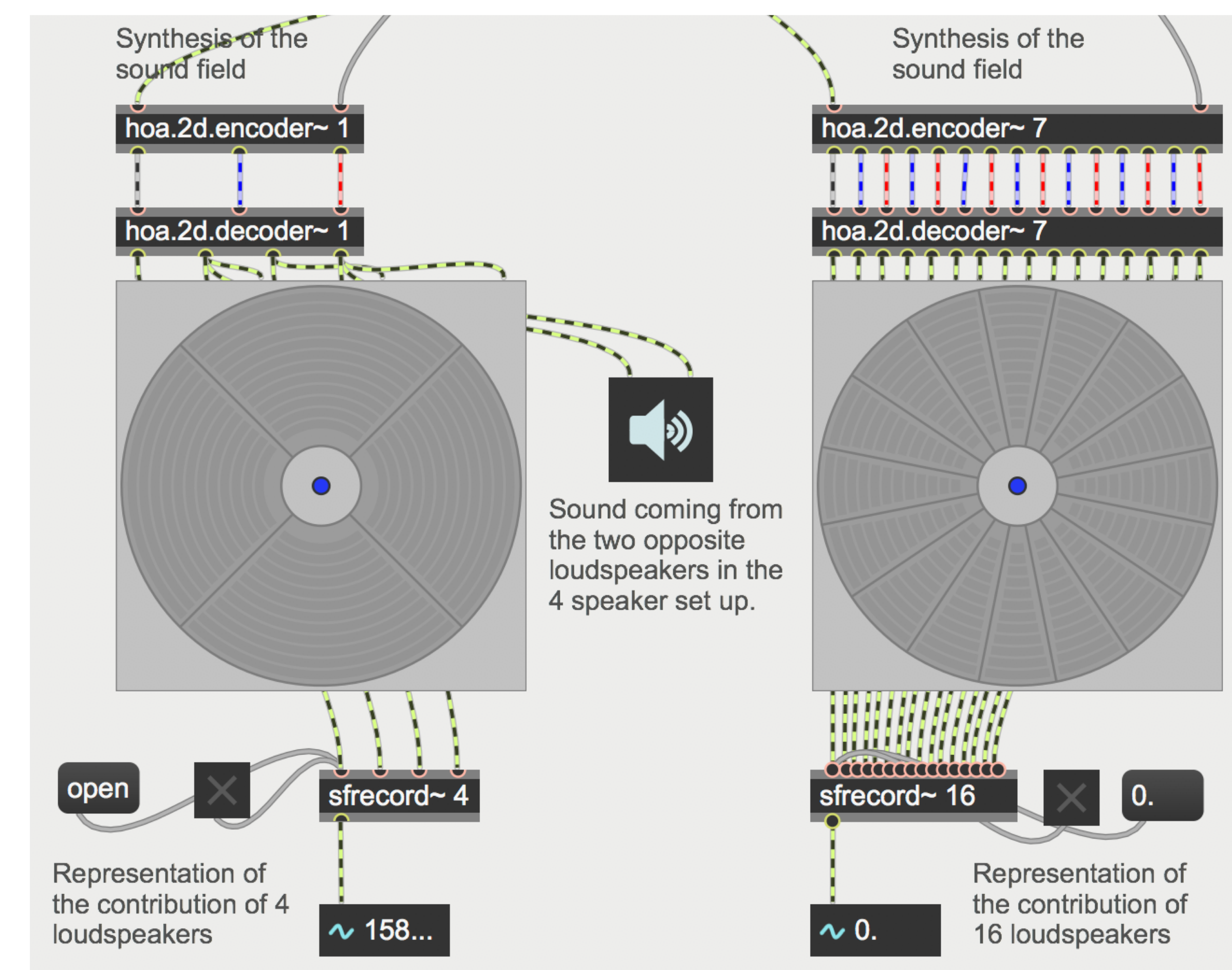


Figure 3 : Ambisonic Encoding / Decoding and Recording

## Future Work

- Expand to fully 3D ambisonic encoding, meaning the object elevation would also be taken into account
- Allow for easy addition of multiple sound sources by just adding them in Unity.
- Create a clean UI for the Max MSP patcher.
- Add an installation script that simplifies that process.

## References

- OSC for Unity:  
<https://github.com/jorgegarcia/UnityOSC>
- Ambisonic Encoding/Decoding in Max:  
<http://hoalibrary.mshparisnord.fr/en/downloads/max/>