

CLAIMS

1. A method comprising:
determining, by a processor, a direction of sound received by an array of beamforming microphones,
wherein the array of beamforming microphones receive sound from different directions;
determining, by the processor, a focus based on the direction of the sound;
outputting, by the processor, a signal based on the focus;
receiving, by an audio output device, the signal output by the processor; and
outputting, by the audio output device, a filtered sound, the filtered sound preferentially treating certain sounds received by the array of beamforming microphones based on the signal output by the processor.
2. The method of claim 1 further comprises providing a smart contact lens comprising the array of beamforming microphones, wherein the smart contact lens is worn by a user.
3. The method of claim 1, wherein determining the direction of the sound comprises determining a gaze direction of a user.
4. The method of claim 3 comprises filtering the sound received by the array of beamforming microphones based on the gaze direction of the user to determine filtered sound.
5. The method of claim 4, wherein the filtered sound is output via a bone conduction hearing device.
6. The method of Claim 3, 4 or 5 wherein the gaze direction of the user is determined based on sound localization of the sound received by the array of beamforming microphones.
7. The method of Claim 1, further comprising displaying a visual simulation synchronized to the filtered sound.
8. The method of Claim 7, further comprising changing a playback speed of the filtered sound and the visual simulation.
9. The method of Claim 7, further comprises providing a smart contact lens comprising the array of beamforming microphones, wherein the smart contact lens is worn by a user and wherein the visual simulation is displayed by the smart contact lens.
10. The method of Claim 7, wherein the visual simulation is displayed on an external display.

11. The method of Claim 1, further comprising displaying a visual augmentation synchronized to the filtered sound.
12. The method of Claim 9, further comprising changing a playback speed of the filtered sound and the visual augmentation.
13. The method of Claim 9, wherein the visual augmentation is displayed by the smart contact lens.
14. The method of Claim 9, wherein the visual augmentation is displayed on an external display.
15. A non-transitory computer readable storage medium comprising computer executable instructions which when executed by a computer cause the computer to perform a method of filtering sounds, the method comprising:
 - determining, by a processor, a direction of sound received by an array of beamforming microphones, wherein the array of beamforming microphones receive sound from different directions;
 - determining, by the processor, a focus based on the direction of the sound;
 - outputting, by the processor, a signal based on the focus;
 - receiving, by an audio output device, the signal output by the processor; and
 - outputting, by the audio output device, a filtered sound, the filtered sound preferentially treating certain sounds received by the array of beamforming microphones based on the signal output by the processor.
16. The non-transitory computer readable storage medium of claim 15 further comprises providing a smart contact lens comprising the array of beamforming microphones, wherein the smart contact lens is worn by a user.
17. The non-transitory computer readable storage medium of claim 15, wherein determining the direction of the sound comprises determining a gaze direction of a user.
18. The non-transitory computer readable storage medium of claim 17 comprises filtering the sound received by the array of beamforming microphones based on the gaze direction of the user to determine filtered sound.
19. The non-transitory computer readable storage medium of claim 18, wherein the filtered sound is output via a bone conduction hearing device.
20. The non-transitory computer readable storage medium of Claim 17, 18 or 19, wherein the gaze direction of the user is determined based on sound localization of the sound received by the array of beamforming microphones.

21. The non-transitory computer readable storage medium of Claim 15, further comprising displaying a visual simulation or augmentation synchronized to the filtered sound, wherein the visual simulation or augmentation is displayed by at least one of the smart contact lens and an external display.
22. The non-transitory computer readable storage medium of Claim 21, further comprising changing a playback speed of the filtered sound and the visual simulation.
23. A system comprising:
an array of beamforming microphones;
a processor in electronic communication with the array of beamforming microphones and configured to determine a direction of sound received by the array of beamforming microphones, determine a focus based on the directions of sound, and output a signal based on the focus; and
an audio output device configured to receive the signal output by the processor and to output a filtered audio, the filtered audio preferentially treating certain sounds received by the array of beamforming microphones based on the signal output by the processor.
24. The system of Claim 23, further comprising a mobile device including the processor, wherein the array of beamforming microphones are disposed on a contact lens.
25. The system of Claim 24, wherein the contact lens is paired with at least one of the mobile device and the audio output device.
26. The system of Claim 23, further comprising a mobile device including the processor, wherein the array of beamforming microphones are disposed on a frame of eyewear.
27. The system of Claim 26, wherein the array of beamforming microphones is pointed substantially in a direction of a view afforded by the frame of eyewear when worn by a user.
28. The system of Claim 24, wherein the array of beamforming microphones is paired with at least one of the mobile device and the audio output device.
29. A computer program comprising program code means adapted to perform the method of any claims 1 to 14, when said program is run on a computer.