

VisAural

A wearable sound-localisation device for people with impaired hearing

PROBLEM + MOTIVATION

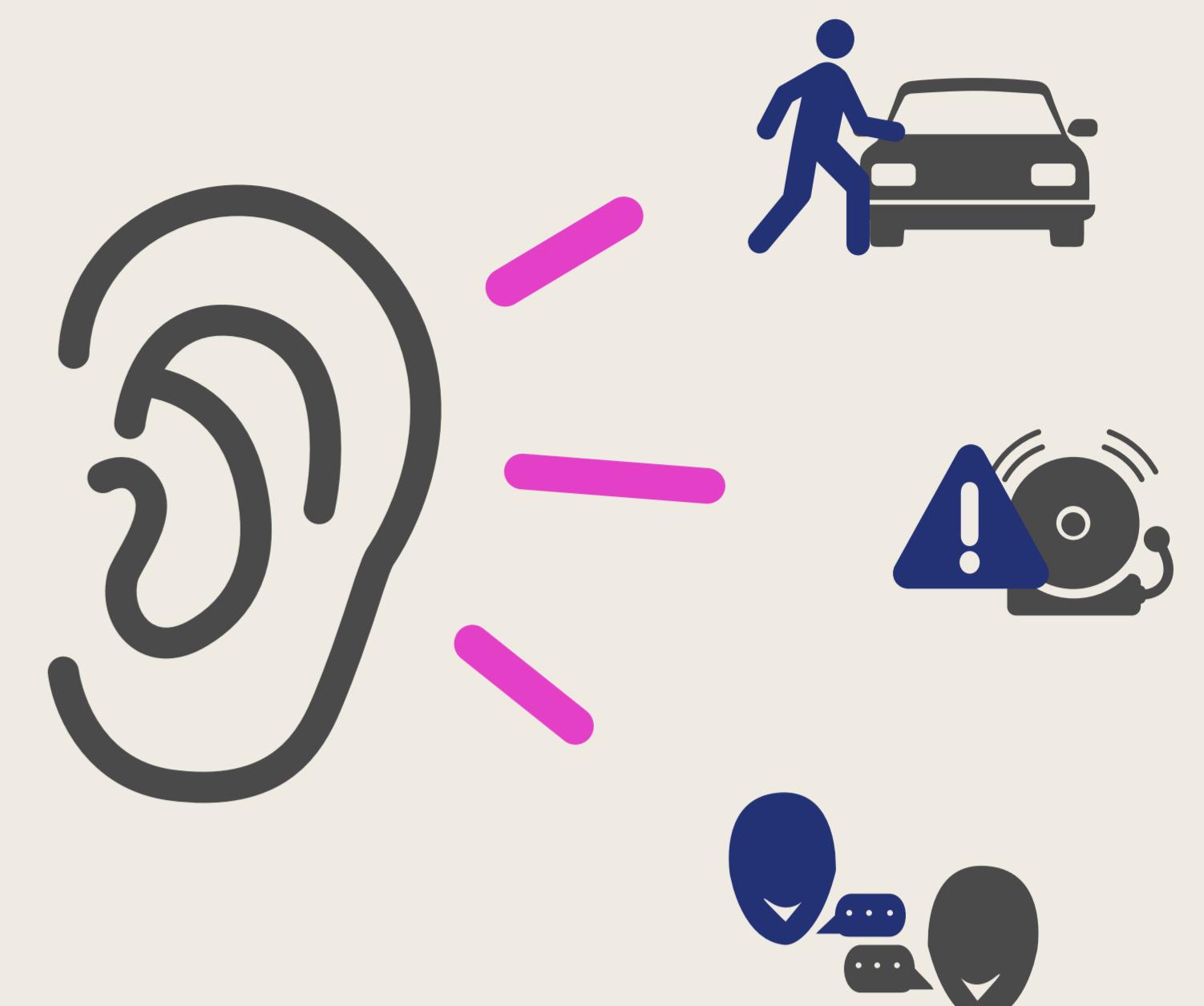


1 in 6 people

Action on Hearing Loss Information
2011 (UK)

People with impaired hearing often cannot locate the direction of a sound source as well as those with typical hearing.

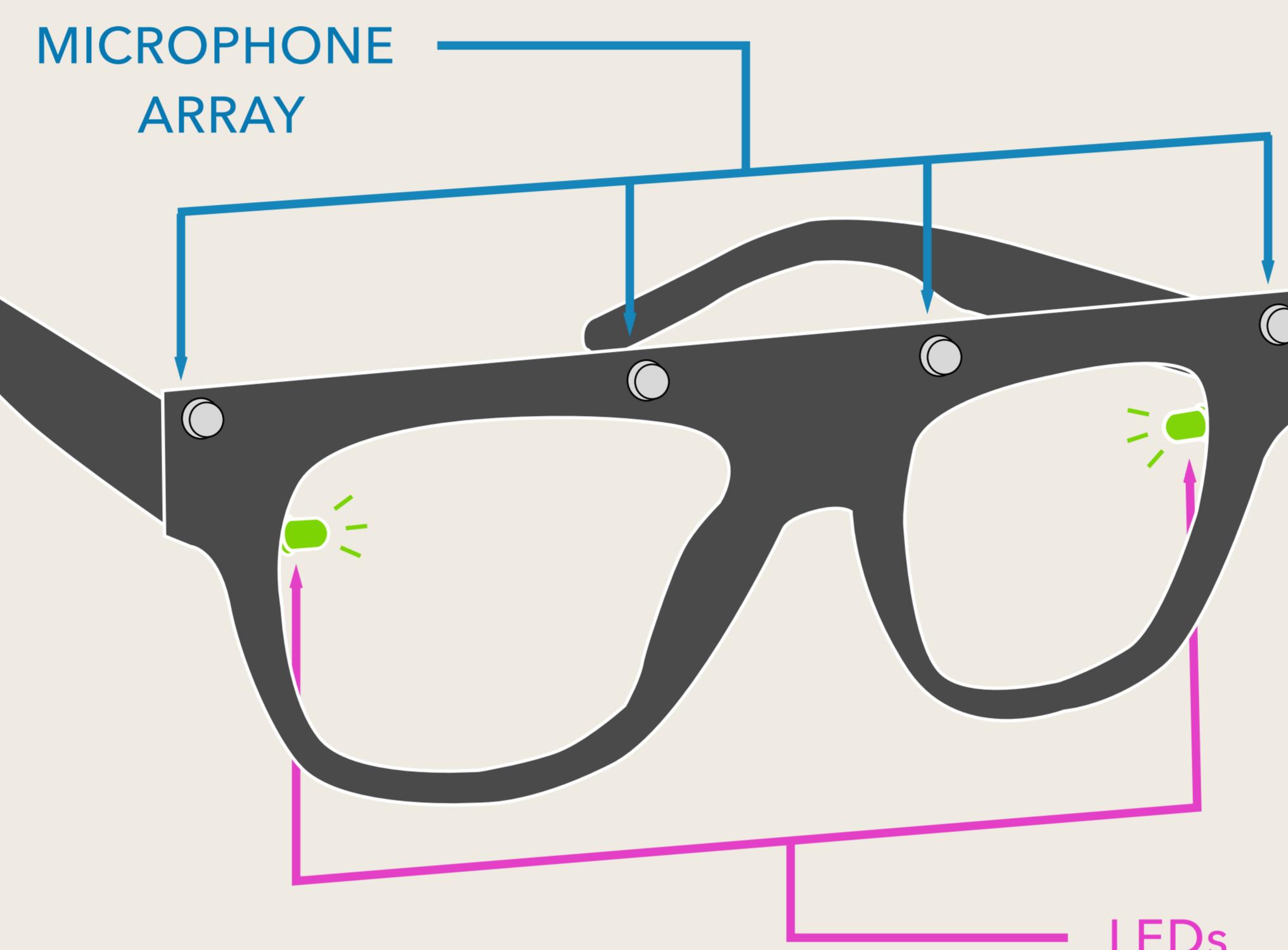
Inability to localise sounds has a range of implications, from daily to safety critical situations.



SOLUTION

Our solution is a wearable device which converts sounds into simple visual cues.

Through preserving spatial information individuals should be able to overcome the challenges outlined above.



Using a **microphone array** the difference in arrival time of sound waves to each microphone is processed to estimate the direction of a sound source.

LEDs located in the peripheral vision guide the wearer to the source of the sound.

SOLUTION STEPS

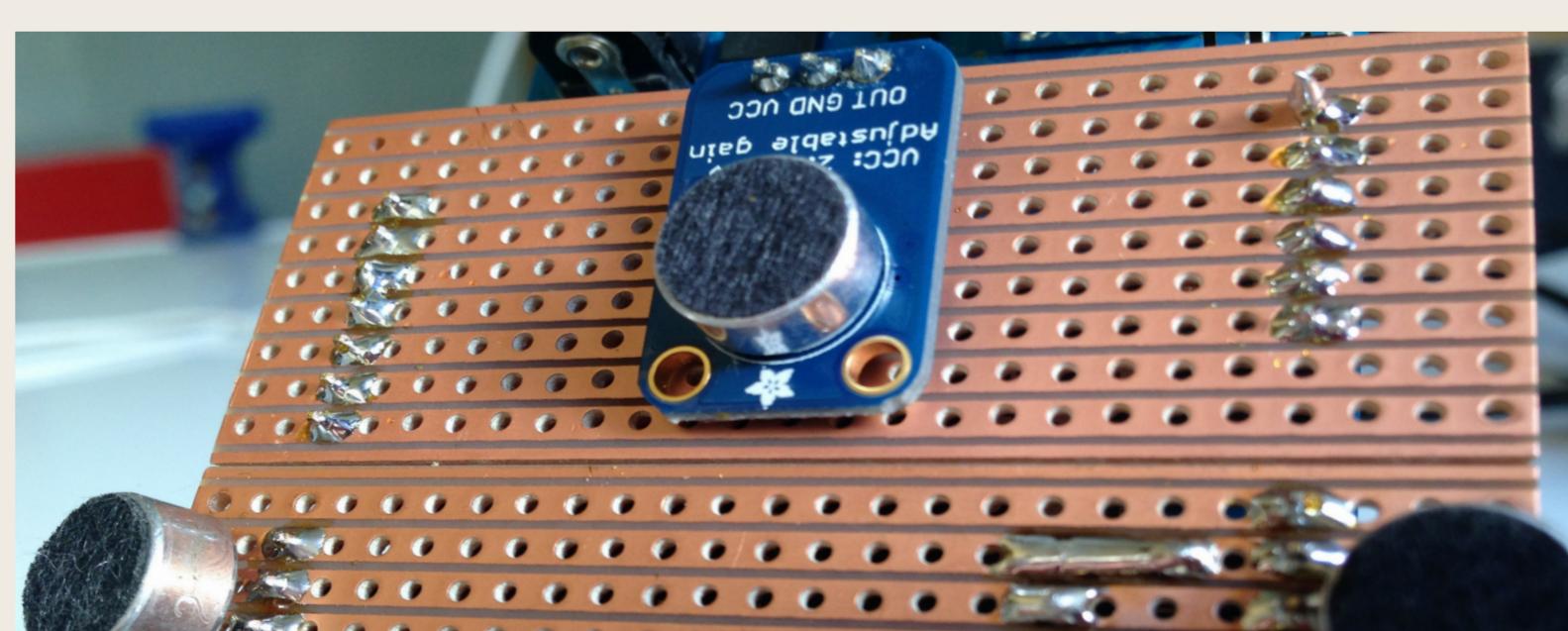
1. Formative Study - 14 Participants with impaired hearing evaluated a prototype through a sound localisation task. User feedback was positive. Areas of improvement were the input and output of the system.



2.A Output - 12 participants took part in a target acquisition task using head tracking. Three methods of feedback were evaluated with and without distractor tasks.



2.B Input - Participants will evaluate a system where a microphone array is connected to a mobile device during a sound localisation task. The aim of this study will be to evaluate the effectiveness of a user directed microphone array.



Work-in-progress microphone array which makes use of electret microphones and an arduino microcontroller

3. VisAural - Results of input and output evaluations will be combined to form a full working solution outlined above.

EVALUATION

Evaluation of our solution will involve participants with and without impaired hearing.

Participants will complete a sound localisation task in a controlled environment.



Participants with impaired hearing will perform the task twice; once with the device and once without. Participants with typical hearing will perform the task once without the device, serving as a baseline.



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