Problem Statement and Goals
Software Engineering

Team #6, Six Sense
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Table 1: Revision History

Date	Developer(s)	Change
Date1	Name(s)	Description of changes
Date2	Name(s)	Description of changes
...	...	...

1 Problem Statement

[You should check your problem statement with the problem statement checklist. —SS]

[You can change the section headings, as long as you include the required information. —SS]

1.1 Problem

Individuals who are deaf or hard of hearing tend to have difficulties with staying situationally aware, generally leading to increased risk of injury. Many safety cues such as "the sounds of a tea kettle, the warning beep as a fork lift backs up, and the engine of an oncoming car may be missed". [1] General sound cues such as someone calling their name, or a phone ringing, may also be missed, often leading to miscommunication and elevated frustration. With 1 in 10 Canadians being impacted by hearing loss [2], there are over 4 million individuals in Canada dealing with these struggles every day.

1.2 Inputs and Outputs

[Characterize the problem in terms of "high level" inputs and outputs. Use abstraction so that you can avoid details. —SS]

The high level input of the system is the audio from the surrounding environments, with the output being an indication of the direction of audio sources and their respective classifications.

1.3 Stakeholders

The primary stakeholders are individuals who are deaf or hard of hearing.

1.4 Environment

[Hardware and Software Environment —SS]

The software environment is a Linux-based system running C/C++ code. The hardware environment is a 4 dimentional microphone array, with each microphone connected to the same 4-channel analog digital converter (ADC), and a pair of smart glasses (Rokid Smart Glasses).

2 Goals

3 Stretch Goals

4 Extras

1. Price + Hardware Selection Report
2. Usability Report

References:

[1] E. Masterson, "Measuring the Impact of Hearing Loss on Quality of Life," NIOSH Science Blog, Apr. 27, 2016. [Online]. Available: https://blogs.cdc.gov/niosh-science-blog/2016/04/27/hearing-loss-years-lost/

[2] Healthing.ca, "Hearing loss in Canada: Stats, impact and resources," Jun. 2025. [Online]. Available: https://www.healthing.ca/hearing-health/hearing-loss-in-canada-stats-impact-and-resources.

[3] National Research Council (US) Committee on Disability Determination for Individuals with Hearing Impairments, R. A. Dobie, and S. Van Hemel, Eds., "Impact of Hearing Loss on Daily Life and the Workplace," in Hearing Loss: Determining Eligibility for Social Security Benefits. Washington, DC, USA: National Academies Press, 2004, ch. 6. [Online]. Available: https://www.ncbi.nlm.nih.gov/books/NBK207836/

Appendix — Reflection

[Not required for CAS 741 —SS]

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

1. What went well while writing this deliverable?
2. What pain points did you experience during this deliverable, and how did you resolve them?
3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)?