Meeting minutes: Design – Adaptive Hearing Aid 2nd meeting

[27th September 2018], [10:40 am]
Wits University, Flower Hall Entrance

Facilitator: Prof. Rubin

Note taker: Kyle L. Govender

Attendees: Kavilan Nair, Iordan Tchaparov, Joel Oommen, Kyle Govender, William Becerra, Fiona Oloo, Boitumelo Mantji, Verushen Coopoo, Lindokuhle Mbatha, Jean Jordaan, Daniel Edwards

Agenda:
Work division
Project Management
Directionality
Filtering
Miscellaneous

Also Present: None

Apologies: None

Absent: Arunima Pathania

Agenda item: Work Division

- The course co-ordinator, Dr Masisi, emphasises the importance of the ELO pertaining to individual work for this specific project.
- As previously established, students are allowed to work in pairs. An update in this regard is that each student in the pair solely works on either the Filtering or Directionality component of the project.
- Both students in the pairs need to fully comprehend and understand the aspect of the project that their partner is working on i.e. Filtering or Directionality. The design of the Filtering and Directionality needs to be developed such that these two subsystems 'can' be integrated, but actual integration is not required for the final solution.
- The report needs to be centred around the student's allocated aspect of the project, whilst the other should be referenced where appropriate.
- Each member's report should adequately convey that they understand their partner's section of the project.

Agenda item: Project Management

- At this point in the project students should be using the Gantt chart, that should have been already developed in previous weeks, to monitor and track their progress to ensure they are on track.

Agenda item: Directionality

- It can be assumed that the subject has 'normal hearing' i.e. a flat response at all frequencies in the audiogram.
- Polar plots considered must be of a 2D projection, not 3D.
- The achieved design must be at the electronic level of abstraction.
- The resolution of achieved directionality is at the student's justifiable discretion.
- The microphones used in the array need to be omnidirectional.

- Prof. Rubin suggests that a 90° dexterity on either side of the normal to the user's head orientation is a sufficient dexterity of directionality i.e. spanning a 180° spatial field.
- The behaviour of the achieved design should be validated by means of polar plots.
- Directionality behind the user should not be considered.

Agenda item: Filtering

- The achieved design must be at the electronic level of abstraction.
- The designed filters need to be constructed with narrow enough filter bands to compensate for audiogram limitations.
- The filtering needs to be readily adjustable to different audiograms.
- The auditory system and achieved solution can be considered as one composite system i.e. the hearing deficit for each ear is the same.
- Filtering should realistically/practically stop at 8 kHz, students can go higher if they so wish.
- Prof. Rubin suggests that a standard Desktop PC would not be computationally sufficient for the filtering thus, a dedicated chip should be considered.

Agenda item: Miscellaneous

- Cost is not a factor to consider in this design however, there is an upper bound on the practicality of the system that needs to be considered at each student's discretion.
- Prof. Rubin will send a link after the meeting to an image of the overall system block diagram of the group who did the hearing aid for the Lab Project.
- The design of a power system required for the design should not be considered for the purposes of this project i.e. off the shelf solutions or mere bench supplies is sufficient.
- The validation of the system should take the form of simulation and level of functionality according to the well-defined objectives stated at the start of the design, comparison to a 'Gold Standard' is not required.
- A digital system is not required, an analogue or hybrid system is perfectly acceptable.
- The hearing aid is to be designed for the purposes of listening to speech and music.
- Lindo brings forward conflicting ELO requirements in two different versions of the Design Project Course Brief and Outline, Prof. Rubin indicates that he will confirm which is the correct version and convey this information to the students.

[11:30 am] Meeting adjourned.