Meeting minutes: Design – Adaptive Hearing Aid 5th meeting

[15 October 2018], [10:15 am]
Wits Chamber of Mines, School of EIE, Seminar Room

Facilitator: Prof. Rubin

Note taker: Kavilan Nair

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

Agenda:
Revised Project Brief
Directionality
Filtering
Next meeting

Apologies: None

Absent: None

Agenda item: Revised Project Brief

- Revised brief was sent out in the morning which mentioned that a **low cost** should be a requirement. **PLEASE IGNORE THIS STATEMENT AS THE DESIGN DOES NOT HAVE COST AS A CONSTRAINT.**

Agenda item: Directionality

- Verushen (Question): There are a lot of polar plots that we can show in the report, should we include all?
- Prof. Rubin (Response):
  - ➤ Only some key plots should be necessary
  - ➤ Jean (Suggestion): Can plot a 3D graph to combine and make the graphs concise.
- Kyle (Question): Is it advantageous to increase the range beyond 180 degrees?
- Prof. Rubin (Response):
  - ➤ Not really, you can if you want but make sure it doesn't sacrifice the performance
- Verushen (Question): Can we use digital mics?
- Prof. Rubin (Response):
  - ➤ You can use it but it must be compatible with what your partner needs to work with
- Iordan (Question): Is there a limit to the number of DSPs that the design uses?
- Prof. Rubin (Response):
  - ➤ No hard cap, but it should be within reason and practical.
- Kyle (Question): Is 100 microphones too many?
- Prof. Rubin (Response):
  - ➤ It needs to be reasonable

Agenda item: Filtering

- Fiona (Question): I have picked my DSP device, do I need to explain the concepts of it or have a detailed pinout?
- Prof. Rubin (Response):
  - ➢ Yes, you need a pinout so you can embed it in the circuit diagram
- Joel (Question): What level of detail is required for the electronic circuit diagram and algorithms?
- Prof. Rubin (Response):
  - ➢ Given the allocated time for this project, it doesn't have to be low level
  - ➢ Can provide the pseudocode in the form of flowchart for the algorithms implemented on the DSP
- Fiona (Question): If the DSP already contains a built in DAC, do I need to design my own?
- Prof. Rubin (Response):
  - ➢ Can treat the DSP as a black box
  - ➢ Don't worry about the internals of the device, using an example, you dont need to worry about the transistor level if you are using an operational amplifier
- Boitumelo (Question):
  - ➢ Is the DAC and speaker design components only for the adaptive filtering students?
- Prof. Rubin (Response):
  - ➢ This is where the teamwork comes into play and it depends on the design and how the two systems integrate.
- William (Question): Do we need to simulate the DAC and ADC?
- Prof. Rubin (Response): It isn't necessary.
- Fiona (Question): Is it better to have full simulation or modular simulations
- Prof. Rubin (Response):
  - ➢ Makes sense to modularize and it makes things a bit easier
- Joel (Question): Is Dynamic Range Compression (DRC) essential?
- Prof. Rubin (Response):
  - ➢ Yes, you have to have compression
- Lindo (Question): Can we use libraries?
- Prof. Rubin (Response):
  - ➢ Yes you can, but make sure you show the design thought that you put into setting some of those parameters
- Lindo (Question): In terms of building up the design and justifying, can I use a filter bank with variable bandwidths?
- Prof. Rubin (Response):
  - ➢ Sure, as long as you can justify it.
- Fiona (Question): What is meant by adaptive?
- Prof. Rubin (Response):
  - ➢ The directionality must be adaptive in terms of being able to focus the microphones within a specific range
  - ➢ The filter must be adaptive in terms of the gains adjusting to match the audiogram

- William (Question): Do we need to show the power supply circuitry?
- Prof. Rubin (Response):
  - ➢ Yes you should, show the power to the components with a voltage regulator for example.
- Fiona (Question): Can we map the -1 -> 1 of a signal as the dynamic range?
- Prof. Rubin (Response):
  - ➢ Not too sure, maybe test it yourself or message Kirsten at Optinum?

Agenda item: Report and group aspects

- Joel (Question): How much does the individual report relate to the other group member
- Prof. Rubin (Response): Don't talk about the detail implementation of partners system. Talk in terms of input/output and how the two subsystems will interface with each other.
- William (Question): In terms of the integration of the two systems, will there be a penalty if that parts doesnt make sense.
- Prof. Rubin (Response): There will be a penalty, as group work does make up a component of the project.
- Jean (Question): When we are discussing the other person's design in the report, how do we reference it?
- Prof. Rubin (Response): You should have a section where you discuss the partners design in terms of input/output and you should reference their report like you would reference any other paper.
- Prof. Rubin (Statement): Write the partners name on the front of the report, but it should be small and at first glance the reader should know whose paper this is.
- Verushen (Question): Should the abstract go on the cover page?
- Prof. Rubin (Response): It should not be on the cover page.
- Iordan (Question): Can we have an acknowledgements section?
- Prof. Rubin (Question): It is essential, especially for directionality, with the help from Dr. Nitch.
- Dan (Question): Can I use a design approach where I build up and prove some of the design decisions, such as how many filters to use.
- Prof. Rubin (Response): Sounds good, as long as you link it back to the original spec. One thing to note is that Design is not always objective, it can be subjective.

Agenda item: Next meeting

- There will be a meeting next week on the 22nd of October, this meeting will however, not be compulsory and no minutes will be taken.

[11:15 am] Meeting adjourned.