Smart Sweet Spot of Your Home Stereos

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Background

- Takes a considerable time in adjusting the speakers.
- When new furnitures are added, all the work done previously have to be redone.
Objects

- Explore when and how the optimal point will occur.

Develop a system where:

- A receiver that can receive the sound signal from the speaker and analyse them, further then send feedback to speakers.

- Speakers that can adjust automatically according to the user’s position.
Testbed and Tools

- Raspberry π 3 B+
- Linux
- MATLAB
- USB Sound Card
- Omnibearing Microphones
- Separate channels of Speakers

Image of our testbed
System Development I

- We connect our Raspberry π to an external sound card to enable it of recording.
- We changed the default setting in Raspberry π so we could access the external sound card interface.

Default Sound Card Interface

External Sound Card Interface
System Development I

- A simple recording command can be run to save the recorded information to mp3 or wav format. (In Linux)
- We use python to perform short-time Fourier Transformation of those sound files to visualize and analyse the sound signals.
System Development I

• We combined the previous two process of recording and analysing.
• We write a python algorithm to perform the real time short time fourier transform which is a combination of recording and analysing. (We can also access this py file remotely through our laptop)
System Development II

• To simulate the real-time stereo system, we use MATLAB to control the channels of the speaker and furthermore explore how human perceive sound signals and when the ‘sweet spot’ will appear.
Future Direction

• Find out how human perceives sound and when does the sound has the most impact on our hearing.

• Come up with a feedback method so that the receiver (Raspberry π) can communicate with the speaker.

• Come up with a method that the speaker can move accordingly to the feedback send by the receiver (Raspberry π).
Thank You!

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