

Servant Engineering Project Pathway (aka Rainbow of Responsibilities)

Servant engineering projects might span multiple years, with teams working on various parts of the projects as it progresses - or, a smaller project might be self-contained within one year. While Servant Engineering projects come in a wide variety of forms, they will all follow the same basic pathway for students participating in the program. This is demonstrated by the rainbow-colored elements identified on the main page (and below). Most of these elements prescribe specific design "deliverables" that each team (and sometimes each member) must complete as part of the servant engineering course.

Every team will be expected to perform each of the steps in full (with the exception of the purple areas, which might extend over multiple years). Projects that are already defined will have a different pathway through the "green" section.



<u>Understand Servant Engineering Course Requirements</u>	
<u>Identify Team Information</u>	
<u>Detail Domain Motivation</u>	
<u>Frame the Design Challenge</u>	
Is the Project Already Defined?	
NO	YES
<u>Define the Problem</u>	<u>Understand the Problem</u>
<u>Establish Initial Project (Customer) Requirements</u>	
<u>Explore Conceptual Design</u>	
<u>Develop Detailed Design</u>	
<u>Conduct Testing</u>	
<u>Deliver Project to Client</u>	
<u>Complete Course Requirements</u>	

AAC



2021/2022

Instructions: Each section of this document contains instructions in green text. Follow the instructions to complete each section, then delete the green text. When this document is complete, there should be no text in green remaining in the document!
This is a living document and will change as you go through the project.

-  In the document, at the beginning of each section, each deliverable is marked with a checkbox.
-  Right-click on the checkbox and change it to a check when completed.

<u>Identify Team Information</u>
<input type="checkbox"/> Deliverable #1: Contact Information
<input type="checkbox"/> Deliverable #2: Weekly Schedule -- Established before team meeting week 2
<input type="checkbox"/> Deliverable #3: Project Management Solution

Contact Information

Enter contact info and declared major for each team member in the following table. Include the faculty advisor at the end. Please add or delete rows as needed to complete this section.

Name	Phone	Email
Isaac Castile (CS)	(904) 226-4855	icastile19@georgefox.edu
Cassie Wischhoefer (CS Cyber)	(360) 626-3698	cwischhoefer20@georgefox.edu
Matthew Tiemersma (CS Cyber)	(360) 477-2478	mtiemersma19@georgefox.edu
Adam Hearn (CS)		ahearn19@georgefox.edu
John Dexter Roxas (IS)	(971) 545-9267	jroxas18@georgefox.edu
Brian Snider (CS)	(503) 554-2725	bsnider@georgefox.edu

Weekly Schedule

Name	Day	Time
Team Meeting	Wednesday	2:00 PM
Lab Meeting	M/F	2:00 PM - 2:50 PM
Isaac Castile	Friday	10:30AM - 1:30PM
Matthew Tiemersma	Thursday	3:00PM - 4:00PM
Cassandra Wischhoefer	Thursday	12PM - 3PM

Project Management Solution

Trello is the project management solution. Below is the link to access the project.

<https://trello.com/b/V38K0tY0/project-board>

1. Sign up for an account
2. Join the Project board
3. Review current "ToDo" list
4. As work begins on each task, update to "Doing" list
5. Once a task is complete, add the task to "Done" list


Detail Domain Motivation
❑ Activity #1: Empathy Exercise
❑ Deliverable #1: Develop Domain Motivation Presentation

Empathy Exercise

Use an accessibility feature of a smartphone to perform a basic daily task such as composing a text message to a friend, as if you had a vision impairment.

1. Enable voice/haptic feedback accessibility feature on your smartphone (VoiceOver on iPhone/iPad or TalkBack on Android devices).
2. Put on a blindfold.
3. Use the voice/haptic feedback to navigate the launcher/home screen interface and launch a messaging app.
4. Use the voice/haptic feedback to navigate the app interface and select a contact to send the message to.
5. Use the voice/haptic feedback to compose the message. Try to use an available keyboard to type the message (without looking); you may use voice dictation if your device does not provide an accessible keyboard, but you should only use voice/haptic feedback to start and stop voice dictation.
6. Use voice/haptic feedback to replay/speak your composed message, to review it before sending it.
7. Use voice/haptic feedback to change one or more words in your message.
8. Use voice/haptic feedback to send your message.

Motivation Presentation

 Assistive Tech Motivation Presentation

Frame the Design Challenge
❏ Activity #1: Framing a Design Challenge
❏ Deliverable #1: Frame Your Design Challenge

Design Challenge

“Properly framing a design challenge is critical to human-centered design and key to your success.

Scope a challenge that’s too broad and it’ll be hard to know where to start, but pose one that’s too narrow and your solution may not achieve the intended impact.”.

Write your initial design challenge here: Example - How might we provide healthier food options for people in need?

- 1) Take a stab at framing it as a design question.
- 2) Now state the ultimate impact you’re trying to have.
- 3) What are some possible solutions to your problem? Think broadly. It’s fine to start a project with a hunch or two, but make sure you allow for surprising outcomes.
- 4) Finally, write down some of the context and constraints that you’re facing. They could be geographic, technological, time-based, or have to do with the population you’re trying to reach.
- 5) Does your original question need a tweak? Try it again.

Enter your Final Design Challenge here:

Is the Project Already Defined? NO
Define the Problem
RESEARCH PROBLEM AREA
<input type="checkbox"/> Deliverable #1: Plan Research Methods
<input type="checkbox"/> Deliverable #2: Build Interview Guide
<input type="checkbox"/> Deliverable #3: Conduct Your Research
SYNTHESIS
<input type="checkbox"/> Deliverable #4: Share Inspiring Stories & Learnings
<input type="checkbox"/> Deliverable #5: Cluster Into Themes
<input type="checkbox"/> Deliverable #6: Create Insight Statements
<input type="checkbox"/> Deliverable #7: Create “How Might We” questions
DEFINE THE PROJECT
<input type="checkbox"/> Deliverable #8: Brainstorm Project Ideas
<input type="checkbox"/> Deliverable #9: Select and Assess Your Best Ideas
<input type="checkbox"/> Deliverable #10: Determine and Define the Project
<input type="checkbox"/> Deliverable #11: Justify the Project

RESEARCH PROBLEM AREA

Team Knowledge and Assumptions

1. What are the aspects of the challenge that you already know a lot about? What are your assumptions?
 - a. I know it's difficult, if not impossible, to find fresh fruit in my neighborhood.
 - b. I'm under the general assumption that unhealthy options are cheaper than their healthier counterparts.

2. What are the aspects of the design challenge where you need to learn more? What don't you know?
 - a. Do people who need healthier food options want to eat healthier?
 - b. Are healthy food options generally accessible to people? Where do they go to find them?

Plan Your Research

3. People to Learn from
 - a. ____
 - b. ____
 - c. ____
 - d. ____
 - e. ____
4. Experts to Speak to
 - a. **Shannon Singleton** - Speech language pathologists + assistive technologies facilitator
 - b. **Rick Muthiah** - Director of Learning Support Services
 - c. **Ezekiel Macario** - PE Teacher
5. In-Context Immersion Locations
 - a. ____
 - b. ____
 - c. ____
 - d. ____
 - e. ____
6. Analogous Inspiration Locations
 - a. ____
 - b. ____
 - c. ____
 - d. ____
 - e. ____

Build an Interview Guide

1. Open General - What are some broad questions you can ask to open the conversation and warm people up?
 - a. - What do you do for a living?
 - b. - Who makes up your family or household?
 - c. - Describe your last family meal. Who was there? Where did it take place?
2. Then Go Deep

- a. Draw your dream grocery aisle. What would be on the shelves, the coolers?
- b. Describe your favorite meal. What do you love about it?
- c. Imagine you can only eat one meal everyday. What would it be and why?

Conduct Your Research

1. Learn from People
 - a. Remember to reference the interview guide you created. Depending on who you are talking to, you will want to tailor your questions to address this person specifically. Remember to try and interview extreme users as well.
2. Learn from Experts
 - a. Remember to reference the interview guide you created. Depending on who you are talking to, you will want to tailor your questions to address this person specifically. Remember, for experts, it's also okay to communicate via telephone or Skype if they aren't readily available in person.
3. Immerse Yourself In Context
 - a. Visit organizations, institutions, and events that you can gather inspiration from. Plan your observations by choosing places where you can have experiences that are relevant to your challenge. Take notes and photos. Capture interesting quotes by talking to people that spend time in these spaces. What do they love? What is frustrating? Draw sketches, plans, and layouts.
4. Seek Analogous Inspiration
 - a. Visit places and situations that are different from your design challenge. These places should approach an angle of your problem in a unique way. For instance, what could you learn from an amusement park about engaging experiences that you could apply to the fruit aisle at a grocery store or waiting in line at a bank to open a new savings account?

SYNTHESIS

Share Inspiring Stories & Learnings

Capture picture(s) of your notes on the wall.

Cluster Into Themes

Capture picture(s) of your notes on the wall.

Create Insight Statements

Write Your Design Challenge:

Theme: Payments

Insights:

1. ____
2. ____
3. ____

Theme: Hygiene

Insights:

1. ____
2. ____
3. ____

Theme: Proximity

Insights:

1. ____
2. ____
3. ____

Create “How Might We” Questions

Insight: ____

How Might We: ____

Insight: ____

How Might We: ____

Insight: ____

How Might We: ____

DEFINE THE PROJECT

Brainstorm Project Ideas

Capture picture(s) of your notes on the wall.

Select Your Best Ideas

Most Innovative Idea

Design Challenge:

HMW Question:

Selected Idea:

Describe the Idea:

How will this Idea have Impact on the Challenge You're Addressing?

Most Likely to Succeed Idea

Design Challenge:

HMW Question:

Selected Idea:

Describe the Idea:

How will this Idea have Impact on the Challenge You're Addressing?

RESEARCH THE PROJECT

Research/Interview Guide

AAC Research Plan & Research

We created a google form, along with a Daily Bruin request. While we only received two responses, both provided valuable feedback for our project.

Daily Bruin Survey Request

Google form:

https://docs.google.com/forms/d/1l_C31wkpWGpTmZdF_Wnk_jPlYaCg0dDr8jVfM2bZ1NI/edit?usp=sharing

Data from survey:

Augmentative and Alternative Communication Servant Engineering Survey (Responses)

Client Contact/Interview

Verify that you have completed the checklist on Deliverable #3 before heading to the interview.

- ☐ *Which people will be asking which sets of questions?*
- ☐ *Who will be taking minutes?*
- ☐ *Has transportation been arranged?*
- ☐ *Does everyone know when the meeting is occurring?*
- ☐ *Does everyone know where the meeting is taking place?*
- ☐ *Is there an interview guide?*
- ☐ *Are there multiple copies of the guide?*
- ☐ *Is there a camera to take any photos? (Obtain permission first).*

SYNTHESIS

Share Inspiring Stories & Learnings

Capture all of the information from your research here. This includes descriptions of the existing space, the relevant existing technologies, and the results of your interview(s).

Do not delete this part - this is the final part of both pathways through the green section

DEFINE THE PROJECT (continued)

Project Information

Title: Dynamic Environment Audio Feedback

Project Overview

Millions of people worldwide struggle with the capability of being auditorily aware of their surroundings. This lack of awareness in the real world can translate to something as simple as missing a doorbell, or as dangerous as a honking car while crossing the road. For people without impairment, these things go unnoticed as the sounds are heard and processed with some form of directionality to the sound. Directionality is incredibly important in determining our response to situations. The problem we are looking to solve encompasses both sound recognition and directionality. This will allow the wearer of our technology to be alerted of sounds that are in nature 'alarming' and also give them the direction in which those alerts are coming from. By wearing this technology, the user will be able to respond appropriately to situations.

Problem Statement

Auditory impairment is widespread across the world. Individuals with auditory impairment struggle with auditory alerts, directional audio, and dangerous situations. Our goal is to empower and enable those who have any sort of auditory impairment or disability.

Project Context

This project is to provide directional audio awareness to those who suffer from hearing impairment. This device takes form in the shape of straps that the user will wear in order to detect any noise from his/her surroundings. Upon detection, the device should provide haptic feedback in the direction of the noise. To classify each noise, the device's AI should categorize each sound that is detected.

Please describe the context within which this design project will exist. This will help our faculty and students make sure that they pursue a viable design path. Please describe the context of this project in 1 to 2 short paragraphs addressing the questions "Who?", "What?", "Where?", "When?", and "How often?".

Project Deliverables

The desired deliverable of this project is to produce a haptic feedback device that can assist those with auditory impairment to identify directional sound in their environment.

TODO: Update these deliverables

- Establishing needs of those affected by auditory disabilities.
- Developing corpus of sounds
- Training AI Model
- Developing POC device to support enhancing user's auditory awareness

Please fill out the table below listing the items that you would like to have delivered at the end of this project. This can include a large variety of things such as prototypes, tools, drawings, procedures, manuals, etc. Feel free to add or remove rows from the table as needed.

Deliverable	Description	Quantity

Provided Resources

Please fill out the table below listing any items that you would will be providing to assist with the completion of this project. This can include information, tools, parts, supplier contacts, or any number of other things. Feel free to add or remove rows from the table as needed.

Resource	Description	Quantity

<u>Establish Initial Project (Customer) Requirements</u>	
<input type="checkbox"/>	Deliverable #1: Determine Minimum Viable Requirements
<input type="checkbox"/>	Deliverable #2: Identify “Stretch” Requirements
<input type="checkbox"/>	Deliverable #3: Identify Relevant Standards

Minimum Viable Requirements

Number	Minimum Viable Requirement	Test Procedure
1		
2		
3		

Stretch Goals

Number	Stretch Goal	Test Procedure
1		
2		
3		

Relevant Standards

Standard Title	Revision	Description
1		
2		
3		

<u>Explore Conceptual Design</u>
<input type="checkbox"/> Deliverable #1: Research Existing Technologies
<input type="checkbox"/> Deliverable #2: Conduct Literature Review (use the library!)
<input type="checkbox"/> Deliverable #3: Ideate using generic brainstorming/mind-map
<input type="checkbox"/> Deliverable #4: Ideate using 2 more Ideation techniques e.g. scamper, mash-up, etc.
<input type="checkbox"/> Deliverable #5: Reduce/Combine ideas into multiple solutions
<input type="checkbox"/> Deliverable #6: Prototype leading solutions (low-fidelity)
<input type="checkbox"/> Deliverable #7: Validate leading solutions (Functionally/Numerically/ .. Physics)
<input type="checkbox"/> Deliverable #8: Select ultimate solution using a decision matrix (Justify)
<input type="checkbox"/> Deliverable #9: Generate ultimate solution specifications

Existing Technology Review

Solution Description	Cost	Requirements Met or Not Met

Literature Review

CS230: Deep Learning, Winter 2020, Stanford University, CA.

Dreyzehner, J., & Goldberg, K. A. (2019). Depression in deaf and hard of hearing youth. *Child and Adolescent Psychiatric Clinics of North America*, 28(3), 411–419.

<https://doi.org/10.1016/j.chc.2019.02.011>

Fleury, M., Lioi, G., Barillot, C., & Lécuyer, A. (2020). A survey on the use of haptic feedback for brain-computer interfaces and neurofeedback. *Frontiers in Neuroscience*, 14.

Stage 3 Ideation: Collaborative Brainstorming

{Insert write-up as described on the Servant Engineering website.}

Idea Reduction

{Insert a brief paragraph or two describing how your team reduced your many concepts into three to six fully defined designs.}

Design #1 - Insert Clever Name Here

Using at least 2 paragraphs and at least 1 picture, describe this design idea here. This should include descriptions of components, materials, and any significant design elements. If your project requirements include a cost element (they often do...) try to mention an approximate estimate of final cost as well.

Design #2 - Insert Clever Name Here

Using at least 2 paragraphs and at least 1 picture, describe this design idea here. This should include descriptions of components, materials, and any significant design elements. If your project requirements include a cost element (they often do...) try to mention an approximate estimate of final cost as well.

Design #3 - Insert Clever Name Here

Using at least 2 paragraphs and at least 1 picture, describe this design idea here. This should include descriptions of components, materials, and any significant design elements. If your project requirements include a cost element (they often do...) try to mention an approximate estimate of final cost as well.

Prototyping Progress Report



For our first prototype, we focused primarily on formfactor. We created an extremely rough draft of what our device might look like. We utilized cardboard, hot glue, and staples to roughly 'size up' the design.

Feedback from JD using the device:

The straps were loose, a design with more adjustable straps, preferably one that sticks really close to the body. Loose straps may make the user be unable to feel some of the haptic motors, specifically the underarm area. The box we attached to the back impeded both my sitting and lying down positions, a more compact design would provide more comfort.

Final Prototypes

(Insert the description of your prototyping experience as described on the Servant Engineering website.)

Design Validation

{Insert design validation and write-ups as described on the Servant Engineering website.}

Ultimate Solution Selection

{Insert the decision matrix and write-up as described on the Servant Engineering website.}

Solution Specifications

{Please use the table below to list all of your specifications. Be sure to include functionality, performance, physical shape and durability, and interface to any external systems. The specifications are numbered for later reference. Please add or delete rows as needed to complete this section.}

Number	Specification	Test Procedure
1		
2		
3		
4		
5		

Develop Detailed Design

Now that the specs are complete, it is time for detailed design. This phase of the design cycle will not be fully documented here. Instead, use this section to thoroughly describe the ***final result*** of your work. Some of this may need to consist of references to external documents, such as working drawings or source code. Be sure to include at least 2 paragraphs of description and at least 1 image. When you are done, **it should be possible to completely build your final design using the information in this section.**

To be clear, this is the final result of your work. As you design, you might spend weeks on a portion of the design that is ultimately deleted. There is no need to capture these elements here unless there is significant value in relaying that information as part of the final deliverable.

Conduct Testing

At this point, you’ve finally built a prototype. Hooray! Now, it’s time to see how it measures up to your specifications. Go back to your list of of specification tests and start performing them using your prototype. As you go, you may find that you fail some of your tests (or that you can’t perform the tests). For each such conflict, you will need to either change your design (and update the Detailed Design section) or change your specification (and update the Specifications and Test Procedures section). If you change your specification, make sure you have a good reason! Please use the table below to list the results of all of your specification test procedures. Use the Pass Criteria column to list what a passing result should be, before you perform the test. Please add or delete rows as needed to complete this section.

Use narrative in this section to explain anything about the tests that needs to be explained (setup, process, etc.).

Test Procedure	Pass Criteria	Test Results

Test Descriptions

As necessary, describe each test here including such things as setup, procedure, and any other relevant test information.

Test Procedure Name:

Details of test procedure

Test Procedure Name:

Details of test procedure

Deliver Project to Client

Once the design has passed all of the specifications testing and expectation testing, there is one final step before delivery: writing instructions for the client. This includes any documents that will be delivered to the client. If the result of the design is a product, this should at a minimum include usage instructions and some sort of troubleshooting help. Use this section to reference all the external documentation you will be providing to the client.

Complete Course Requirements

- ☐ Deliverable #1: Prepare Final Presentation (last week of class)
- ☐ Deliverable #2: Complete Project Report and all other documentation
- ☐ Deliverable #3: Archive Project for future
- ☐ Deliverable #4: Create Poster for Engineering Expo
- ☐ Deliverable #5: Participate in Engineering Expo

Provide a link to your final presentation and expo poster here.

Appendix A: Meeting Minutes and Status Reports

AAC weekly meeting – 2021-09-08

Attendance: Everyone

Business:

We will not be completing everything in the Project Report

Create a communication stream between us

Appendix C is the schedule for the year, we will not be using that

We will work through the document from top to bottom

****We need to work on the Domain motivation presentation****

- Make some slides with photos
- how many people are affected by these conditions
- Discuss how vast this topic is
- Make the presentation to motivate people and get them interested in AAC
- 3-5 minutes
- Does not have to be on anything particular

Action Items

Complete Motivation presentation - Adam Hearn

Meeting concluded at 2:54pm.

AAC weekly meeting – 2021-09-13

Attendance: Everyone

Business:

- Brainstorming Block:
- Blind & Deaf:
- Blind: Cannot see environment
 - Tools to assist with specific task
 - Generalized tools to help them overall
 - Ideas:
 - Glasses to help deaf person navigate through haptic or auditory cues
- Deaf: Cannot hear

- Difficulties: Interpersonal communication - Ordering at restaurants, talking to friends, driving
- Ideas:
 - Wearable device to translate real world into visual or haptic cues
-
- What are deaf and blind people missing out on that we can give back to them?
- Communication
- Deaf: Hearing the music
-
- Roombas close to walls
-
- Echo location
- Microphones
- Cameras
- Lidar
- Radar
- End Brainstorming Block
- Adam Work on presentation

Meeting concluded at 2:47pm.

AAC weekly meeting – 2021-09-15

Attendance: Everyone

- Begin: 2PM
- End:
- Presented “Motivation Presentation”
- Discussed what language Dr. Snider was using in Operating System Class
- Focus is human centered design
- What is a real world problem, who is affected by it and how do we solve it.
- What are the users' Goals?
- - EX: I as a mute person want to talk to my children
-
- If we don't need the paperwork tasks, then don't do them.

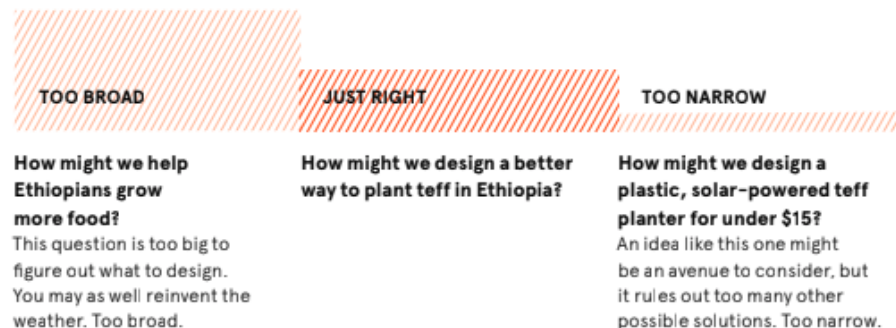
Example

2

How Might We Design a Better Way to Plant Teff in Ethiopia?

Teff is a vastly important grain in Ethiopia, but its seeds are miniscule and it's been planted in the same way for thousands of years. In a yearlong project, IDEO.org was engaged to figure out how to plant teff efficiently and quickly while taking into account different soil types and terrain. The brief also told us that we'd have to design a method that was inexpensive, easy to use, and could be built and repaired in Ethiopia.

Ask The Right Question



Need to do Frame the design challenge

- You want to ask the right question
 - Not too broad
 - Not too narrow
- The goal is to figure out who we will be helping

Defining the Problem

- Fill some stuff in the project report
- Deliverables
 - o Learn from people who suffer from the disability we are assisting
 - o Interview experts in the field
 - o Research the existing solutions
 - o We really want to research the domain

TODO

- Constrain down the people we want to help as a consensus
 - o Age
 - o Place of life
 - o EX: "assist
 - o Type of impairment
 - Reason why they need the assistance/device
 - o It could be age or situation in life
 - o What are the goals in trying to assist them
 - o How did we individually come to a domain
 - o How did we as a group come to a domain

Look Ahead

- How would we research this
- Who could we interview

Made fun of adam

Talked more about Dr. Snider's course offerings

Adam talked about his "girl" friend

Meeting concluded at 2:45pm.

AAC weekly meeting – 2021-09-20

Attendance: Everyone

Business:

- Brainstormed potential difficulties of the blind and deaf
- Read through interview from Cassie
- Constrained domain: Blind Children

Meeting concluded at 2:45pm.

AAC weekly meeting - 2021-09-20

Attendance: Everyone

Business: Constrain the domain

Meeting concluded at 2:40pm.

AAC weekly meeting 2021-09-24

Attendance: JD, Cassie, Isaac, not Adam, not Matt

Business: Develop a research plan

- Research Plan
- Interview Rick Mathias
 - How many blind/deaf students
 - What accommodations do you typically provide
 - What sort of restrictions do they have in regard to degree plans
 - Can you think of any tools you don't have that would be helpful
 - Are there any common struggles among those with disabilities
 - Is there any accommodations you can't make?
- Find/Interview parents/doctors who work with kids who are blind/deaf
 - How old are they
 - What are the things that they struggle with daily
 - What are the most challenging things
 - What is something that could help them better communicate/interact with other people or the environment?
 - How does this affect their social life?
 - How did they learn to communicate
 - If they cant hear/see how did they learn the words
- JD will contact PE Teacher who works with the blind
 - Similar questions as above
- Cassie will speak again speech pathologist
- Watch day in the life/general youtube videos
 - Figure out what problems they deal with
 - Get an idea of the technology they currently use to help them
- Check scholarly articles for current applications/affects
- Find/Interview parents/doctors who work with kids who are blind/deaf

Meeting concluded at 2:40pm.

AAC weekly meeting – 2021-09-29

Attendance: Cassie, Adam, JD

- Created research plan, covering all types of research.

Meeting concluded at 2:50pm

AAC ASYNC weekly meeting – 2021-10-01

Adam Hearn: This week I focused on starting my scholarly research. I utilized pubmed and bookmarked a few articles I plan to read, then figured out how to use the library

AAC ASYNC weekly meeting – 2021-10-04

Adam Hearn: This async 'meeting' I read about 10 scholarly articles. I uploaded the most significant articles to the shared drive under [Research Papers](#) folder.

AAC weekly meeting – 2021-10-06

Attendance: Everyone

Rick Muthiuh Interview

- Of the target recruitment population 18-22 from the PNW, how many people would be classified as blind or deaf

TODO:

- Research enough to get comfortable with a particular focus

Meeting concluded at 2:50pm

AAC weekly meeting – 2021-10-13

Attendance: Everyone

- Have we constrained the domain down to either blindness or deafness?
 - No
- Went around the room, sharing our research
 - Isaac - 2 videos of raising blind/deaf babies
 - Matt 2 interviews

- Cassie
 - Will interview professor - waiting for reply
 - Would prefer working with deaf people because it would be hard for someone to communicate.
- Adam - created GFU poll
 - Scholarly articles
 - Haptic feedback for blindness and deafness
 - Auditory detection of (siren, car other alerts)

TODO:

- Start to transition from research to brainstorming
 - Get some ideas by next wednesday
 - The week after that we will want to have picked one (NOV03)
- Make sure everything is sorted in the project report
- Complete CATME next week
 - Self and peer evaluation
- Refine the domain down a couple of problems we want to crack
- Keep track of what we are talking about

Meeting concluded at 2:50pm

AAC weekly meeting – 2021-10-18

Attendance: Everyone

- Brainstorming Ideas:
 - Haptic Feedback
 - AI Speech to text
 - AI Seeing eye stick
 - Machine learning data collection
 - Alert users of environment
 - Directional Hearing assistive device -> Driving
- What do we not want to do:
 - Adam: Extensive hardware design -> aka minimal circuit design
 - Isaac: Willing to do anything
 - Cassie: Not familiar with AI or Machine learning -> Snider teach us please
 - JD: Same as cassie
- Tentative Problem Statement: We are going to create an assistive device to aid with directional hearing for those who have auditory or visual impairments.

Meeting concluded at 2:35pm

AAC weekly meeting – 2021-10-20

Attendance: Everyone

- Go over domain:
- A device that reads the environmental sounds and gives haptic feedback of the direction
- Separation of signal from noise
 - Sound isolation(1)
 - Direction analysis(2)
 - Classification of sound(3)
 - CAN BE TUNED TO A SPECIFIC DOMAIN
 - How do we act upon it(4)
- What problem are we trying to solve:
 - We are going to create an assistive device to aid with directional hearing for those who have auditory or visual impairments.
- It is general purpose
- Now it is time to look at similar products/competitors
- Given 2 mics, how do we know which direction its coming from
 - If they are the same freq then its either front or back
 - If one has a higher freq then its on that side, but where?
- Design/Draw some sketches of what it might look like
 - What am i going to wear that could have the haptic feedback on?
 - Belt, glasses, head strap, chest strap
 - Is it enough to have a left and right wrist band
- How would you interact with the thing
- What form factor
 - Wrist bracelets
- Live running or passive
 - Do they want it to be on all the time or just passively
 - Just assume for now that they want to use it and its on
 - Low power mode where it only recognizes alertering noises
 - Do we want to have a sensitivity adjustment
- Start with how it will be worn/where it will be worn
- Then focus on sensitivity, things to listen for and things to ignore
- Mind map or a whiteboard
 - Some central idea
 - Direction finding microphone

- Augmented Directional sound
- Draw spokes off central idea
 - Detecting sound direction
 - This might open up a bunch of literature about different ways to do that
 - Number of microphones
 - How humans perceive sound direction
 - Hardware and power
 - Form Factor
 - Wrist bands
 - Belt
 - hat/headband
 - Competing products
- As we look into these we may find that they can do some of the things that we are looking to do
- From central idea we organically grow out the ideas that we can think about later but don't have to do currently
- Look at servant engineering website, there is a calender, weekly meeting 8, click on it, go to exploring the conceptual design
 - It talks about how to do product centric research
 - Useful for us to do in terms of structure
 - Ideation
- How will the vibration disrupt the directional sound?
- TO DO
 - Mind Map
 - ***Dig into form factor***
 - How are other devices delivering notifications
 - Dont spend too much time on the detecting sound direction
 - Dig into competitive products

Meeting concluded at 2:35pm

AAC weekly meeting – 2021-10-27

Attendance: Everyone

- Discuss mind map
- Went over machine learning
 - X: training data
 - Y: ground truth
 - The model

- All we need to do is pick the right model that has already been created
 - Went off the rails a little bit with beamforming, but really cool ideas
- Looked at different model ideas
- What do we not want to do:
 - Speech corpus sounds
 - Danger
 - Generate our own recordings
 - Continue to branch out form factor
 - Pro's con's of each
 - Could have one form for the input
 - Another form for the feedback to user
 - How do we make this useful for someone especially considering the form factor
 -
- Tentative Problem Statement: We are going to create an assistive device to aid with directional hearing for those who have auditory or visual impairments.

Meeting concluded at 2:35pm

AAC weekly meeting – 2021-11-01

Attendance: Adam, Isaac, Matt, JD

- Worked on mind map under form factor
- Isaac was in fred meyer
- Found data to train our ai model

Meeting concluded at 2:41pm

AAC weekly meeting – 2021-11-03

Attendance: Adam, Isaac, Matt, Cassie, Dr. Snider

- Continued discussion focused on form factor
 - Multi-part
 - Single device
 - We honed in on specifically working towards helping individuals who are deaf
 - We could purchase a multi directional microphone array
- What sort of microphone device should we use to record the creative corpus?
 - We could talk to the music/audio people at fox
- We will need to collect the directional sound ourselves
- Beyond direction, what if something is just a notification and what if something is more serious?

- How will we differentiate?
 - Vibration intensity
- What are we looking for in a mic
 - Freq response range
 - Vocalist at a church
 - Monitoring bird song
 - 4-5k htz
 - noise floor
 - Lower noise floor more \$
 - Use decent mics that we can borrow to record
- Would someone actually wear it / use it?
- What is more important, directionality or classification?
 - Directionality
 - Less info available
 - Could pick up spikes in db levels that could alert the person which would still be more beneficial to someone that telling them there's an alarm but not which direction to run

TODO

- Prototype
 - Rough it out
 - Put something around shoulders/neck
 - Wear it around
 - Use scrap/cardboard to form into rough shape
 - Add buttons (on/off)
 - Live with it
- Where are the mics/will they be directional
- Gather some ideas about materials
 - We do not have to come back on wed with a prototype
- Think about what kind of material are we going to need to purchase
- Ask church if we could borrow some of their recording equipment
- Work on the mind map feedback

Meeting concluded at 2:41pm

AAC weekly meeting – 2021-11-08

Attendance: Adam, Isaac, Matt, JD, Cassie

- Discussed further options for form factor
- Matt presented his design for the device
 - Pros:
 - Adjustable

- Natural feel
 - Can help with posture as well
 - Can be worn over or under clothing
 - Mics and haptic feedback in one device
- Cons:
 - Adam broke it
- We need to get a backpack with straps that we can use to make a more solid prototype
- JD is going to test out the device



Meeting concluded at 3:03pm

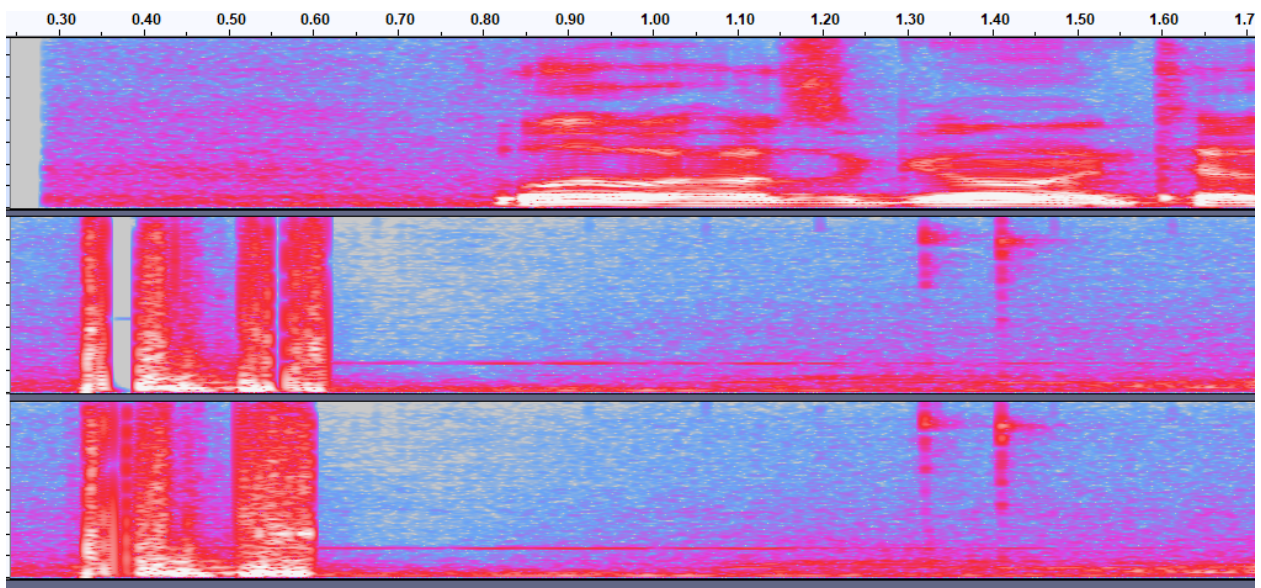
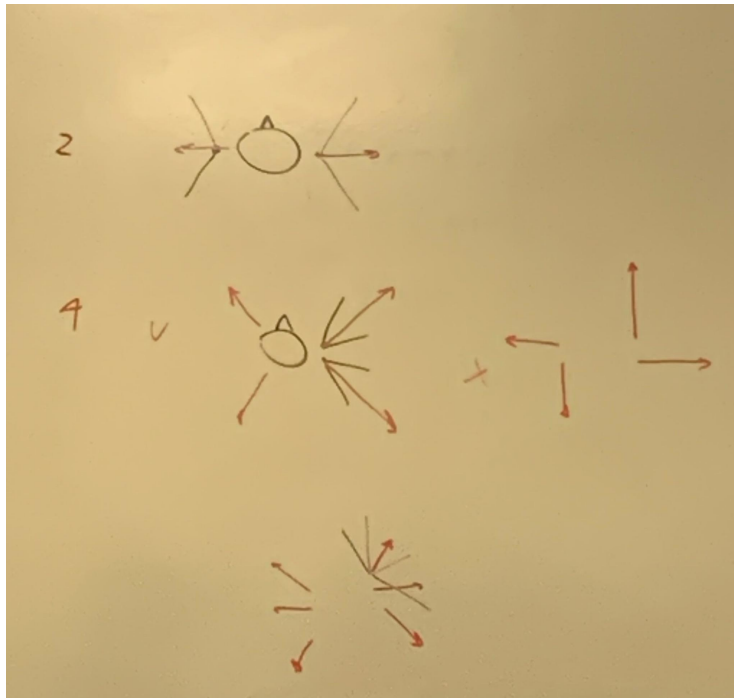
AAC weekly meeting – 2021-11-10

Attendance: Adam, Isaac, Matt, JD, Cassie

- Went over prototype design
- Good form factor
 - Really nice aspects:
 - Microphones by ears, and oriented with position
 - Could be worn all day
 - Easy to fabricate a lofi prototype
 - We need to have some sort of microphones eventually
 - Harness with wire harness to laptop/power
 - Once we have a trained model we can put it into something very small that the microphones could use to predict what the sound was
 - We need to get the machine learning model produced
 - Later
 - Task

- Collect audio data with multiple microphones
 - At least two
 - 4 would be better
 - Picture of microphone setup below
 - We need to ask someone who could potentially wear this in the future if they would actually wear it
 - One concern is, will the users voice disrupt the microphones?
 - Depends on the microphone and the frequencies
 - We are going to want to do some classification with mostly directional
 - Blocking out some talking wouldn't be a bad thing
 - Determine if its speech or not
 - If its not determine what direction its coming from
 - It will not be hard to determine if the noise is something we need to alert the user to
 - Below is a picture of the clear difference between talking and a loud noise using a spectrogram
 - Top is talking
 - Bottom two tracks are loud bang
 - We are not too concerned with speech itself at this moment
 - Direction finding is going to be the first problem to solve
 - Then we need to get the direction of the loudest thing
 - Then we can move towards speech
- We should consider the option to have a gain knob for adjusting the sensitivity
 - People may enter a building/space with more noise than usual and we don't want alerts to an annoyance.
- Goal for next week:
 - Record some audio at some point **
 - It has to be multi-channel audio pointing in different directions
 - Once we have some audio we need to label it
 - This is tedious
 - Once labeled we can start the machine learning
 - Until we are able to begin recording, we can look into the machine learning stuff.
 - **
 - Dr. Snider will send information to us about very basic machine learning
 - Parts list
 - Board with the microphones
 - Velcro
 - Vibration motor
 - Arduino board
 - Draw a more thorough prototype
 - Put the Mind-map into this document

Meeting Concluded at 2:55pm



AAC weekly meeting – 2021-11-15

Attendance: Adam, Isaac, JD, Cassie

- Today we met in the library
- Worked primarily on updating the project report
 - Added mind map, research, existing solutions, and more

Meeting Concluded at 2:55

AAC weekly meeting – 2021-11-17

Attendance: Adam, Isaac, JD, Cassie

- TODO:
 - Fill out project name and project information on page 15
 - Ask someone if they would actually wear it
 - Willing to wear it for a day
 - What could be improved
 - impedances
 - What types of sounds/environments do we want high level
 - 3 second ish long recordings
 - List of outdoor sounds
 - Horn
 - Screeching tires
 - Sirens
 - List of outdoor sounds
 - Fire alarm
 - Try to find free recordings of the above sounds
- ZOOM h2n will work
- We need 4 channel input for all directions perfectly aligned
 - Then record a sound, label with the position and type of sound and save it
- How many sounds/recordings do we need? - as many as possible
 - What types, in what environments - quiet room, near a loud highway
 - We want to do a lot of different sounds in many environments
 - We only need to worry about clean sounds now
 - We can blend audio tracks together
 - If we had long running audio outside
 - During rush hour
 - Slow traffic
 - Morning
 - Then go back in with our horn sounds and blend the two together

Meeting Concluded at 2:55

AAC weekly meeting – 2021-11-22

Attendance: Adam, Isaac, JD, Cassie, Matt

- Today we met digitally
- Adam will email individual from survey to check if they would wear the device
- Established project information
 - Project title
 - Project overview
 - Project description
- What types of sounds/environments do we want high level
 - 3 second ish long recordings
 - List of outdoor sounds
 - Horn
 - Screeching tires
 - Sirens
 - School bell
 - Truck backup beeping
 - List of indoor sounds
 - Fire alarm
 - Oven timer
 - Microwave timer
 - Baby monitor
 - Doorbell
 - Indoor & Outdoor
 - Shouting
 - Talking - **Above a certain decibel, code: turn off after alert x seconds**
 - Gunfire
 - Phone alarm
 - Alarm clock
 - Bang / Sudden loud noise - **Decibel based?**
 - Dog barking

Meeting Concluded at 2:55

AAC weekly meeting – 2021-12-01

Attendance: Adam, Isaac, JD, Cassie

- Upload slides to servant engineering shared drive, presentations folder by monday dec.6 12:00pm
 - Auto timed slides
- Presentations on monday at 2p in EHS 125
- We are meeting on the 8th to discuss/debrief for last time of semester 2pm ehs 110
- Project report due friday(17th) of finals week at 5pm
 - Confirm completion with email to Dr. Snider

- Time difference of arrival
 - The microphone phases are out of phase and the one that began first is the direction in which it originated
- The cinema production has a strict policy that their material is only for them, but they do have a student that needs to do some recording
 - We may be able to work with them
 - Dr. Snider will try to figure that out before christmas

Meeting Concluded at 2:55

AAC weekly meeting – 2022-01-12

Attendance: Adam, Isaac, JD, Cassie, Matt

- Should have microphones by next wednesday
- Come up with a script of the sounds we will make/record
- Here are all the takes we need
 - Louder
 - Softer
 - Turn mic to every few degrees
 - From this we could predict from which degree its coming from
- Beyond recording we need to label it
- Put together google spreadsheet with sound and label
 - One tab per sound(pre recorded to sound the same) that we'll play
 - Car slamming on breaks
 - Honking(directional)
 - Consistent frequency
 - Fire alarm
 - Smoke detector
 - Police siren(directional)
 - People talking(directional)
 - Diverse band of frequency bands
 - In that one tab we'll want something like
 - That same sound played from a bunch of degrees
 - We want the degree of position(36 different positions 0, 15, 30, 45,...)
 - The time stamp
 - The next tab will be a different sound
- Use audacity to record
 - Use continue
- There could be many different fire alarms that could go in different tabs
 - Then later we could combine into different classifications
- How many different points around a circle do we want to record?
 - Every 15-45 degrees
 - That way we can determine front right/front left

- We can attempt to decouple the sound determination from the directionality later
- There are natural places we can pick up sound from
 - Canyon commons
- There will be some machine learning
- There will be slicing of the audio clips
 - Labelling them as well
- We will run a script and see how well it does
- We can begin to
 - get some microphones
 - Get a circuit board
 - Begin to connect this all together
 - This can be done in conjunction with the sound classification/directional piece
- We want to be able to present a proof of concept at the end of the project
 - We could either have l.e.d. Representation of directionality or an on screen presentation
- We should think about how the microphones will be interrupted by jackets/backpacks
- Once we have proof of concept, tech can be applied cars/wheelchairs
- TODO
 - Create spreadsheet
 - Tab out the layout of the spreadsheet
 - **Determine/Find sounds(100's of different kinds of the same sound)**
 - We shouldn't have to go into the wild to find the sounds
 - Many different kinds of the same sound
 - In this way the model will be able to determine what kind it is
 - Start looking for materials now
 - Mics
 - For dr video
 - 4-6 mics
 - Circuit board
 - Dr. Snider will
 - Look into getting the recording equipment
 - Look into increasing the budget

LET THE GROUP KNOW IF YOU ARE NOT GOING TO BE IN ATTENDANCE

Meeting Concluded at 2:51

AAC weekly meeting – 2022-01-17

Attendance: Adam, Isaac, JD, Cassie, Matt

We need to approach

5 different sheets categorized by type of sound

- Each sheet has 5 sounds of that category of sound
- Each sound has 12 recordings from each degree point
- We will record one large file stopping at every 15 degrees to play sound and split recording by timestamp or by silences with wavepad
- Adam will ask Dr. Snider about recording different tones
- We will begin with focusing on directionality for proof of concept then integrate classification of sound
- We currently have 4 sounds
 - Alarms
 - Sirens
 - Talking
 - Horns

Meeting Concluded at 2:20

AAC weekly meeting – 2022-01-19

Attendance: Adam, Isaac, JD, Cassie, Matt

- We should have all the sounds at the same sample rate with **wav** files
 - No MP3/MP4
 - Do not go below 16Khz
 - We can use audacity or sox to do that
- Tasks by Friday:
 - Split files if there is dead space in the middle
 - Remove dead air from ends
 - Clean up name - 00_siren_ambulance.wav

Future:

- Come up with tasks for those who want to work, but not on ML Adam:
Convert files to: - WAV - Mono - 16K? - float or int

Meeting Concluded at 2:53

AAC weekly meeting – 2022-01-26

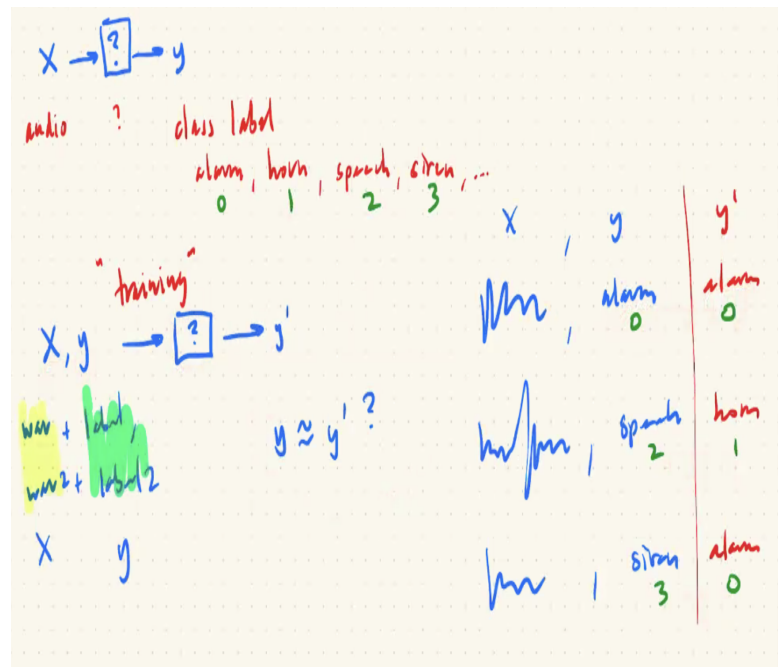
Attendance: Adam, Isaac, JD, Cassie, Matt

- Reported about the weeks accomplishments

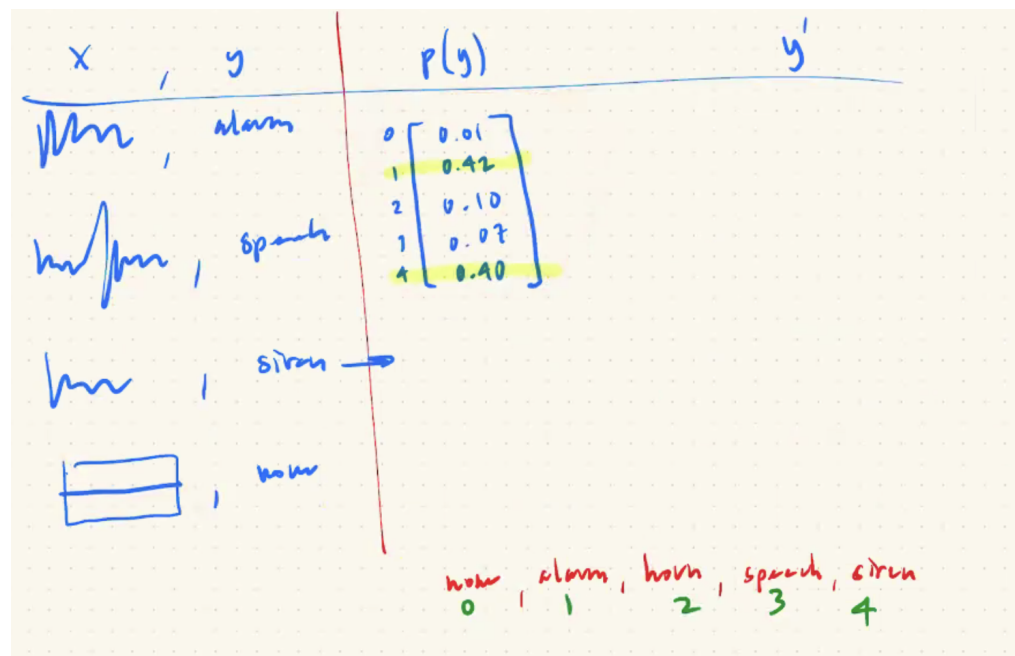
- Haven't heard from work study student or dean about selling some equipment to buy more
 - We should be able to do recording soon for directional
 - We are not blocked on the sound classification
 - What does the machine learning look like
 - Snider to give familiarity so we can turn the corner and begin writing code
 - How can other people stay involved who will not be doing machine learning model
 - There will be some physical form factor things to work out
 - Mics not getting hung up
 - Usability of the form factor
 - UI/UE stuff
 - Is the device always on?
 - Where is the switch?
 - Try it out, ask people to wear it
 - Maybe microphones go on the straps
 - Begin sourcing materials
 - Putting things together
 - We will be given an overview of the machine learning
 - The code will be python
 - We will be given an overview
 - There will be a big black box that will need to be figured out
 - Snider has materials he can donate to the physical model
 -
- What everyone is going to do:
 - Matt: Physical model research
 - Isaac: Machine Learning
 - Cassie: Machine learning and physical model
 - May be the point person on sewing machine
 - JD: Machine learning and physical model
 - Adam: Machine learning and physical model
- Outline the tasks that we need to complete
 - Machine learning crash course
 - Try to collect some directional audio data
 - The audio we already have needs to be labeled and sliced (almost done)
 - Physical form factor needs to be built
 - Lofi/hifi prototyping
 - Arduino with a little battery pack
 - Won't get this far
 - It will most likely be a bundle of cords attached to someone's computer
 - Assume that we can sell the GPU and then get some mics

- Get another lofi model so we can get a good idea of what we are wanting
 - We should gather some requirements for what our final presentation will look like with the model
- Purchase list
 - USB interface with 4 audio xlr inputs
 - 4 channel audio that is time aligned
 - Snider will see if he can acquire some of those things
 - Lapel microphone with adapter
 - We may get larger mics
- Send reminder email to Snider to bring the supplies for the physical model
- We may want to look at large data sets for our sounds
 - We could also lower or raise the amplitude of the current sounds
 - We need hundreds of each
- High Level Machine learning
 - Take an x input and put it into a black box and the box will kick out a corresponding y
 - X is the audio
 - Y is the classification of the sound “class label”
 - Alarm
 - Horn
 - Talking
 - Siren
 - We not only have a black box, but we have to train the black box
 - We are not only going to feed it x, but we are going to feed it y also
 - This will train it
 - Give it the sound and the classification
 - We will get back y’
 - Then we will see how similar y and y’ are
 - All sorts of ways to quantify how close they are
 - There is also a class called none, we want to make sure the no sound is classified as none
 - This would be an ambient noise recording
 - We should have a pile of ambient recordings as well
 - Tv static and speech
 - Ambient traffic with horns
 - Ambient traffic with sirens
 - Confusion Matrix
 - Can be used to see how far off the model is
 - We can also ask it to predict the probability of x being each label

- This will allow us to see if there is a really close tie among the labels
- Given we have audio waveforms, what



mathematical information do we extract?



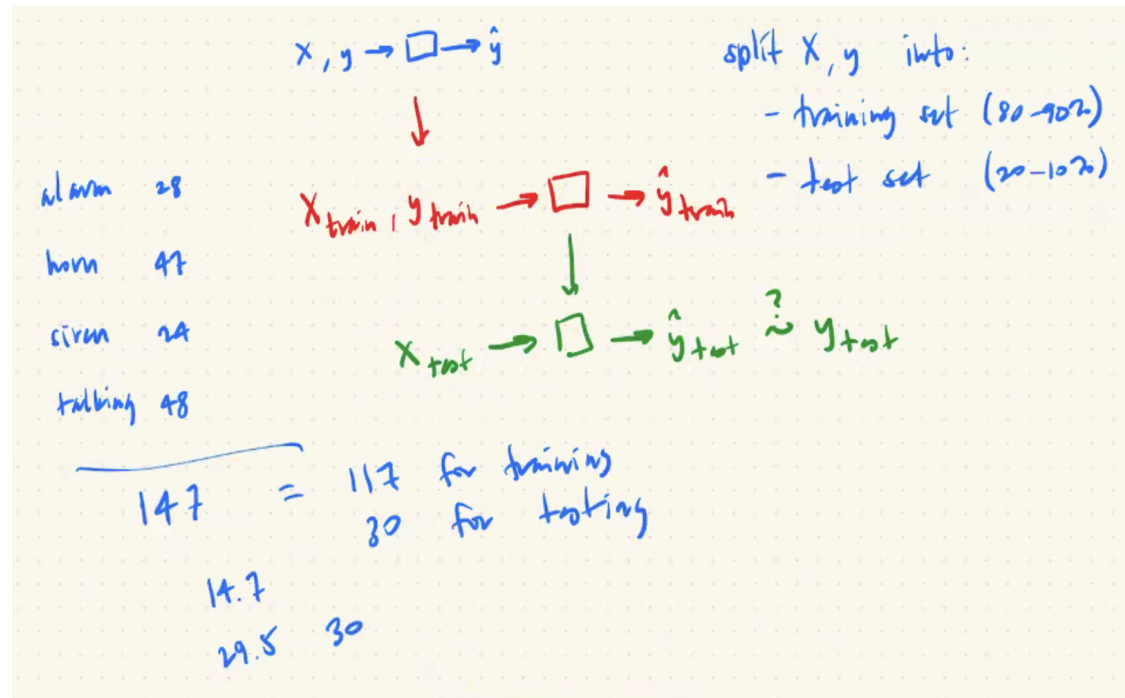
Meeting Concluded at 2:54

AAC weekly meeting – 2022-02-02

Attendance: Adam, Isaac, JD, Cassie, Matt

- Dr. Snider brought the supplies
- We are going to look into finding data that is already cut and labeled
- There will be an end of semester presentation
 - Will be on monday before the last week of class (APR18)
 - 2p-2:50pm
 - Project can come at the end of finals
- MACHINE LEARNING
 - Someone is going to have to start the python script
 - Snider will help with most of this
 - Someone will have to take it from there and run the data through it
 - It is on github
 - Snider could help by coding in class
 - Training
 - Feed the model an x and y
 - X is a WAV file
 - Y is the label
 - 0,1,2,3,4 based on what category it is
 - We will hopefully have thousands of sounds
 - A few hundred of each one
 - Each one has many different types of sounds
 - After it has been trained
 - We will give the box a new X
 - We will then see what Y it kicks out
 - Prediction
 - We can then check the predictability of the correct prediction
 - Categories
 - Alarms
 - 28
 - Horns
 - 47
 - Sirens
 - 24
 - Talking
 - 48
 - 147 total clips
 - We need to train some model
 - We need to feed the x and y's to the box and get a prediction

- We do not want to train the model and then use the same X's to test it
- So...Split X and Y into:
 - Training set (80-90%) 117
 - Testing set (10-20%) 30



- We need to make sure we take 80% of each of these for training
 - Then ensure the other 20% is for testing
 - There is a python function that does this split for us
 - Snider will show us
 - We want to do stratified sampling
 - Preserve the class ratio
 - Use of K-fold cross validation
 - There is a Library to import (scikit-learn) for python
 - Import scikit-learn
 - We just have to figure out the best configuration
 - We could vary the magic box that we use
-
- Feature Abstraction
 - Given the waveform, what features do we want to abstract
 - Sirens are very high frequency, talking are more low frequency
 - If we can determine easily by the waveforms and amplitude
 - We can determine the feature vector
 - Next week

- TODO
 - Organize files
 - Snider
 - Develop barebones script
 - Email out environment file
 -

Meeting Concluded at 2:53

AAC weekly meeting – 2022-02-09

Attendance: Adam, Isaac, JD, Cassie, Matt

- Group coding(mostly Dr. Snider) the data loading
- Someone could be working on the poster

Meeting Concluded at 2:53

AAC weekly meeting – 2022-02-16

Attendance: Adam, Isaac, JD, Cassie, Matt

- We are going to take pieces every so many milliseconds and see how much energy is there every 200 hz from the spectrogram
- Using scikit learn
 - Support vector machine
 - Help identify the spectrogram by its features
- We need to open up the audio file and get a vector of features that we can use in the model to classify
- Use numpy to get the standard deviation of the wavfile shape
 - How much does the frequency change
 - STD - 7599 - Siren
 - STD - 1670 - Horn
 - STD - 1709 - Talking
 - We want to write a loop to get all the files so we don't have to hard code test files
 - We want some big giant x and a big corresponding y with the category

- We need to figure out how to extract the features
 - Each sound has different energy at different Hz bands(0-500, 500-1000)
 - Get the spectrogram and use the matrix from the spectrogram to get the feature
- We can create the Poster

Meeting Concluded at 2:53

AAC weekly meeting – 2022-02-23

Attendance: Adam, Isaac, JD, Cassie, Matt

- Group coded further into the machine learning
- Restricted sampling to 80 bins of 100ms
- TODO
 - TODO:
 - Find nothing sounds
 - Find more alarm/horn
 - Work on poster
 - Work on physical form factor
 - Presentation

Meeting Concluded at 2:54

AAC weekly meeting – 2022-03-02

Attendance: Adam, Isaac, JD, Cassie, Matt

- Group coded further into the machine learning
- Restricted sampling to 80 bins of 100ms
- TODO
 - Poster
 - Slides
 - Prototype
 - Get a bunch of files with nothing
 - Get a bunch of files with light talking or background noise

Meeting Concluded at 2:54

AAC weekly meeting – 2022-03-09

Attendance: Adam, Isaac, JD, Matt

- Went over design of prototype
- Discussed Final Poster
 - Make sure to put the confusion matrix in visual form
 - Possibly put pictures under sections
 - We want to emphasize the design of the product
 - Design and machine learning in the middle of the poster
 - Left side
 - Queue up the problem
 - Right side of the poster
 - Machine learning results
 - Outcome
 - summary /concluding results
 - Next steps/what a future team could do
- TODO
 - Continue working on the Poster
 - Could work on direction finding
 - Check ebay/amazon for microphones
 - Can be reimbursed (140 total)
 - Machine learning
 - Push for 100+ samples
 - Get it to where we can plot the confusion matrix
 - What if we need better feature extraction?
 - Beyond pure energy or frequency
 - Adding other features beyond these
 - 2 stage classification In Sniders Dissertation(ICAST 2013)
 - Spectral
 - Linear Predictive (best for speech)
 - Instead of taking one sample per clip take many
- This is so important that many cell phones are beginning to implement
 - Unreliable due to phone location
 - Our device allows more accurate prediction and notification
 - How much more accurate?
 - How often does each predict the sounds

Meeting Concluded at 2:52

AAC weekly meeting – 2022-03-16

Attendance: Adam, Isaac, JD, Cassie, Matt

- Talked about different ways to improve the modeling by changing the feature vector
- Removed tones from the data because there are too few of samples
- We will combine the predictions of the categories at the end
- Instead of focusing on a working prototype
- We can get a working program that is predicting
- TODO:
 - GET MORE SOUNDS: HORNS, ALARMS, SIRENS
 - Mock up what it would look like for the prototype
 - 3d print the microphones
 - Even if all features don't work, we should be able to speak intelligently about what could be accomplished given another semester

Meeting Concluded at 2:54

AAC weekly meeting – 2022-03-30

Attendance: Adam, Isaac, JD, Cassie, Matt

- Invent Oregon Requirement
 - Rehearse slides
 - Record it
 - Then we will have that to turn in
 - Just respond to Spivey with the poster, and the voiced presentation (5 minutes)
- Ours is not really eligible because we do not have a prototype
- We are going to do the minimum required
- The label should be percent and colored
- Talked about the possibility of doing a live demonstration
- TODO
 - We could loop in Alarm, Siren and horn as ALERT and background and talking as background
 - Presentation done by the 13th
 - Get it done by next week
 - Confusion matrix normalized
 - Accuracy improved
 - If we don't have a prototype we can still have talk about it intelligently

- Investigate the confusion and make a couple bullet points on the presentation
 - In the top corner of the poster put the results
 - Accuracy
 - Balanced accuracy
 - Confusability
 - This is predicted as this but we understand why and its okay (false positives - alert when should not be)(false negatives - no alert when their should be)

Meeting Concluded at 2:51

AAC weekly meeting – 2022-04-06

Attendance: Adam, Isaac, JD, Cassie, Matt

- Looked at the confusion matrix
 - Fix the colors
 - Make sure the number of samples for each category are there
 - Try and make background category 0 and talking category 1
 - Included a balanced table
- Presentation
 - Talk about normalization of data files
 - Talk about the challenges

Meeting Concluded at 2:54

AAC weekly meeting – 2022-04-13

Attendance: Adam, Isaac, JD, Cassie, Matt

- Poster is due Monday the 18th by 5pm
 - Here is a link, please upload
- Presentation is Monday the 18th 2pm
 - Stevens 208
 - DO NOT HAVE TO UPLOAD THE PRESENTATION PRIOR
 - Everyone needs to participate in some way
 - Conclude by pointing out what the purpose of the project is
- Friday the 22nd at 2pm-315pm
 - Senior Design is presenting and we are encouraged to attend those
 - Not required
 - Stevens 109
 - From 3:30 to 5:00pm our Poster will be at the expo
 - One of us needs to be present during this expo at all times
- Poster
 - Fix spacing

- Log Scaling
 - Talk about feature extraction
 - 4 columns
 - Intro
 - Human
 - ML
 - Wrap up
 - Results Section
 - Before Confusion Matrix Picture
 - Section should be in the top right corner
 - Move the current picture to the middle-ish
 - Confusion matrix is a result...
 - Balances accuracy: Uncollapsed/Collapsed
 - Of the confusion matrix information - - what was confused with what
 - Adjust size of photos - Uniform
 - Create a picture of wav file split in bands
-

Meeting Concluded at 2:54

AAC weekly meeting – 2022-04-13

Attendance: Adam, Isaac, JD, Cassie, Matt

- Worked on presentation and poster
- Schedule for the 22nd during Poster showing
 - 3:30pm - 4:00pm (Adam)
 - 4:00pm - 4:30pm (Cassie)
 - 4:30pm - 5:00pm (Matt & JD)

Meeting Concluded at 2:54

Status Reports for the week of xx/xx/xxxx

Initial paragraph should be the summary report for the project.

There should be an additional paragraph for each team member's individual status report. The report should be sufficiently detailed to explain the time spent on the project during the week. Entries like "researched solutions" are wholly inadequate. Instead, an accounting of the different types of solutions researched, along with pros, cons, and potential judgments is more appropriate.

Project summary for the week

Weekly report for student #1

This should include the number of hours spent working on the project. These can be totaled for the final report and presentations to client.

Weekly report for student #2

This should include the number of hours spent working on the project. These can be totaled for the final report and presentations to client.

Appendix B: Expanded Project Pathway

This pathway identifies each of the deliverables that students are expected to produce during the course of a complete servant engineering project.

<u>Understand Servant Engineering Course Requirements</u>	
<input type="checkbox"/> Deliverable 1: Pass Servant Engineering Course Overview FoxTale Quiz	
<input type="checkbox"/> Deliverable 2: Pass Servant Engineering Documentation FoxTale Quiz	
<u>Identify Team Information</u>	
<input type="checkbox"/> Deliverable 1: Contact Information	
<input type="checkbox"/> Deliverable 2: Weekly Schedule	
<input type="checkbox"/> Deliverable 3: Project Management Solution	
<u>Detail Domain Motivation</u>	
<input type="checkbox"/> Activity 1: Empathy Exercise (assigned by faculty)	
<input type="checkbox"/> Deliverable 1: Develop Domain Motivation Presentation	
<u>Frame the Design Challenge</u>	
<input type="checkbox"/> Deliverable 1: How to Frame the Design Challenge	
Is the Project Already Defined?	
NO	YES
<u>Define the Problem</u>	<u>Understand the Project</u>
RESEARCH PROBLEM AREA	RESEARCH THE PROJECT
<input type="checkbox"/> Deliverable 1: Plan Your Research	<input type="checkbox"/> Deliverable 1: Plan Your Research (market?)
<input type="checkbox"/> Deliverable 2: Build Interview Guide	<input type="checkbox"/> Deliverable 2: Build Interview Guide
<input type="checkbox"/> Deliverable 3: Conduct Your Research (Individual)	<input type="checkbox"/> Deliverable 3: Client Contact/Interview(s)

SYNTHESIS	SYNTHESIS
<input type="checkbox"/> Deliverable 4: Share Inspiring Stories & Learnings	<input type="checkbox"/> Deliverable 4: Share Learnings
<input type="checkbox"/> Deliverable 5: Cluster Into Themes	
<input type="checkbox"/> Deliverable 6: Create Insight Statements	
<input type="checkbox"/> Deliverable 7: Create “How Might We” questions	
DEFINE THE PROJECT	DEFINE THE PROJECT
<input type="checkbox"/> Deliverable 8: Brainstorm Project Ideas	<input type="checkbox"/> Deliverable 5: Define the Project
<input type="checkbox"/> Deliverable 9: Select and Assess Your Best Ideas	<input type="checkbox"/> Deliverable 6: Justify the Project
<input type="checkbox"/> Deliverable 10: Determine and Define the Project	
<input type="checkbox"/> Deliverable 11: Justify the Project	
<u>Establish Initial Project (Customer) Requirements</u>	
<input type="checkbox"/> Deliverable 1: Determine Minimum Viable Requirements	
<input type="checkbox"/> Deliverable 2: Identify “Stretch” Requirements	
<input type="checkbox"/> Deliverable 3: Identify Relevant Standards	
<u>Explore Conceptual Design</u>	
<input type="checkbox"/> Deliverable 1: Research Existing Technologies	
<input type="checkbox"/> Deliverable 2: Conduct Literature Review (use the library!)	
<input type="checkbox"/> Deliverable 3: Ideate using generic brainstorming/mind-map	
<input type="checkbox"/> Deliverable 4: Ideate using 2 more Ideation techniques e.g. scamper, mash-up, etc.	
<input type="checkbox"/> Deliverable 5: Reduce/Combine ideas into multiple solutions	
<input type="checkbox"/> Deliverable 6: Prototype leading solutions (low-fidelity)	

☐ Deliverable 7: Validate leading solutions (Functionally/Numerically/ .. Physics)

☐ Deliverable 8: Select ultimate solution using a decision matrix (Justify)

☐ Deliverable 9: Generate ultimate solution specifications

Develop Detailed Design

Conduct Testing

Deliver Project to Client

Complete Course Requirements

☐ Deliverable 1: Prepare Final Presentation (last week of class)

☐ Deliverable 2: Complete Project Report and all other documentation

☐ Deliverable 3: Archive Project for future

☐ Deliverable 4: Create Poster for Engineering Expo

☐ Deliverable 5: Participate in Engineering Expo

Appendix C: Example Schedule - Undefined Project

This is an example schedule for a project that needs to be defined. While projects are all unique, it is recommended that teams attempt to match this schedule as much as possible in order to keep the project on track and ready to enter the detailed design phase near the end of the first semester..

Week #	Team Meeting	Individual Pre-Lab Work	Lab Work
1 all teams together	Class Orientation Bacon Fruit Course Mechanics	Understand Servant Engineering Course Requirements Deliverable 1 Deliverable 2 Identify Team Information Deliverable 1 Schedule lab time Detail Domain Motivation Activity 1	Identify Team Information Deliverable 2 Detail Domain Motivation Activity 2
2	Identify Team Information Deliverable 3 Detail Domain Motivation Debrief on Empathy Exercise, prepare for presentation Frame the Design Challenge Prepare for the coming exercise	Frame the Design Challenge Activity 1	Detail Domain Motivation Deliverable 1 Frame the Design Challenge Deliverable 1
3	Detail Domain Motivation View Presentation Frame the Design Challenge Refine Define The Problem RESEARCH PROBLEM AREA Go over Research Plans	Define The Problem RESEARCH PROBLEM AREA Activity 1	Define The Problem RESEARCH PROBLEM AREA Deliverable #1 Deliverable #2 Make progress on Deliverable #3

4	<p>Define The Problem RESEARCH PROBLEM AREA Develop Research Plan 2.0</p>		<p>Define The Problem RESEARCH PROBLEM AREA Deliverable #3</p>
5	<p>Define The Problem RESEARCH PROBLEM AREA Review Deliverable #3</p> <p>Define The Problem SYNTHESIS Investigate the Process</p>	<p>Define The Problem SYNTHESIS Activity 2</p>	<p>Define The Problem SYNTHESIS Deliverable #4 (take photos) Deliverable #5 (take photos) Deliverable #6 Deliverable #7</p>
6	<p>Define The Problem SYNTHESIS Go over "How Might We's"</p> <p>Define The Problem DEFINE THE PROJECT Investigate the Process</p>	<p>Define The Problem DEFINE THE PROJECT Activity 3</p>	<p>Define The Problem DEFINE THE PROJECT Deliverable #8 (take photos) Deliverable #9 Deliverable #10 Deliverable #11</p>
7	<p>Define The Problem DEFINE THE PROJECT Review the Deliverables</p> <p>Establish Initial Project (Customer) Requirements Investigate the Process</p>		<p>Establish Initial Project (Customer) Requirements Deliverable #1 Deliverable #2 Deliverable #3</p>
8	<p>Establish Initial Project (Customer) Requirements Refine the Requirements</p> <p>Explore Conceptual Design Investigate the Process</p>		<p>Explore Conceptual Design Deliverable #1 Deliverable #2 Deliverable #3</p>
9	<p>Explore Conceptual Design Review ideation, prepare for the coming week.</p>		<p>Explore Conceptual Design Deliverable #4 Deliverable #5</p>

<u>10</u>	Explore Conceptual Design Prepare for prototyping. This process will likely take two weeks.		Explore Conceptual Design Deliverable #6 Deliverable #7 Deliverable #8
<u>11</u>			
<u>12</u>	Explore Conceptual Design Review decisions and prepare for solution specifications		Explore Conceptual Design Deliverable #9
<u>13</u>			
<u>14</u>			
15	Presentations		