General background

Last year I worked on a project regarding disability accessibility software. In this software program people can control their computer with their voice.It is essentially a customizable voice assistant that is focused on helping people with disabilities on Linux. It can do everything from typing text to opening programs and manipulating windows.

- This worked well but I would prefer to work on a different project the semester.
- interested in ways to incorporate disability software with computer networks, improving incentive structures for making accessible software, or general machine learning for low powered mobile devices that will run such programs.

For context I have a orthopedic disorder in my hands Which is why I am motivated for this sort of project. I do the majority of my own work through voice.

I'm specifically interested in Linux phones since they are in emerging market share and prioritize privacy which is specifically important for people with health issues.

My interests for this semester

Option one

- Taking disability software in a new direction. (Networking it between the phone and computer, so that all one's devices are more connected And configuration is shared.)
    - A bit unsure on how to do this since the software I would build upon is not meant to be networked and has too high power consumption to run a voice recognition model continuously in the background.
        - considering not doing this since it seems like it would be more so of a software engineering task instead of academic research.

Option two

- Creating incentive structures for people to design accessible tech or host accessible software on their servers.
    - I'm interested in self hosted and federated software such as that with the activity pub protocol. I feel that these are socially meaningful applications that could do more to support people with disabilities.
    - I have been learning smart contract development with solidity and I feel that there are ways that smart contracts can be used help reward individuals that contribute to meaningful networks.

Option three

- Researching ways to optimize machine learning for the disability tasks I want to do. Trying to incorporate networks of users to improve datasets or training for specialized voice recognition tasks.
    - Disabled users often want to train their own models but it is difficult to get enough data on specific topics, or too computationally expensive to do for people with only mobile devices.

    - thinking about ways of sharing datasets, models, or user code on top of the models.
    - ways of sharing computational power between users?
    - this seems like the best Topic from a research standpoint
    - Possible to include my interests in smart contracts or federated software

Current plan

Option three seems like the option with the most flexibility , but it is also the most abstract. Regardless, I think that this is solving a useful problem, since custom training is hard for those without coding skills or disabilities that make typing hard.

I am specifically familiar with a disability accessibility project called parrot which uses tones and glottal clicks for easy computer navigation. However this project requires you to train the model itself which is hard for new users.

Steps assuming option three

- research machine learning techniques for low powered devices
- focus on ways in which models or training can be networked or shared between users.
- Research different networking protocols for how to best implement this (tradeoffs with centralization and security etcetera)
- implemented front end that users can interact with and make the process of using disability software easier.