

Nakul Kuttua

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CS 4590

Project Deliverable 1: User and Domain Research

The user domain that I will be doing research on is of people who suffer some sort of nerve damage that hinders their sense of touch and feeling. Many people who suffer from nerve damage often have trouble with muscle movements, internal organ problems, and even insensitivity to various temperatures (Mayo Clinic and John Hopkins Medicine). For example, someone who has trouble feeling things with their hands may not be aware if they touched something dangerously hot or cold. These limitations can be a minor annoyance at best and a fatal accident at worst. As of now, some solutions to remedy this are various medicines, physical therapy, and even minor surgery (WebMD and Cleveland Clinic). However, these treatments may need to be continually taken care of rather than a one time option (NIHDS). So for this, I want to research some sort of auditory solution so that nerve impaired users are more aware of their surroundings, and can potentially avoid any dangerous situations.

First off, some activities that I want to explicitly mention that I feel a sound-based solution would help for is any situation where extreme heat is involved. One example would be running water that a person does not know is hot. They could unintentionally expose themselves to that water, and cause some pretty bad burns. A sound-based solution for this would be an alarm of some kind that can mitigate this.

For this solution, I think a lot of data related to the user's current setting and situation would be very helpful. If the user was in the kitchen for example, it would be good to know the temperatures of various objects, how long an appliance has been on for, any potential hazards on

the floor (like water that can make you accidentally slip), and even how heavy some objects can be. Someone who has nerve damage may not explicitly know how hot, heavy, and even safe something might be.

Overall, I think there is a lot to explore here because our nervous system is one of the most important parts of the body, and losing even just a little bit of that can lead to a lifetime of discomfort and suffering. So, I intend to do lots of research related to this subject, and hopefully come up with a potential solution that can maybe be implemented at some point.

Sources

<https://www.webmd.com/brain/nerve-pain-and-nerve-damage-symptoms-and-causes>

<https://www.mayoclinic.org/diseases-conditions/peripheral-neuropathy/symptoms-causes/syc-20352061>

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/peripheral-neuropathy>

<https://www.ninds.nih.gov/peripheral-neuropathy-fact-sheet>

<https://my.clevelandclinic.org/health/diseases/14737-neuropathy>