The Desensitization Station

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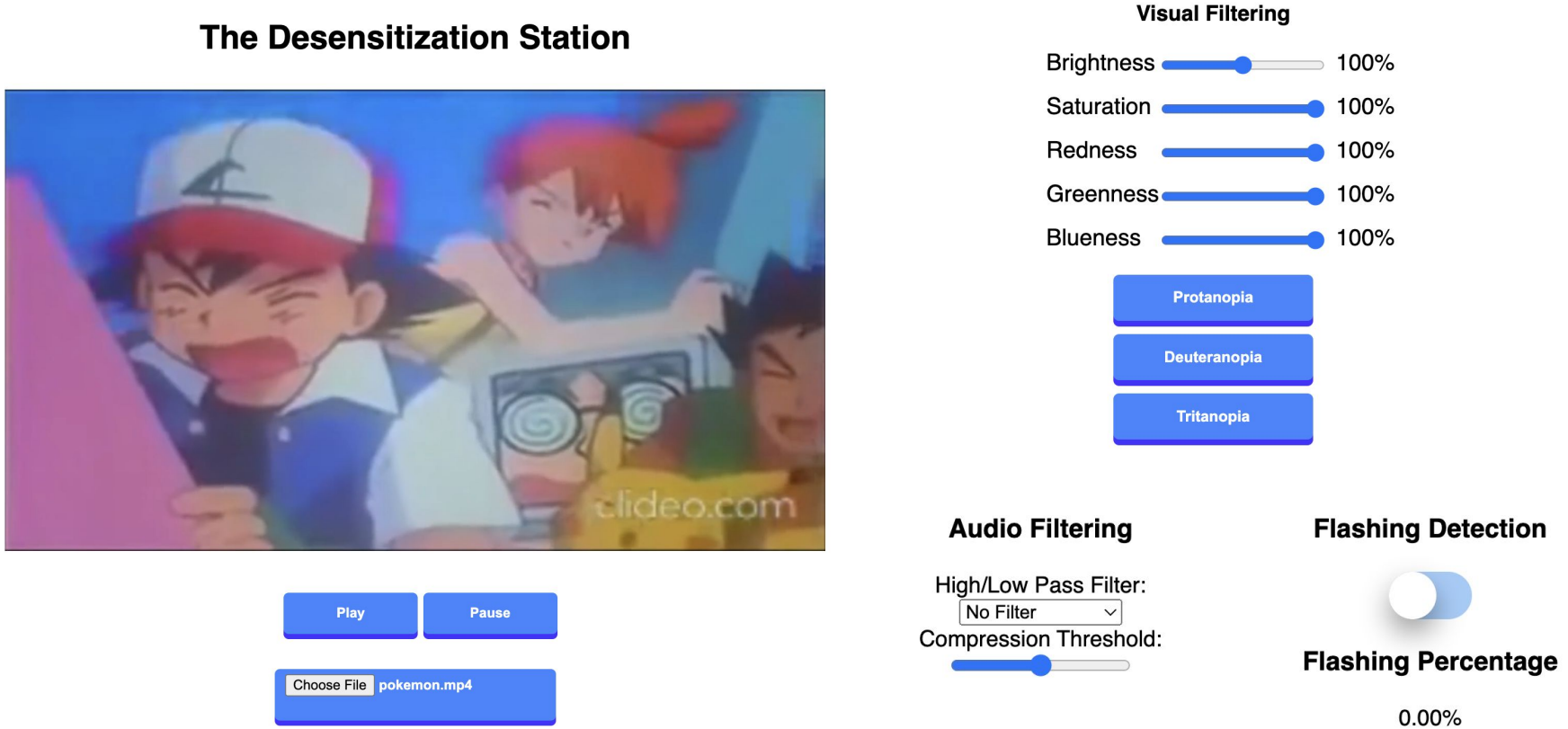
Our Problem

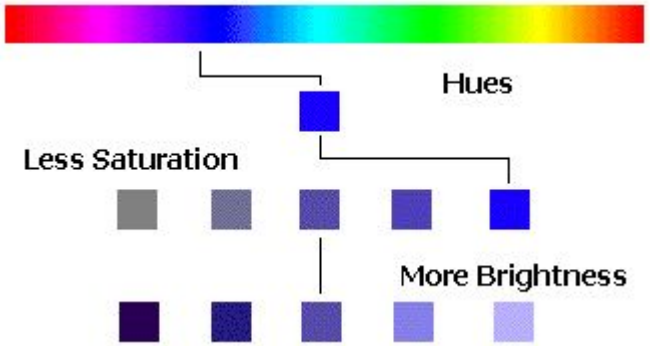
- Many forms of media today are user uploaded, and therefore do not have safeguards for photosensitive and audio sensitive users
- There are few ways to “check” videos without watching them beforehand
- **Lack of centralized** control for media consuming sensitivities

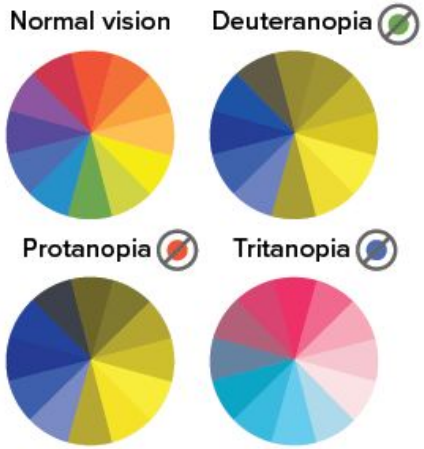
Our Solution: The Desensitization Station

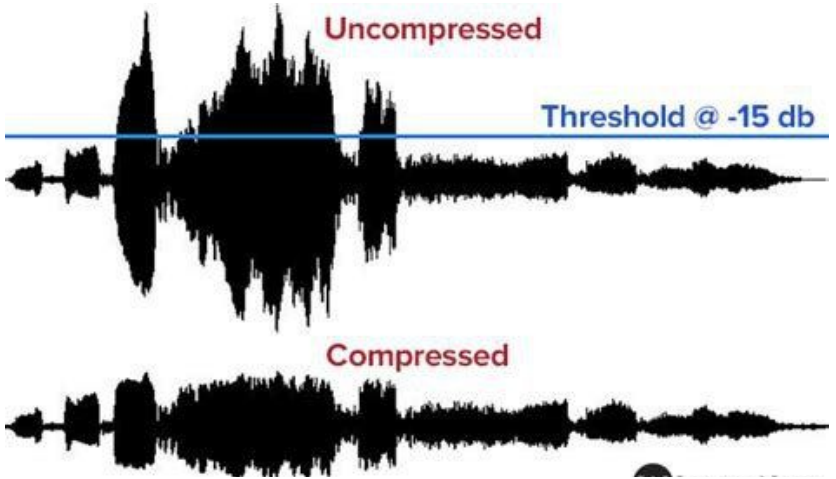


Features

- **Visual Controls**
  - Single color channel control
  - Brightness and Saturation control
  - Colorblindness preset modes
  - Flashing scene blocker
- **Audio Controls**
  - Compression
  - High pass filter
  - Low pass filter







What's under the hood?

- Developed using HTML, CSS, JavaScript, and WebGL.
- WebGL shaders used to control color filter changes and framerate
  - This includes the ability to render frames in real time from the source video to the output canvas
  - Directly access pixel color channels to implement color filters
  - Added checks for flash detection to our rendering function to slow down frame display rate to an acceptable level
- HTML video/audio objects to present/filter content
  - Allows viewers to personalize their viewing experience in a clean, all-in-one dashboard
- Flash Detection algorithm implemented from scratch with JS
  - Guided by movie/TV standards for photo-sensitivities

Use Case Example 1, Part 1

Simon is an individual with ASD.

Due to his ASD, he has light sensitivities to **very bright visuals** as well as an auditory sensitivity to **persistent, higher frequency noises.**

He wants to watch a video he downloaded, but doesn't know how it will appear or how it might trigger his sensitivities. Simon chooses to use the Desensitization Station to assist in viewing the video.

The Desensitization Station

Visual Filtering

Audio Filtering

Flashing Detection

Use Case Example 1, Part 2

Simon realizes while watching the video that the **high saturation** of the colors makes his eyes hurt after watching for a while.

Luckily, The Desensitization Station allows users to **dynamically adjust their chosen settings in real time** as their video plays.

Simon can then use the saturation slider while watching the video to ease his discomfort without interrupting his viewing experience.

The Desensitization Station

1.00

Play Pause

Choose File mickey.mp4

Visual Filtering Audio Filtering Flashing Detection

Use Case Example 2

Theodora has been diagnosed with **photosensitive epilepsy**. Due to her diagnosis, she has to be careful when viewing material, as flashing could trigger a seizure.

She wants to watch a movie, but she isn't sure how it will affect her sensitivity.

T**o do so safely**, uses the Desensitization Station because of its **flash detection** capabilities and her ability to **upload the video of her choice.**

The Desensitization Station

Visual Filtering

Audio Filtering

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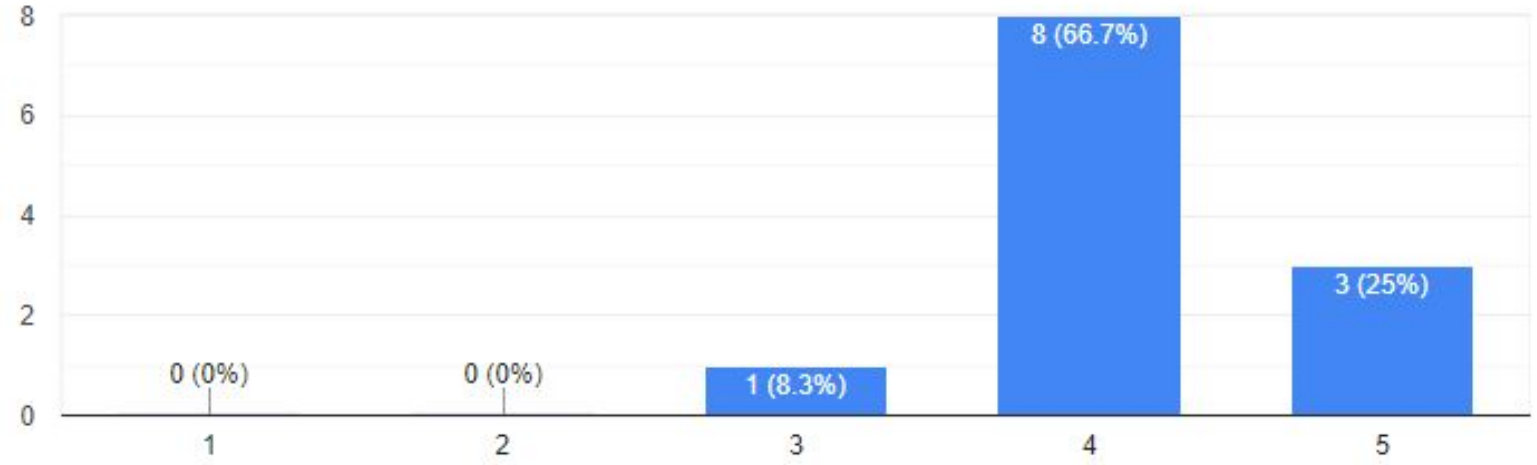
User Evaluation

- Due to difficulty of finding individuals with stimuli sensitivities, we used a variety of subjects to test the program to see how it affected their viewing experience
- We decided to conduct an AB test between viewing a potentially triggering video without the aid of The Desensitization Station and then the same video with the aid of the tools
- After viewing, the users completed a short Google Form to provide their insights on the experience of using the tools in terms of ease of use, relative viewing experience quality, etc.

User Evaluation: Overall Experience

How would you rate your overall experience using the Desensitization Station on a scale from 1 to 5?



User Evaluation: AB Preference

Quotes from those that preferred the Desensitization Station over watching the video without the tools:

“The bright colors can be overwhelming, so it's nice to be able to mute the colors. I was able to lessen the color just slightly so that it didn't affect my viewing experience too much.”

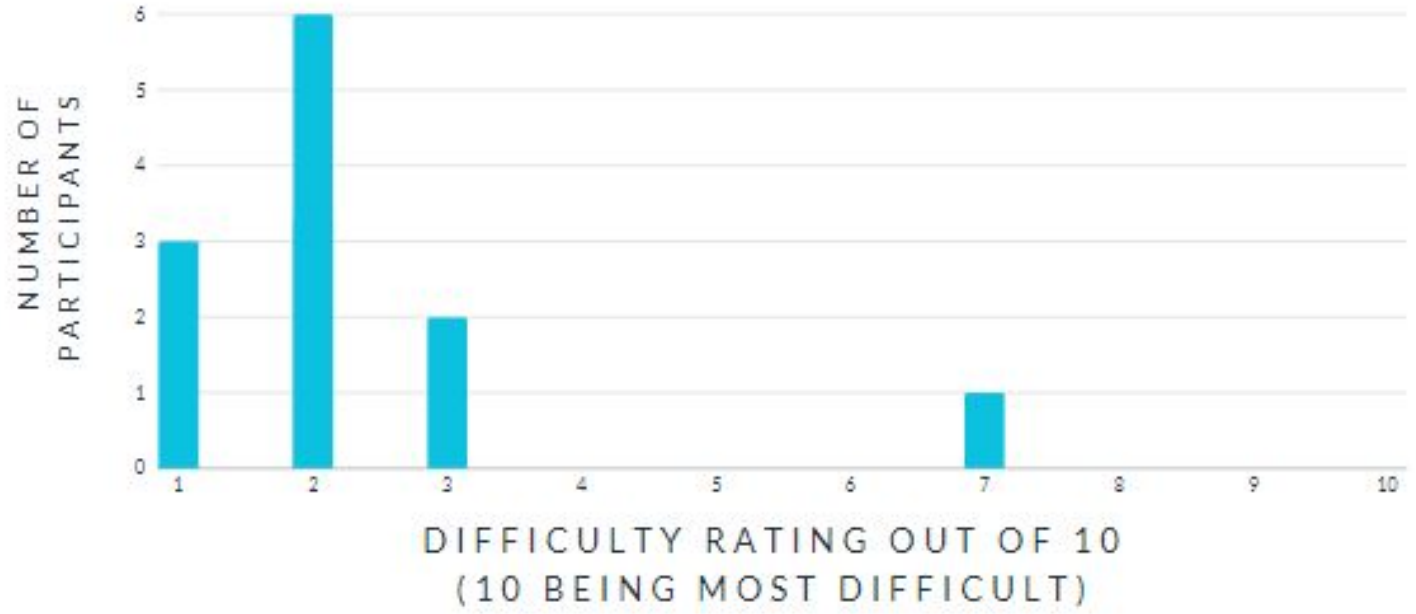
“Reducing the brightness and toggling the flash detection made the video easier to watch.”

Some did prefer the original video without the use of the tools:

“Because I don't have any problems with flashing or colors or audio, so while I appreciate the accessibility, I don’t personally need it... The bright colors helped make the transitions feel more childlike... which I like”

User Evaluation Insights: Ease of Use

On a scale of 1-10, rate how difficult you felt it was to use the Desensitization Station? (10 = difficult, 1 = easy)



Future Work

- Pattern recognition
- Sudden scene brightness changes
- Sudden audio level changes
- Implementing the functionality into a browser extension