Coursework Part 1 Report

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1 Website Description

The main purpose of this website is to give the user the opportunity to calibrate and listen to several different sounds. These sounds include white noise, rain, wind, and waves. The effect this website will attempt to achieve is to block out ambient background noise and other audible distractions that may occur in any environment by generating noise at different frequencies. The main use case for this functionality is to aid the users focus when studying or carrying out work. This functionality could also prove useful for users who suffer from a range of different hearing disorders. For example, tinnitus, where ringing is heard in the ear, can be greatly combated by noise generators such as this as "external sound sources will help you reduce your tinnitus awareness" (Pigeon, 2019)[1].

As well as providing users with the function to create and listen to these sounds, they will also be presented with the option to create a user account and sign in. When creating an account, users will be asked to enter a username, which will be checked server-side to guarantee it is unique. They will also enter a password which must meet the security standards. Once logged in, users will be able to save and edit their created sounds, and add other users sounds to their favourites list.

Users will be able to navigate the site by using the navigation bar at the top of every page in order to visit the pages shown in figure 1. They will also be able to visit a page listing all existing user accounts and can visit specific user pages to view their saved sounds. Users can visit a page which displays the most popular sounds that have been created within the site, giving them the option of listening to each and add them to their favourites list as well.

2 Background Research

Throughout the planning of this project, I have drawn inspiration from an existing site which shares many of the same objectives as my own site. Mynoise.net, has contributed to my own understanding of the difficulties faced when designing such a site, and the possible solutions to overcoming them and achieving the desired objectives. The difficulty of providing the client-side functionality of generating noise is demonstrated effectively on mynoise.net, the methods used by this website will aid in my decisions of how to implement this function on my own website.

Through research of the possible use cases for this websites function, further analysis into the aforementioned ear disorders gave a helpful insight into how the sound generating feature should operate. Hyperacusis causes a "heightened sensitivity to particular sounds that are not usually a problem for others" (Amplifon, 2018)[2], listening to sounds generated from this website could be a legitimate treatment as listening to "long periods of broadband noise at a volume that is just audible" can lessen symptoms (Pigeon, 2019)[1].

With the goal of creating a more aesthetically pleasing user interface and colour scheme throughout the sight, I researched many apps and websites which share similar purposes to my own website. Companies such as Spotify provide branding guidelines which give examples of different variations of the logo and appropriate use of colours to use for branding purposes (Spotify, 2019)[3]. From these examples, some of which are shown in appendix A, I extracted the core principles of colour design and how to properly display graphical elements within the user interface.

3 Features

Sign up & Log in:

The function of creating a user and signing in to the website is included as it will make it possible to store a user's sounds server-side, instead of on the client's-side using cookies. The benefit of this feature is that users will be able to log on and access their sounds from any device.

Create sound profiles:

Configuring the available sounds is the core feature of the website and is imperative to achieving the objectives described above. This allows for each individual user to calibrate the frequencies based on their own hearing curve, and to "compensate for [their] audio equipment and listening environment deficiencies" (Pigeon, 2019)[1].

Save sound profiles:

Saving a users calibrated sound profile to a server-side database will allow for persistence within the site, allowing users to return and continue from the last point of using the website.

Edit/Delete sound profiles:

As created sounds are persistent, users must be given the option to alter and delete their own sounds as they see fit. Enabling this feature will reduce the overall size of database needed to store this information.

Browse top sound profiles:

As saved sound profiles will also be publicly available to other users, it allows a community to form. With the ability to discover other users created sounds, sorted by the most favourites, a more interesting user-experience can be achieved.

Add sound profiles to your favourites:

As users browse published sounds, they will be able to listen to each and add any to their favourites list. This feature allows users to more easily mark out and listen to the sounds that they enjoy the most.

View a users profile:

As the user browses created sounds, a link to the creators profile will be present. Upon viewing a users profile, any sounds that specific user has saved will be listed along with information on each. This feature allows creators to be differentiated within the community, allowing you to view creations from users who may share your sound preferences and frequency ranges.

View all users and sound profiles:

A page listing all user accounts within the site will be publicly available, a search bar will allow specific users profiles to be viewed. This feature will be useful as it allows a person to search for people they may know personally and to share their creations with each other.

Delete your user:

The ability for a user to delete their information from the site is important to include as under the general data protection regulation (GDPR), they “have the right to obtain from the controller the erasure of personal data concerning him or her without undue delay” (Intersoft Consulting, 2019)[4]. Allowing the user to ensure their personal data is erased from the servers will ensure GDPR compliance under article 17 of GDPR.

4 Navigational Structure

The site can be navigated through links in the navigation bar, which will be used as a Jinja template for all pages within the site. Through any child page, the user will be presented with links to return to previous pages within the site structure. These features ensure that all users will be able to navigate the website with ease and also allow screen readers to interpret the web pages for visually impaired users more effectively.

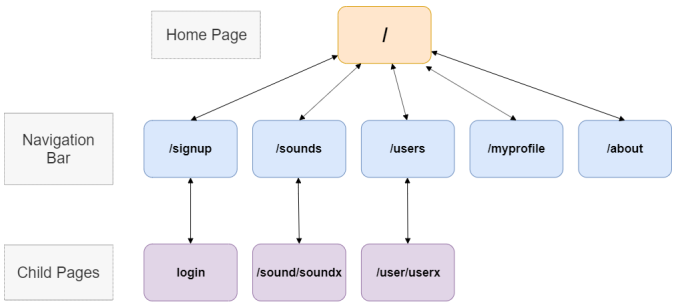


Figure 1: **Navigation Tree** - Web application navigation

5 User Interface Design

In the design and color scheme throughout the site, I have drawn inspiration from elements of Spotify’s user interface as well as elements from mynoise.net. By following this type of UI design and aesthetic a modern and streamlined look and feel is more closely achieved.

Index Page: The user interface design of this website has been influenced by the previously mentioned website, mynoise.net. In figure 2, showing the index page, the simplistic layout aids in addressing the main feature of creating a sound as it is centered within the page and intuitive for the user to understand and use. Removing unnecessary elements from the index page of the website will aid users who may be using a smaller screen. Figure 3 demonstrates the adaptiveness of the user interface elements for users on mobile devices, the elements are rearranged in order to increase the ease of use for one-handed operation.

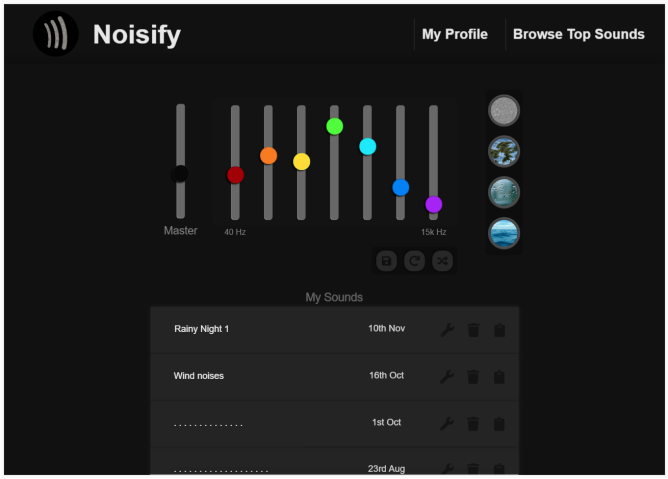


Figure 2: **Home Page** - Index page with noise generator

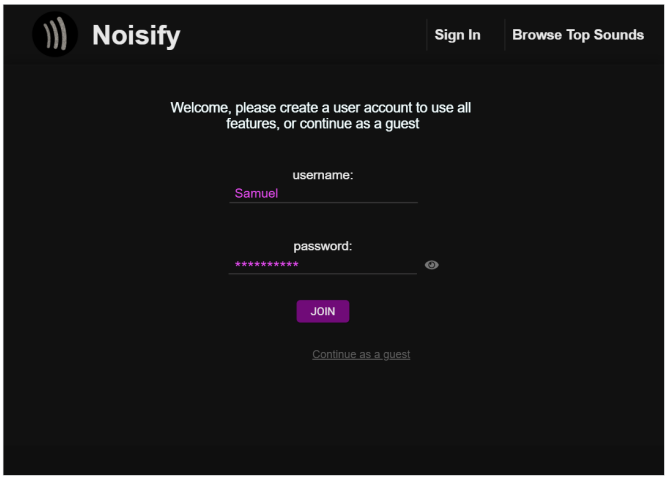


Figure 4: **Sign Up Page** - Account creation page

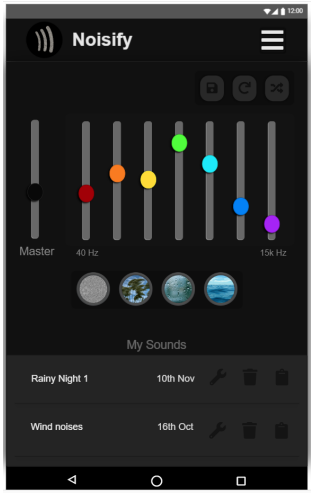


Figure 3: **Home Page** - Index page on mobile device

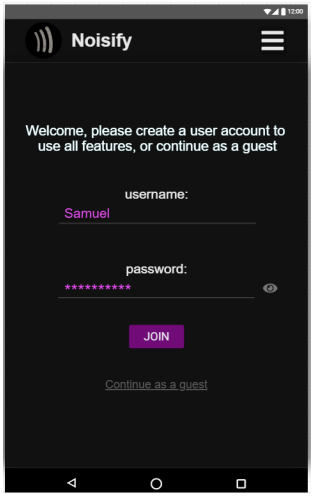


Figure 5: **Sign Up Page** - Account creation page on mobile device

Sign Up Page: The sign up page is shown in figure 4 and 5 and again demonstrates the page adapting to screen size. In order to have a strong consistency within the site, a color scheme will be followed on all pages as well as regularity with fonts and icons. Following this design will make navigating the different pages more aesthetically pleasing and lessen possible confusion, which will therefore increase the sites user retention.

6 Additional Information

6.1 Server-side Storage

In order to provide the functionality of having user accounts and the ability to save sounds I will utilise server-side storage in the form of a MySQL-python database and use flask-sqlalchemy. The benefit of using sqlalchemy with flask is that it increases the security of the web app as it "reduces the risk of SQL injection attacks since [it is] not dealing with the input of raw SQL" (Nzomo, 2016)[5]. Within the relational database, a table containing all usernames and their corresponding encrypted passwords will be stored. An additional table which contains all information about sounds that have been saved, their creator, and how many times they have been favourited or viewed will also be kept on the server (Fig. 6).

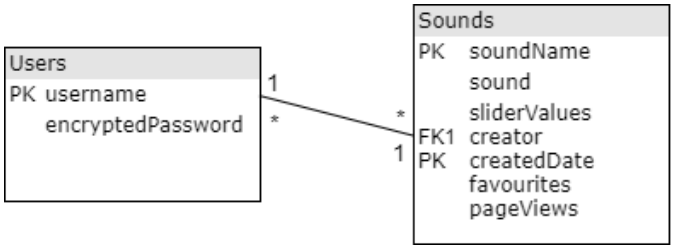


Figure 6: **Relational Database Structure** - User and Sound Tables

6.2 Data API

In addition to the web API serving data to client-side browsers, some API requests can be made to request information from the database for external use. These API requests can be used to retrieve lists of objects or one specific object in the form of JSON. By using the API route '\users' a list of all existing users within the database will be returned as JSON objects. By specifying a username like '\user\[username]', a list of that users created sounds will be returned. The route '\sounds' will return a list of every sound and its corresponding information. '\sound\[sound_name]' will return the specified sound and its information.

References

[1] S. Pigeon, "The ultimate noise (masking) machine," 2019.

[2] Amplifon, "Hyperacusis - symptoms, causes and treatment | amplifon," 2018.

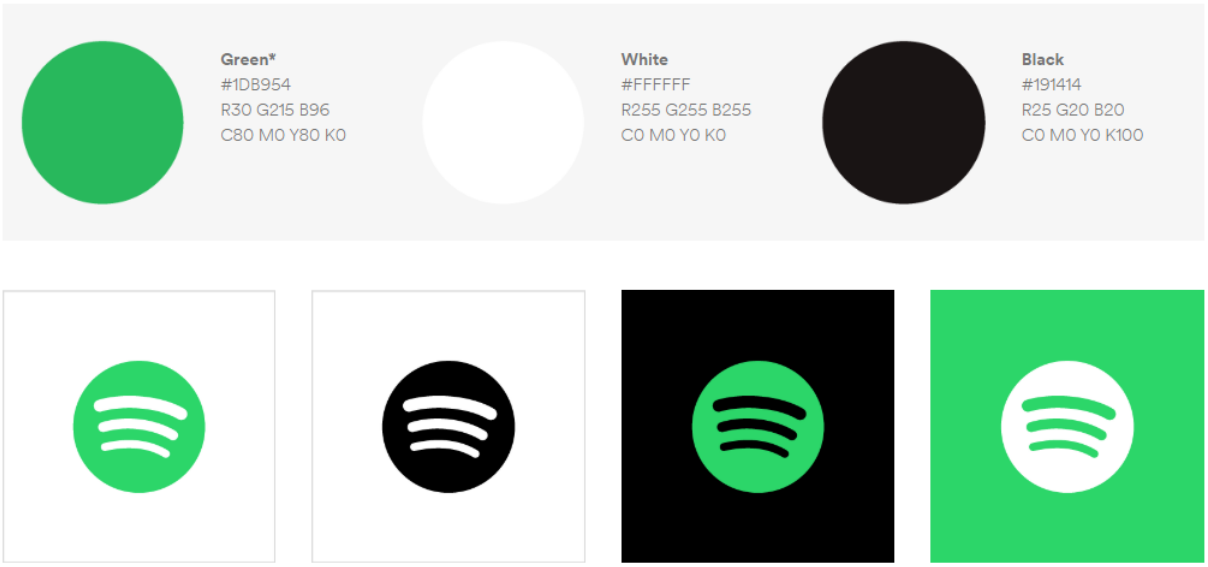
[3] Spotify, "Branding guidelines," 2019.

[4] IntersoftConsulting, "Art. 17 gdpr – right to erasure ('right to be forgotten') | general data protection regulation (gdpr)," 2019.

[5] M. Nzomo, "Build a crud web app with python and flask - part one," 2016.

Appendices

Appendix A



Spotify Branding Guidlines - Colour scheme and logo design (Spotify 2019)[3]