2024

CAB230 Assignment 2 Client Side

CAB230

Volcano API – Client Side Application

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Contents

Introduction

Purpose & description

The purpose of our application is to provide users with a comprehensive database of all the volcanoes around the world. Through our app enthusiasts, researchers, adventurers and curious minds can get access to a rich collection of information on various volcanoes, including their geographical location, year of last eruption, geological features such as its summit and elevation, and the population density within a set perimeter from the volcano.

In addition to providing a comprehensive database of volcanoes our app distinguishes itself through innovative functions and functionalities which are designed to enhance the user experience. We have focused on making the app visually appealing one way we have achieved this is by the use of Font Awesome Icons and Stunning background images and a really futuristic UI. (Figure 1)

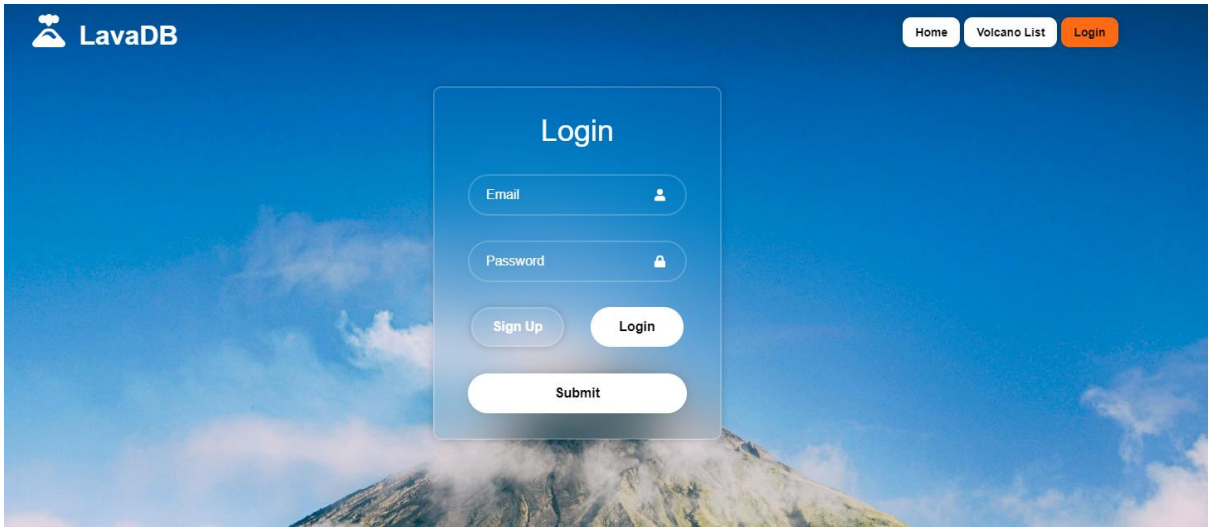


Figure 1 - Login Page

We also display the location of each volcano using pigeon maps, allowing users to explore each volcanoes geographical context with ease. Utilizing interactable tables powered by AgGrid elevates the user interactions by enabling seamless filtering and clickable functionalities for accessing detailed volcano information. (Figure 2)

ID	Name	Region	Sub Region
1	Abu	Japan, Taiwan, Marianas	Honshu
16	Aogashima	Japan, Taiwan, Marianas	Izu, Volcano, and Mariana Islands
30	Adatarayama	Japan, Taiwan, Marianas	Honshu
65	Asamayama	Japan, Taiwan, Marianas	Honshu
68	Aira	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu

1 to 5 of 122 Page 1 of 25

Figure 2- AgGrid Tables

Whether the users are seeking educational resources, planning adventure trips, or simply curious about the wonders of the world Lava DB is the application u should look at.

Completeness and Limitations

When it comes to completeness, we believe our app has met all the standards in the assignment specifications and achieved a high level of functionality. All the essential features are working seamlessly. Navigation throughout the app is handled by React Router while a login context keeps track of the user authentication status and conditionally renders the navigation bar. Controlled forms are used in the login and register pages. Design wise the website is very minimalistic making it extremely user friendly with clear instructions on what everything does. We have integrated maps to provide a visual representation of the location of the volcanoes and its surrounding geographical landscape and charts show the population density data effectively. Overall, our application meets the criteria for a grade 7 level, demonstrating a balance of advanced features and high-quality execution.

Use of End Points

This section talks about the utilization of various API endpoints to populate the page with relevant information, accompanied by screenshots demonstrating their functionality in action.

/countries

The countries endpoint returns an array of all the countries with volcanoes in the REST API. Utilizing this data, our app features an autofill functionality in the search bar, simplifying the user experience by eliminating the need to manually input the complete country name. (Figure 3)

Figure 3 - Autofill Search Bar

/volcanoes

The volcanoes endpoint returns the information of all the volcanoes in a specified country and optionally filter the information to volcanoes that have people living within a specified radius. The information from the API is then displayed in a table using AgGrid. (Figure 2)

/volcano/{id}

The volcano/id endpoint returns additional information about the volcano, which are then displayed on the volcano data page. Upon logging in, users gain access to additional insights into the population density surrounding the selected volcano.

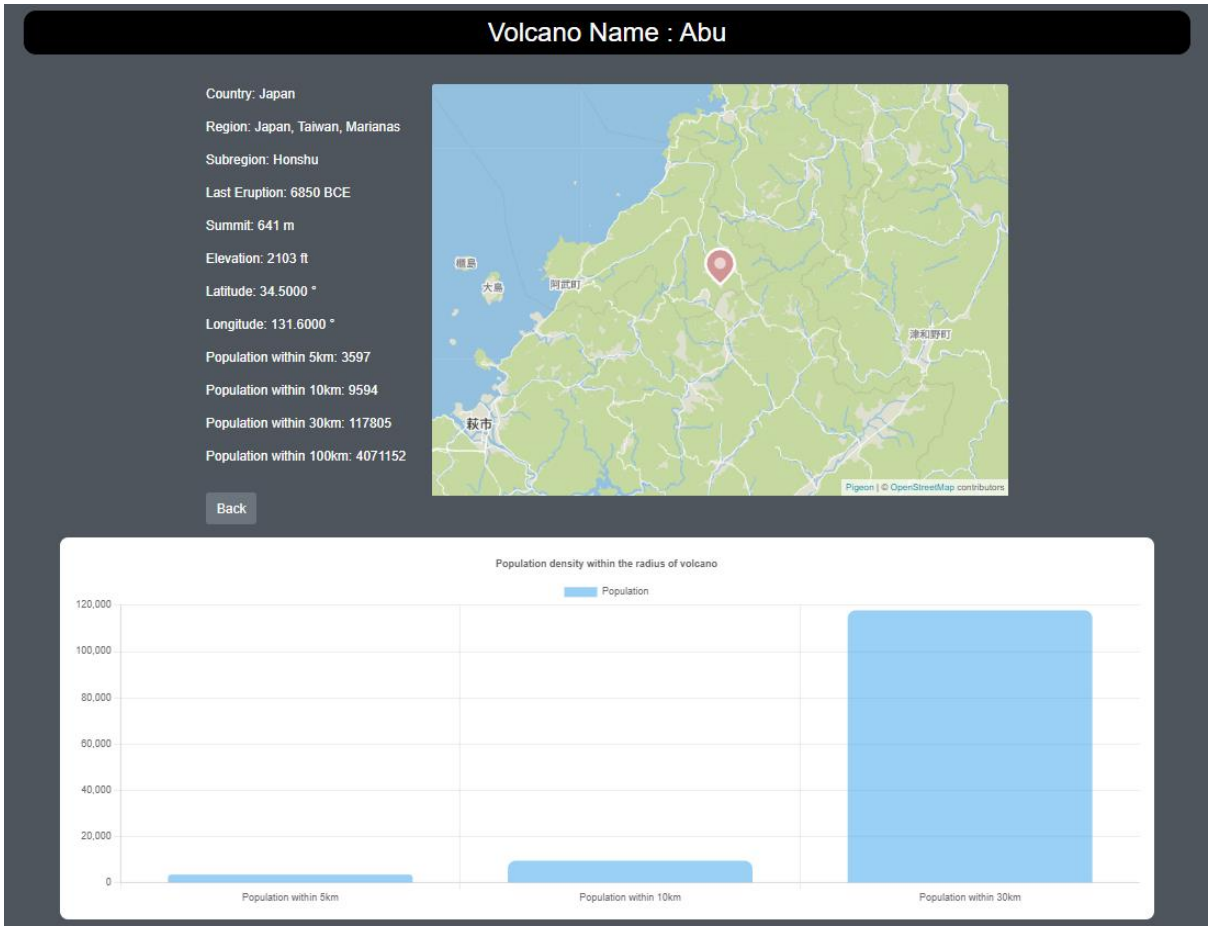


Figure 4 - Volcano Data Page

/user/register

The register endpoint is used to register a user to database in the REST API. It uses a POST request which takes the users Email and Password. If an invalid email is entered or if the user already exists error messages are also displayed to the user.

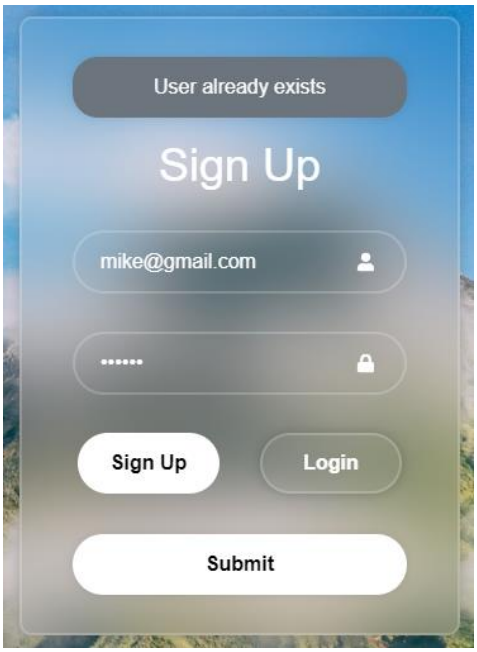


Figure 5 - Sign Up page with Error message

/user/login

The login endpoint is used to authenticate an existing user which is previously created and stored into the database of the REST API. It also used a POST request which takes the users email and password, if the credentials are incorrect, it displays the error message to the user.

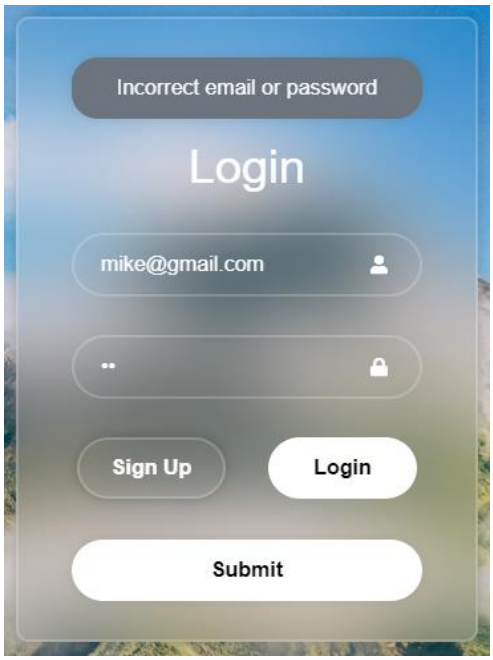


Figure 6 - Login Page with error message

Modules Used

To enhance the application's usability, various external modules were incorporated, outlined below.

Ag-grid-react

Module to provide fully-featured table components, including sorting and filtering.

https://www.ag-grid.com/react-grid/

Font-Awesome

Module to provide icons in the application

https://docs.fontawesome.com/web/use-with/react/

Bootstrap

Module that provides powerful, extensible, and feature packed frontend toolkit
https://getbootstrap.com/docs/5.3/getting-started/download/#npm

React strap

An extension of boot strap that provides reuseable components in react
https://reactstrap.github.io/?path=/story/home-installation--page

Chart Js

Module to provide charts to display information visually.
https://www.chartjs.org/docs/latest/getting-started/installation.html

Pigeon Maps

Module to provide fully featured maps, including markers and different tiles.
https://pigeon-maps.js.org/docs/installation

React Router

Module that lets u seamlessly route between pages in the application

https://reactrouter.com/en/main/start/overview

Application Design

Navigation and Layout

While designing the site, careful consideration was given to providing the users with seamless access to the various features of the app. The app was designed to be very minimalistic with 4 pages, a home page, a volcano list page where the user can search up a volcano based on the country its located, a volcano data page where the user can get additional information on any volcano and a sign up/login page through which the user can make an account and login in. Navigation between these pages is facilitated by a navigation bar, dynamically rendering either a login or logout option based on the user's authentication status.

To make it more appealing to the user careful selection of colours and images was made, with the back ground of the site being an image of a dormant volcano, complemented by colours that matched this image. Additionally various UI elements such as search bars, dropdown

boxes, pagination for tables, password hiding functionalities, maps, charts and GIFs were used to lend a more futuristic aesthetic to the webpage.

The flow between the pages were designed to be really straightforward, guiding the users effortlessly to access the information they were interested in. Clear instruction was provided at each page so that the user doesn't end up with any confusion. This minimalist approach distinguishes our app, as users can effortlessly explore its features and functionalities, enhancing their overall experience.

Usability and Quality of Design

- **Display Organisation:** When designing the layout special care was given to add enough spacing to make the layout visually appealing and functional at the same time. Additionally relative units such as rem (rem) and ratios such as percentages (%) were preferred instead of pixels to maintain consistency across various screens.
- **Navigation:** As mentioned above the navigation was designed to be really basic and straightforward. Users can easily navigate between pages using the buttons in the navigation bar or by following on-screen instructions provided on each page. This straightforward approach enhances user experience by minimizing confusion and streamlining the navigation process.
- **Consistency with User Expectations**: The application largely aligns with user expectations from similar apps, offering familiar navigation patterns and UI elements. Design inspiration was made from website examples available online. [1]
- **Visual Design Consistency**: The visual design is relatively consistent across screens, with a cohesive colour palette and typography.
- **Usability:** In general, the design is very useable, with intuitive navigation and clear instructions making it really user friendly. While minor compromises may exist continuous refinement through user testing can help improve the usability and make it more enjoyable for the user.

Accessibility

Accessibility wises our App ticks most of the Priority 1 Accessibility Requirements [2]. Some of them includes providing text equivalent for every non-text element such as adding alt text to images, GIFs and buttons. Documents are organised to be readable without the style sheets, even when stye sheets are disabled or not supported the content remains structured and understandable. The application avoids causing the screen to flicker minimizing the risk of inducing seizures or discomfort to users with photosensitive epilepsy or other visual sensitivities. Tables within the application appropriately identify row and column headers clearly distinguish them from the data they represent.

Overall, the application demonstrates a strong commitment to accessibility, based on the guidelines provided by W3C which makes it accessible to a diverse userbase.

Technical Description

Architecture

The overall structure follows a modular structure while following the best practices for a react app. (Figure 7). The images and GIFs used in the app are inside the public folder.

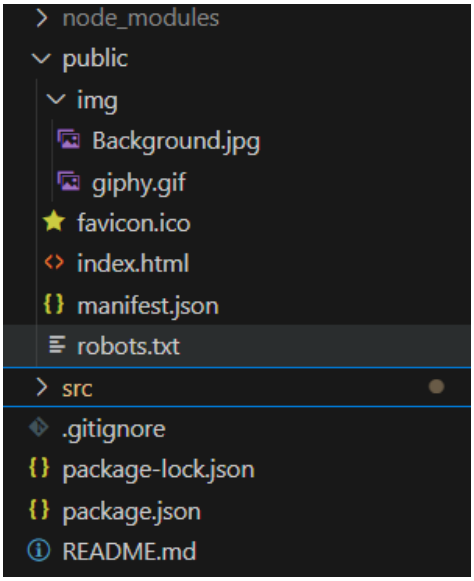


Figure 7- Structure

The Src directory is organized into sub folders (Figure 8):

Components: This folder contains reusable UI components that are used across multiple pages of the application. Each component is designed to be self-contained and encapsulated, promoting code reusability and modularity.
Pages: The individual pages of the application are inside this folder also contains the CSS subfolder with the CSS for each of the pages
Context: This folder houses the Login Provider Context which is used to check the authentication status of the user this was put in a different sub folder as it is more of a utility rather than a component.

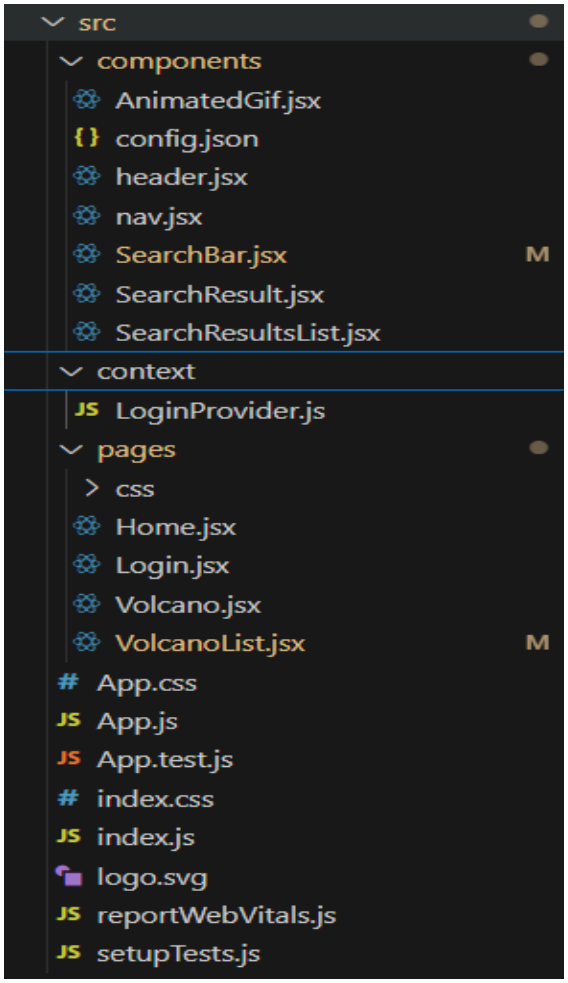


Figure 8- Src Structure

Test plan

Task	Expected Outcome	Result	Screenshot/s (Appendix)
Register an existing user	Display Error, Application Continues	PASS	01
Login with wrong credentials	Display Error, Application Continues	PASS	02
Search a countries name	Autofill box pops up	PASS	03
Search for a country	Results displayed in a table	PASS	04
Sort by distance	Results are filtered	PASS	05
Click on a volcano name	Displays information, Map populated	PASS	06

Difficulties / Exclusions / unresolved & persistent errors /

The Difficult bits include setting up the login context which remembers the authentication status this was achieved by referring a YouTube tutorial [3]. Setting up chart.js [4] and the auto-fill search bar [5] which was also achieved by a YouTube tutorial.

User guide

1. The home page is the first screen the user sees when opening the webpage, featuring an engaging gif showcasing a volcano scene from a popular Disney movie. The user can navigate to either the volcano list page or to the login page from here.

Figure 9- Home page

2. If the user decides to click on the get started now button it will load the volcano list page where a user will be prompted to enter a name of a country (Figure 10).

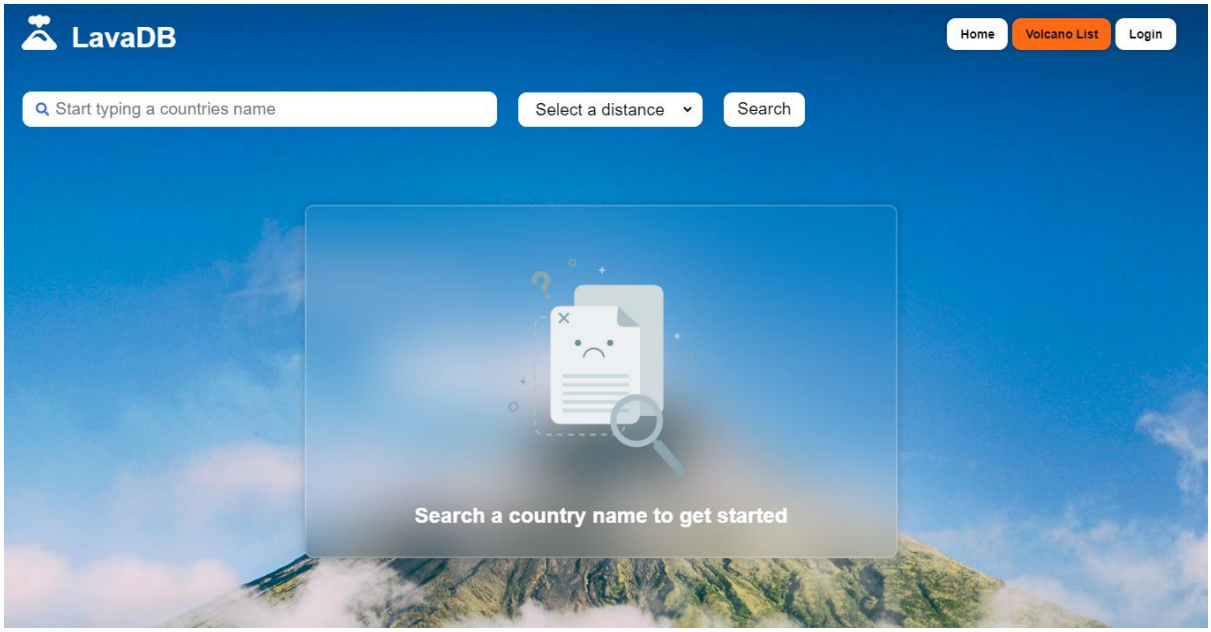


Figure 10- Volcano List page

When the user starts typing an auto fill box pops up from which the user can select the country they want to search.

Figure 11- Autofill box

After typing the name of a country, the user has the option filter the data to those that have people living within a specified radius. On clicking search a table is rendered with the information about the volcanoes in that country. The user has the option to sort the rows in either ascending or descending, they also have an option to filter the names of the volcano. (Figure 12)

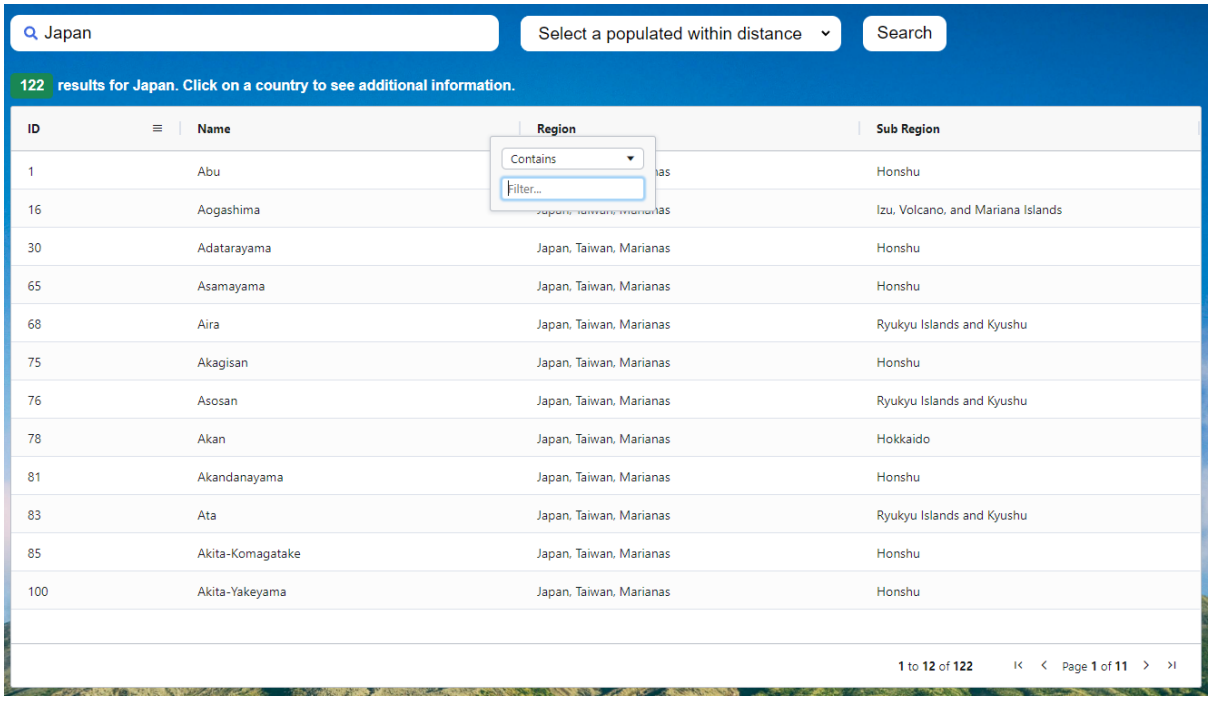


Figure 12- Table with the volcano information

3. If the user is interested to view additional information of a specific volcano, they can click on it from the table which will render the volcano data page. (Figure 13)

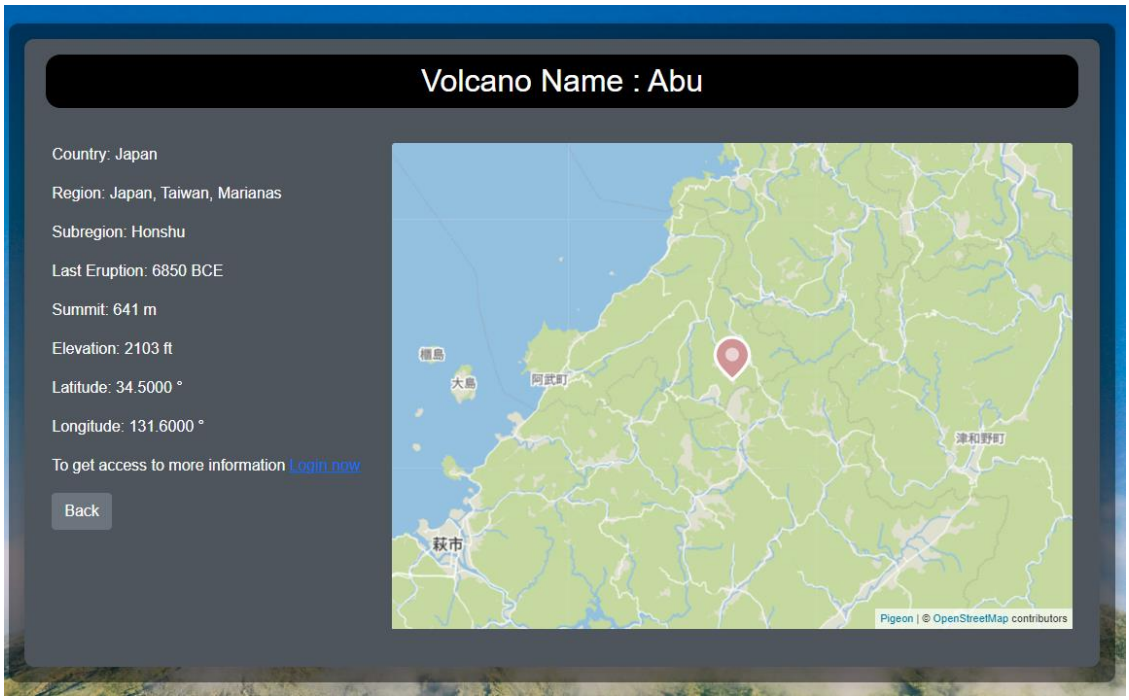


Figure 13- Volcano Data page without login

If the user hasn't logged in the only information available to them will be the basic details of the volcano and a map with a marker on the coordinates of the selected volcano. The user is prompted with an option to login to view additional information.

4. If the user is interested to see more information, they have the option of clicking the Login now link in the body or the Login button in the nav bar, which takes them to the login page. (Figure 14).

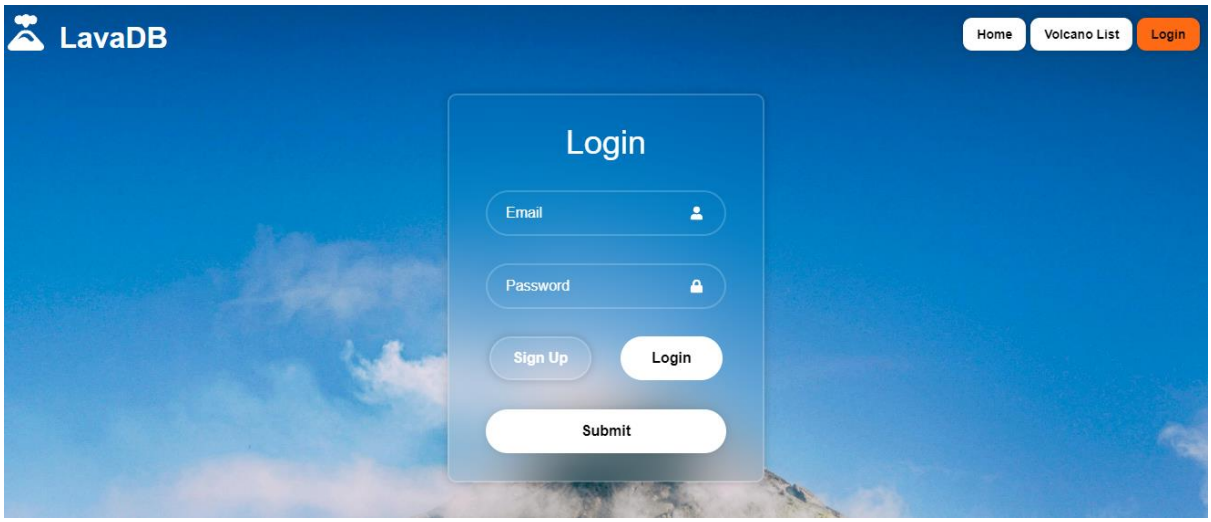


Figure 14- Login Page

By default, the page loads in with login selected if it's the first time the user is visiting the website and hasn't created an account before they can register an account by clicking Sign-

Up and providing an email and password. (Figure 15).

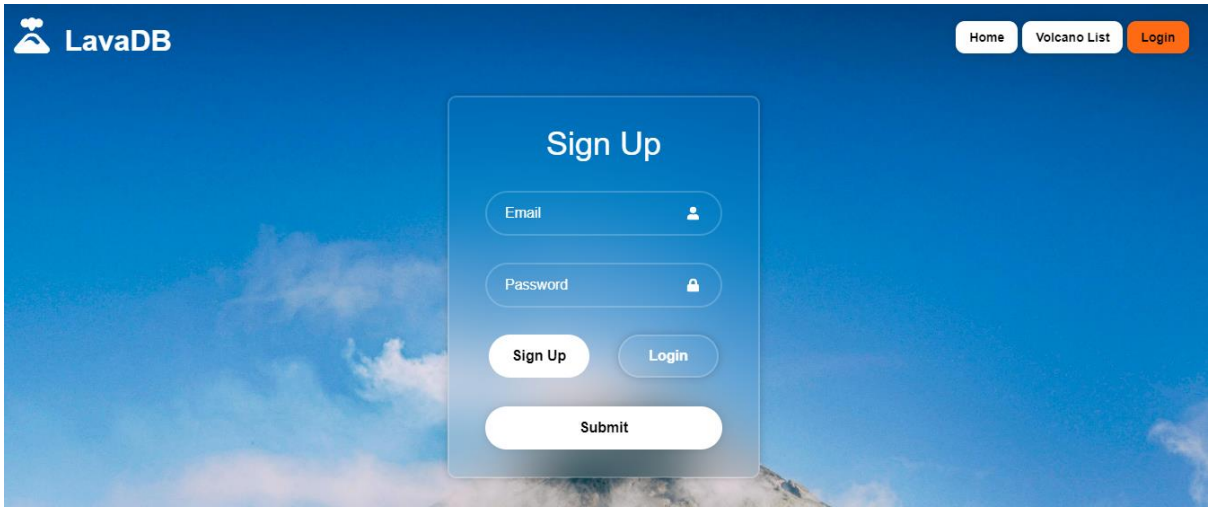


Figure 15- Sign Up page

After logging in. the user can go back to the volcano data page but now, they have access to all the information available. (Figure 16).

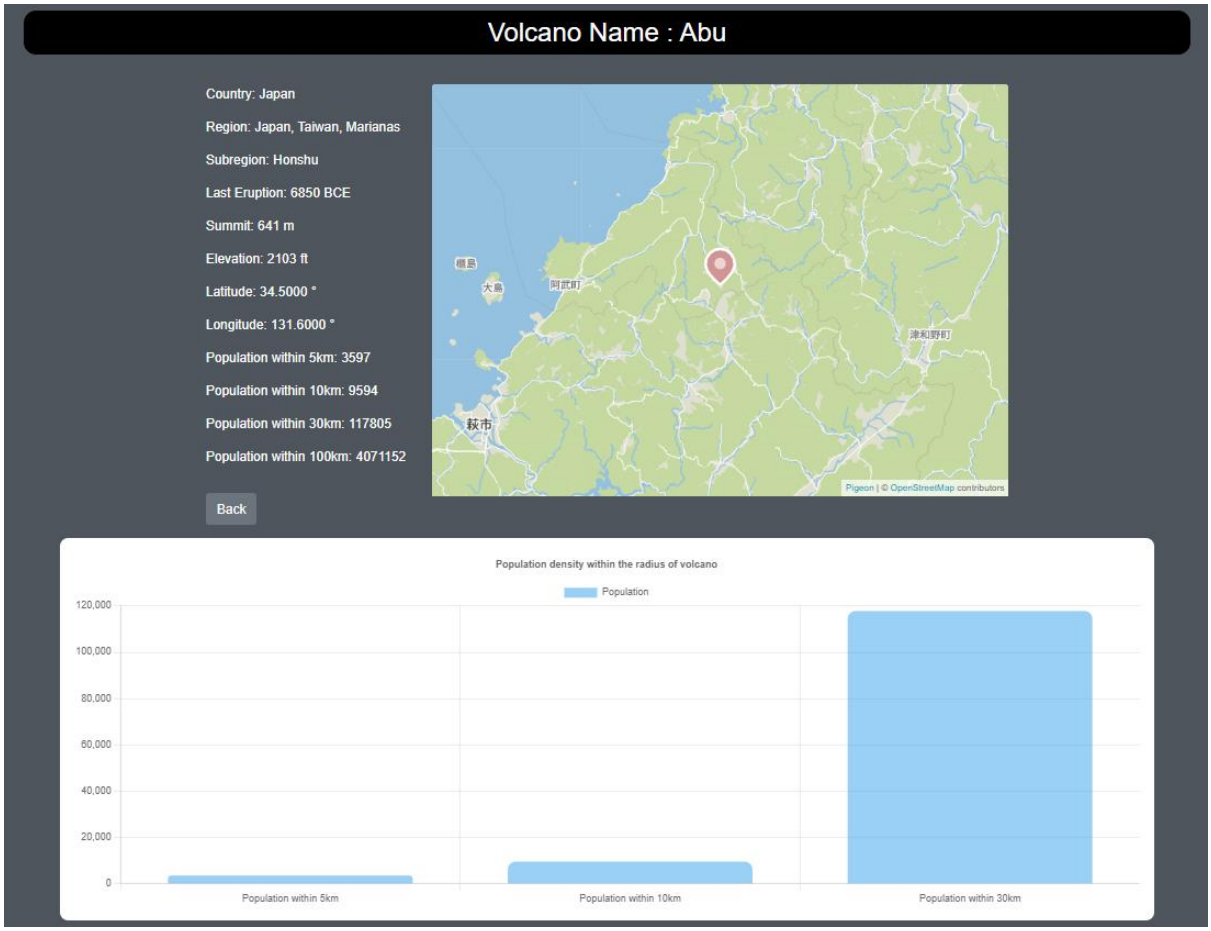


Figure 16-Volcano data page with additional information and a bar graph

References

[1] Webflow, “15 small business website examples for inspiration in 2024,” 1 February 2024. [Online]. Available: https://webflow.com/blog/business-website-examples.

[2] W3C, “Checklist of Checkpoints for Web Content Accessibility Guidelines 1.0,” 1999. [Online]. Available: https://www.w3.org/TR/WAI-WEBCONTENT/full-checklist.

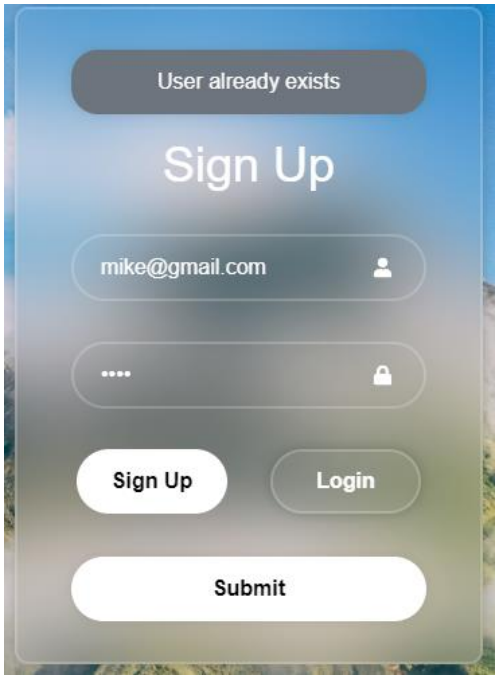
[3] F. S. Niraj, *React Navigation Conditional Rendering Navigators,* 2022.

[4] C. Complete, *Learn React ChartJS in 8 Minutes | Complete Guide,* 2023.

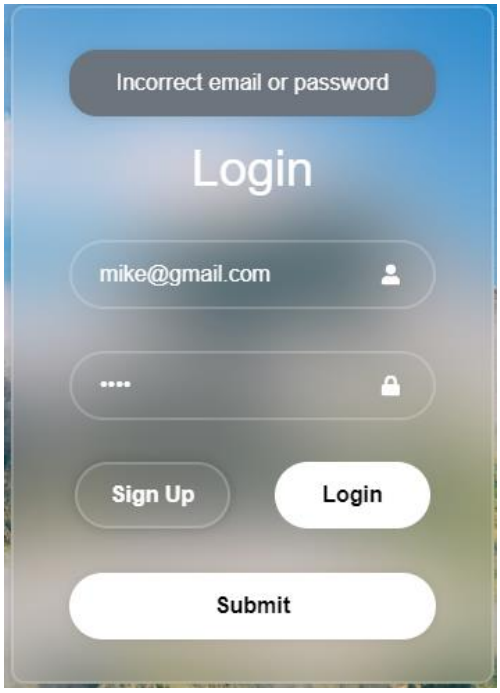
[5] C. Complete, *Make a Search Bar with React (with API Calls) | Beginners Tutorial,* 2023.

Appendix

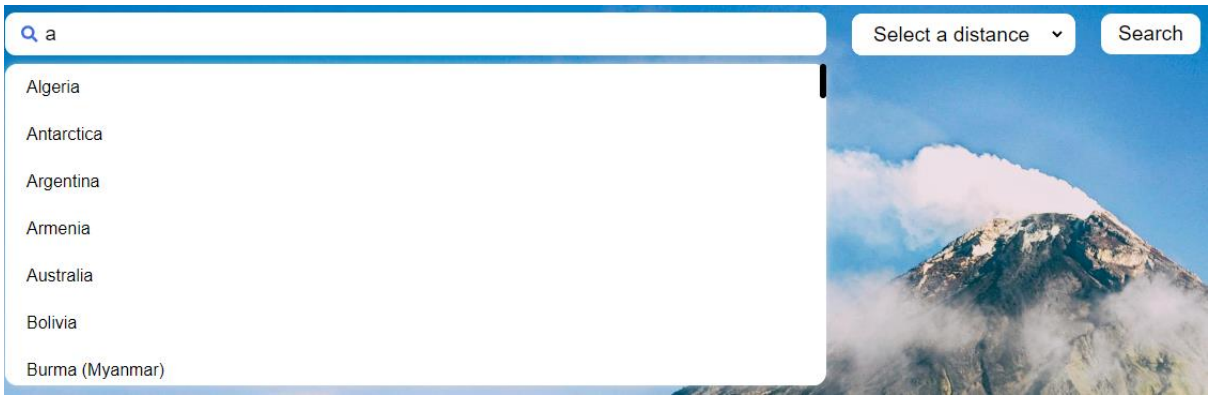
Appendix 01



Appendix 02



Appendix 03



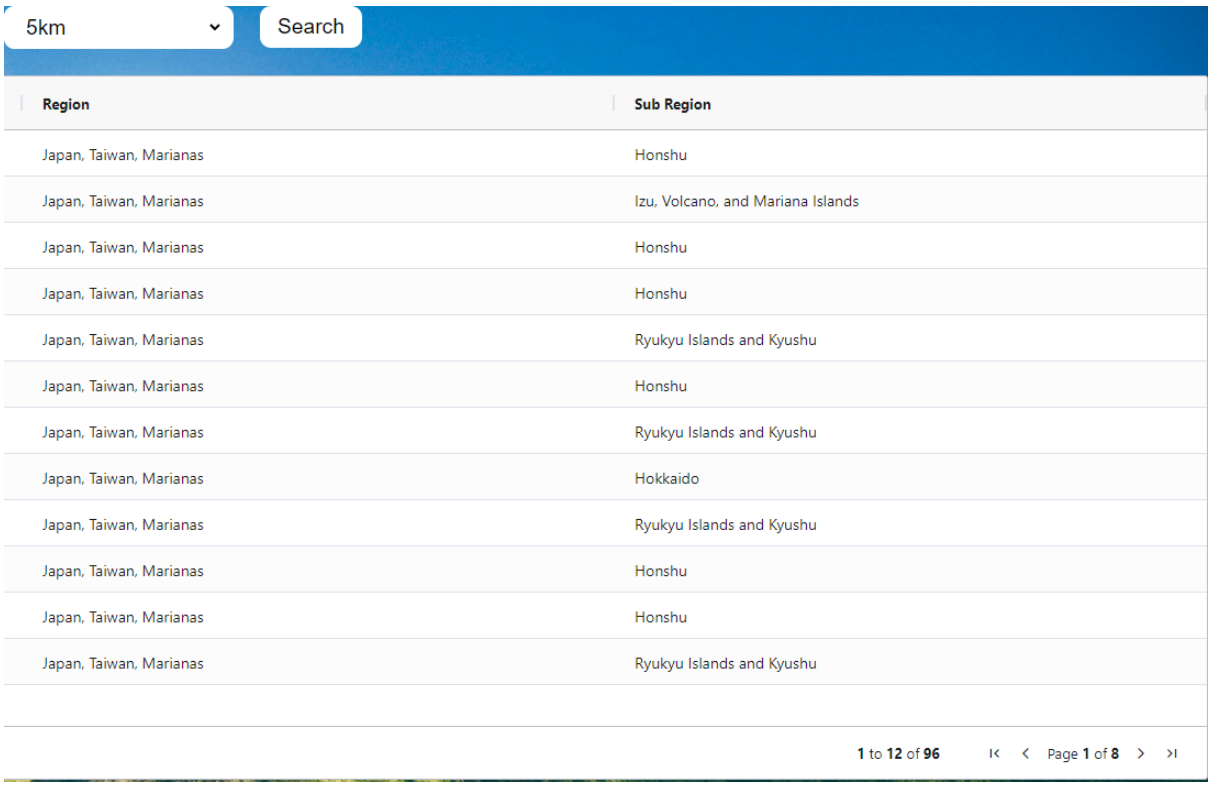
Appendix 04

ID	Name	Region	Sub Region
1	Abu	Japan, Taiwan, Marianas	Honshu
16	Aogashima	Japan, Taiwan, Marianas	Izu, Volcano, and Mariana Islands
30	Adatarayama	Japan, Taiwan, Marianas	Honshu
65	Asamayama	Japan, Taiwan, Marianas	Honshu
68	Aira	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu

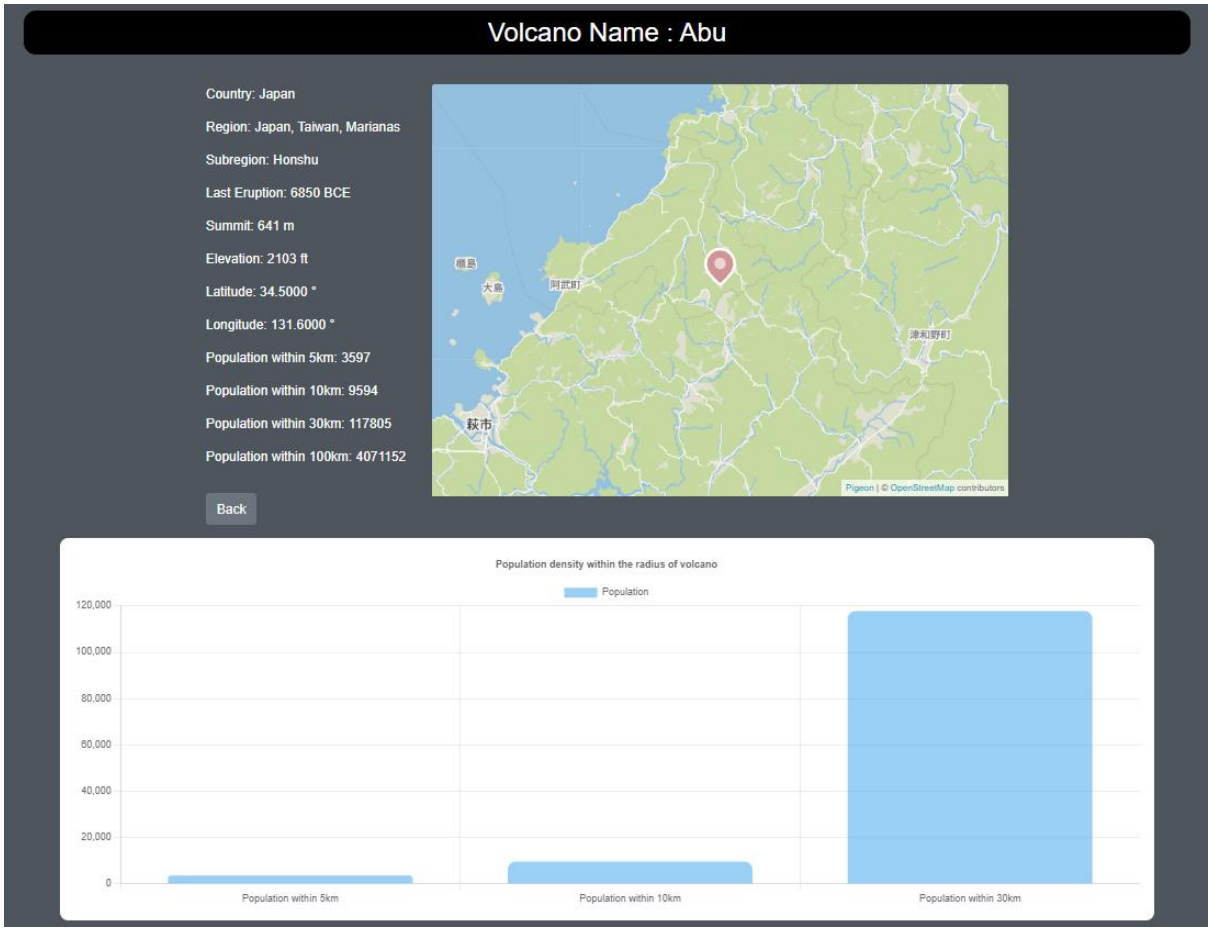
1 to **5** of **122** Page **1** of **25**

Appendix 05

When setting distance to 5km the results decrease to 96 from 122 (Refer Appendix 04)



Appendix 06


Volcano Name : Abu
Country: Japan
Region: Japan, Taiwan, Marianas
Subregion: Honshu
Last Eruption: 6850 BCE
Summit: 641 m
Elevation: 2103 ft
Latitude: 34.5000 °
Longitude: 131.6000 °
Population within 5km: 3597
Population within 10km: 9594
Population within 30km: 117805
Population within 100km: 4071152
Back
Population density within the radius of volcano
Population
120,000
100,000
80,000
60,000
40,000
20,000
0
Population within 5km
Population within 10km
Population within 30km