AnimAtlas

Visualizing Paleobiological Information on a Website for Educating a General Audience (view at https://animatlas.me/)

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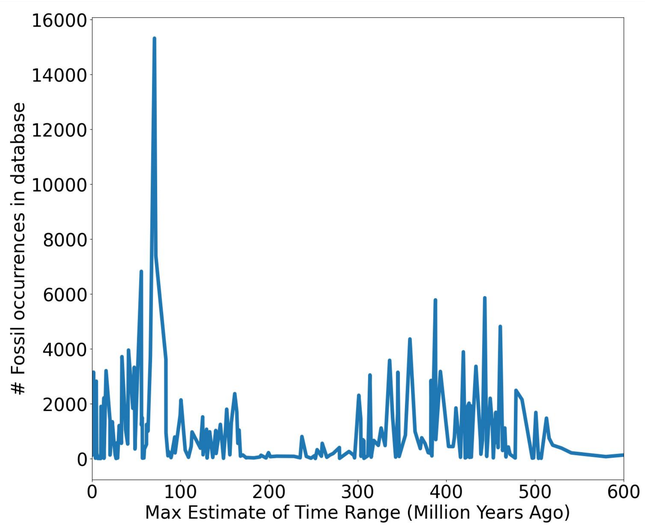
BACKGROUND

Education of paleontology is important and relevant to ongoing issues. For example, understanding the history of Earth's wildlife is important to put the ongoing climate crisis into context. AnimAtlas ("Animal" + "Atlas") is a website that aims to make paleontology education more accessible to the general public. It features a map that can be used to interactively explore fossil information sourced from the Paleobiology Database, a well-known collection of recorded fossil information.

INTRODUCTION

AnimAtlas is a website that features an interactive map of Earth, and is accessible at https://animatlas.me/. This map features the locations of fossil occurrences, and when clicked on, the user can learn facts including but not limited to its name, diet, time period it lived during, and journal articles that describe it. The user can filter what data appears on the map, explore which organisms lived during which periods of time by using a slider that filters by geologic time period, and interact with a chatbot powered by OpenAI. The website also features various data visualization methods to encourage data exploration.

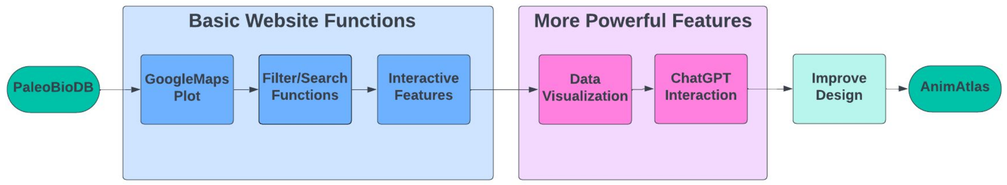
DATA



The Paleobiology Database provides an extensive collection of fossil information recorded by a community of experts. As of November 6, 2023, the Paleobiology Database contains 1,597,907 occurrences. Older fossils are very sparse; fossils that are at most 400-500 million years old are the most common.

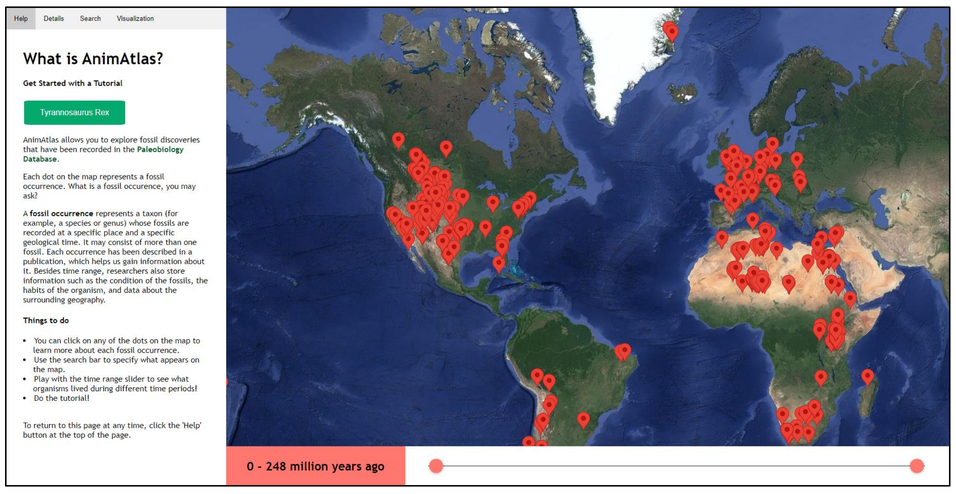
https://github.com/Sophie-Ngo/AnimAtlas

PIPELINE

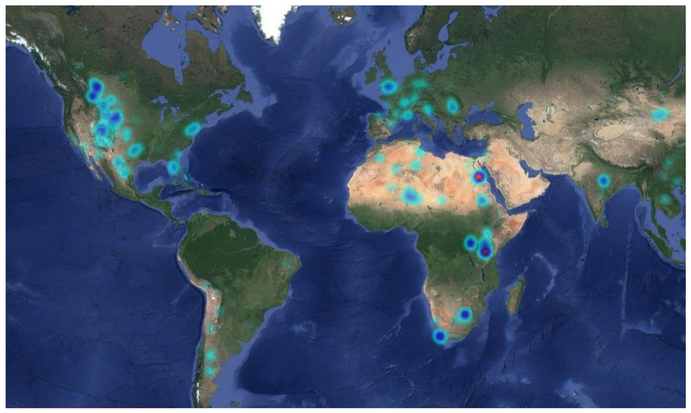


The process of building AnimAtlas began by configuring the map to display data based on the latitude/longitude of each data point. The sidebar–which is the main interactive feature besides the map–then needed basic functions such as a navigation menu, a search function, a tutorial page, and an info display area. Advanced functionality was then built using basic functions as a foundation and includes the AI chatbot and different data visualization options. After AnimAtlas performed all planned functionality, stylistic choices were implemented, including visual design (e.g. color, size, spacing, margins). UI/UX design however was kept in mind from conceptualization as it required forethought as to how the website would be organized and therefore built.

RESULTS



- When visiting the website, the user is first greeted with a map displaying locations of fossil occurrences of all records in the clade Dinosauria (all dinosaurs). The data is initially visualized in clusters. The sidebar defaults to the 'Help' page, which gives an introduction to the website, describes what the data on the map means, and offers a tutorial to get started.
- The tutorial offers users a choice of either clicking a button that automatically fetches all fossil occurrences identified to be T. Rex, or following instructions on how to use the search function to perform this task themselves.
- Using the slider at the bottom of the website, the user can filter what fossils appear based on the time range in which they have lived. The bounds of the slider update based on the minimum and maximum time ranges present in the current dataset.



- The users can also choose to view a heatmap of the data which shows the abundance of fossils by location. The clustering visualization accomplishes this in a way, but a heatmap is a more effective way to communicate high-density areas.
- When a data point is selected, various information about the fossil is displayed in the sidebar by fetching it from the database. Some terminology may be unfamiliar to laymen, so there are help buttons available that activate a popup explaining each term.
- Also on the details page, the user can ask questions to the AI chatbot, which will respond based on the information present in the database. The chatbot is trained on the Paleobiology Database's user guide, meaning it can help clarify terminology, explain how the database is organized, and answer other questions related to the database

Current Website Icon

CONCLUSION

AnimAtlas, as it stands, can be a useful tool for basic exploration of the Paleobiology Database for the general public. It features only the simplest operations possible to ease the digestibility of the data, which has the potential to incentivise those intimidated by large and complicated datasets to learn something new, relevant, and important.

FUTURE WORK

The website needs further testing, bug fixes, and improved visual design. Additional features that were conceptualized and could be implemented in the future include the ability to create an account and bookmark certain search queries or fossils, have a side-by-side comparison of two fossils, and the ability to test one's knowledge via quizzes or games. AnimAtlas could also benefit from including data of modern-day organisms, which may help users to form a personal connection to the content. An alternative to using Chatbase for the chatbot may be ideal to avoid cost and message limits.