FINDING THE PERFECT TRAIL ON A TRIP THROUGH GLACIER NATIONAL PARK MADE EASY

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Introduction

National parks a wonderful place to visit and have a relaxing and wonderful time at. However, one of the main issues that people face time and time again is the number of visitors on the same trail as yourself and visiting the same locations. This is a problem being faced by many families and individuals each time they head to Glacier National Park. What this app does in a nutshell is help alleviate that problem. It allows users to quickly and easily search for trails that are typically less crowded, find lodging that fits your needs, and displays the main attractions and points of interest for any type of visit to Glacier National Park.

Glacier was officially recognized as a National Park on May Glacier was established as a May 11, 1910 and became America's 10th national park. Newspapers from around the country spoke of its seemingly endless alpine scenery and many glaciers as reasons for visiting this new and wonderful park. Early newspapers touted its alpine scenery and numerus glaciers as reasons to visit the park. Interestingly enough, America's love for cars and trucks was gaining traction at this time and a demand for roads through the park began to rise. So, the first road ever created through the park had 15 switchbacks up the side of the mountain allowing for Logan Pass to be easily traversed. However, the second and final road to this day was built in the late 1920's which only had a single switchback and was cut into the rocky cliffs which has allowed it to be awarded one of the best mountain roads in all of America. It's because of this largely pristine natural landscape and lack of roads through the park that has gained is such popularity through the years and why it is considered to be a blueprint for merging man with nature. It's also a large reason why there are so many hiking trails through the entire park and why they are so heavily congested with park visitors.

This app gets rid of the unnecessary fluff and information for the person who wants to enjoy nature to its fullest by only keeping things such as transportation, key details of the park (such as gas stations and restrooms), lodging and trail head locations on the map. It's meant to only display key information and allow users to see and leave reviews of trails that they might be interested in. Users desiring details about the park outside of this might be disappointed. With it being geared towards hikers and individuals looking for an adventure it is not geared towards things like trips to the amphitheater or a day out on one of the lakes.

Libraries, ER, and Schema

Some of the most important aspects of an app is what is happening behind the scenes such as its libraries and scripts. Below is a miniature peek into the backend of the application starting with some key aspects that were utilized:

Carto DB- is a platform that stores a user's data as a dataset which acts as a PostgreSQL database table. These datasets are created by importing a file that can then be called be in an application for retrieving and submitting information into. For this particular app it was mainly used for retrieving information from and use as a database storage system for easy access. It was of course also used for the user submission details as well.

Bootstrap- is a program that initializes an operating system during startup and is currently the most popular CSS framework for developing responsive and mobile-first websites. It is one of the key components to making the web application function on mobile devices.

FontAwesome- is a font and icon toolkit based on CSS and was made to be incorporated easily with bootstrap. It allows developers to use icons that are easily recognizable to users and easy to implement.

Leaflet- is an open-source JavaScript library that allows for easy and effective creation of mobile friendly interactive maps. Some key things that were utilized in the map was a "Zoom home" feature that allows the user to go back to the maps original gps location, "Geolocation" which as the name suggests locates the users location, a "Group Layer Control" which allowed for the basemaps and points of interest to be grouped into a single location to be viewed, and a "Legend" feature which displays important information to make the map more readable.

Openstreet- is an editable map of the world that allows volunteers to create and expand map layers and was utilized in each of the basemaps.

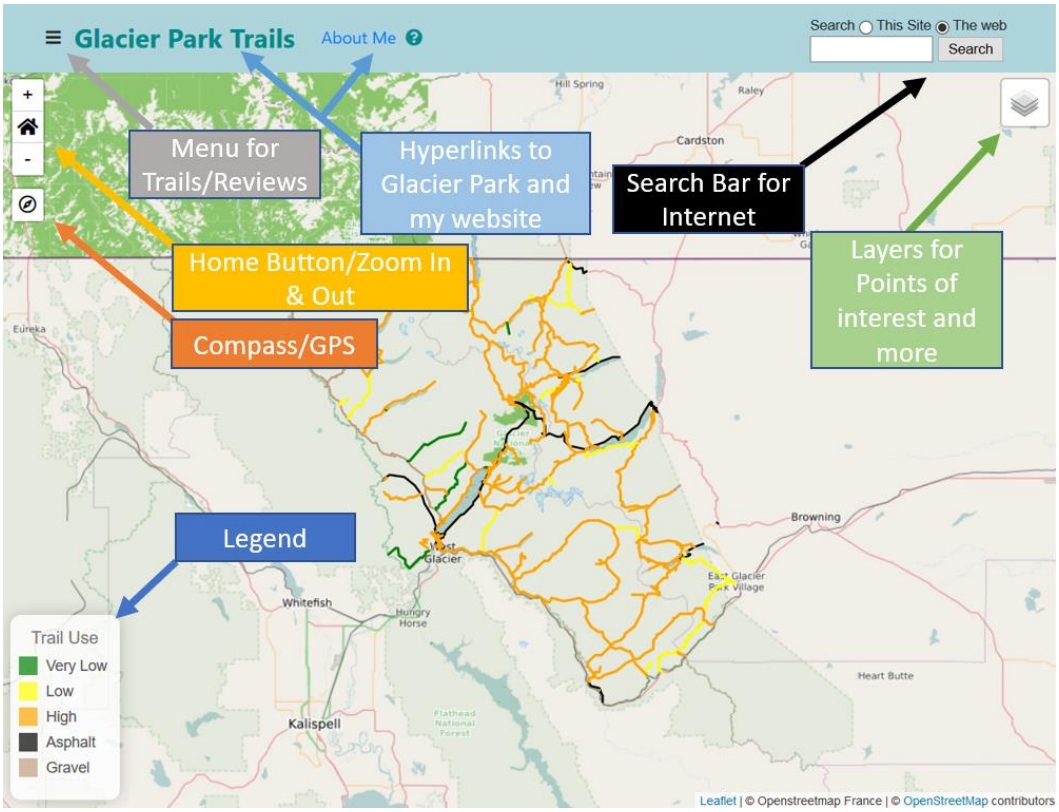
Then there is the other aspect of the backend which includes the ER and Logical Schema (which have been included at the end of this paper).

ER- is a graphical approach to database design. It uses Entity/Relationship to represent real world objects which in our case shows the relationship between the different data layers that were being used the specific information that they each hold. The data layers that were used in our application were a basemap (which isn't included in an ER), roads, trails, points of interest, and user submitted data. Each aspect of the ER and what resides within each is depicted at the end of the paper.

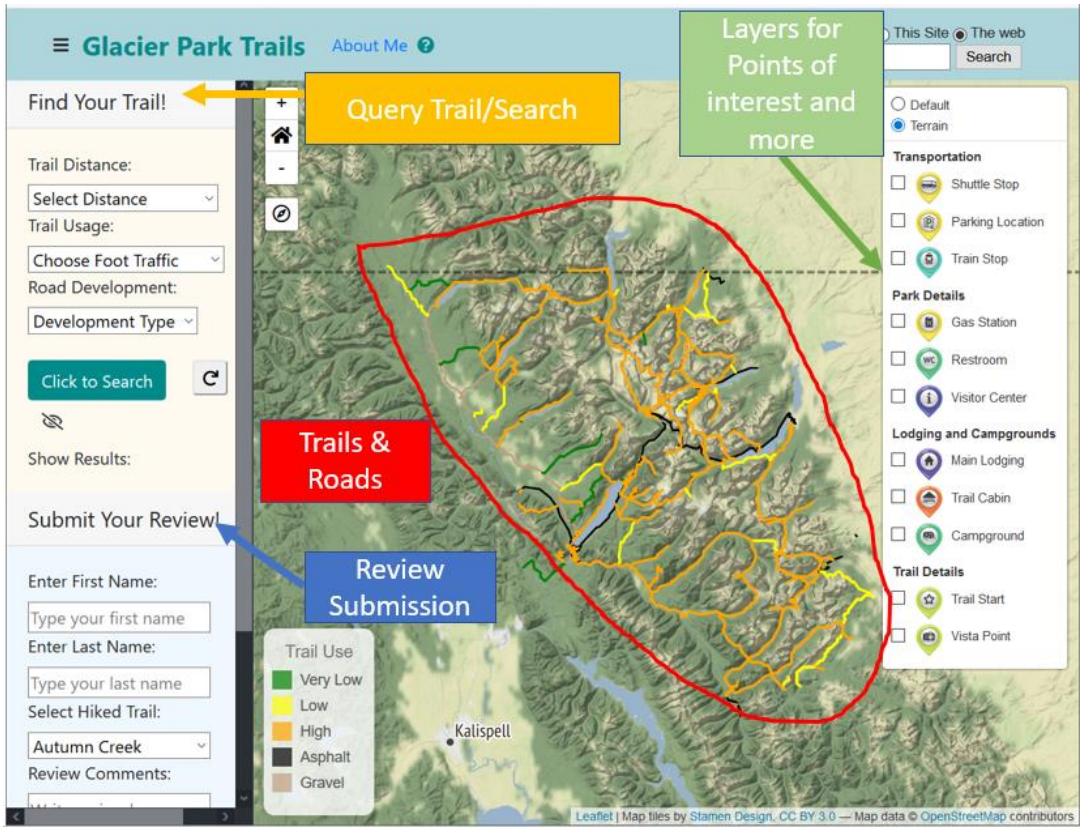
Logical Schema- is a design-centric database structure that is expressed independently of a specific database but is instead in terms of relational tables and classes. It essentially acts like the architect's drawings of a database. They simplify what's being shown in an ER in an easier to understand graphic and the one for this app is depicted at the end of this paper.

Visual Display

Just as if not more important than good code and its documentation is a visual display geared towards the type of user in mind. The main aspects of the user interface from a computer web browser are broken down and explained below:



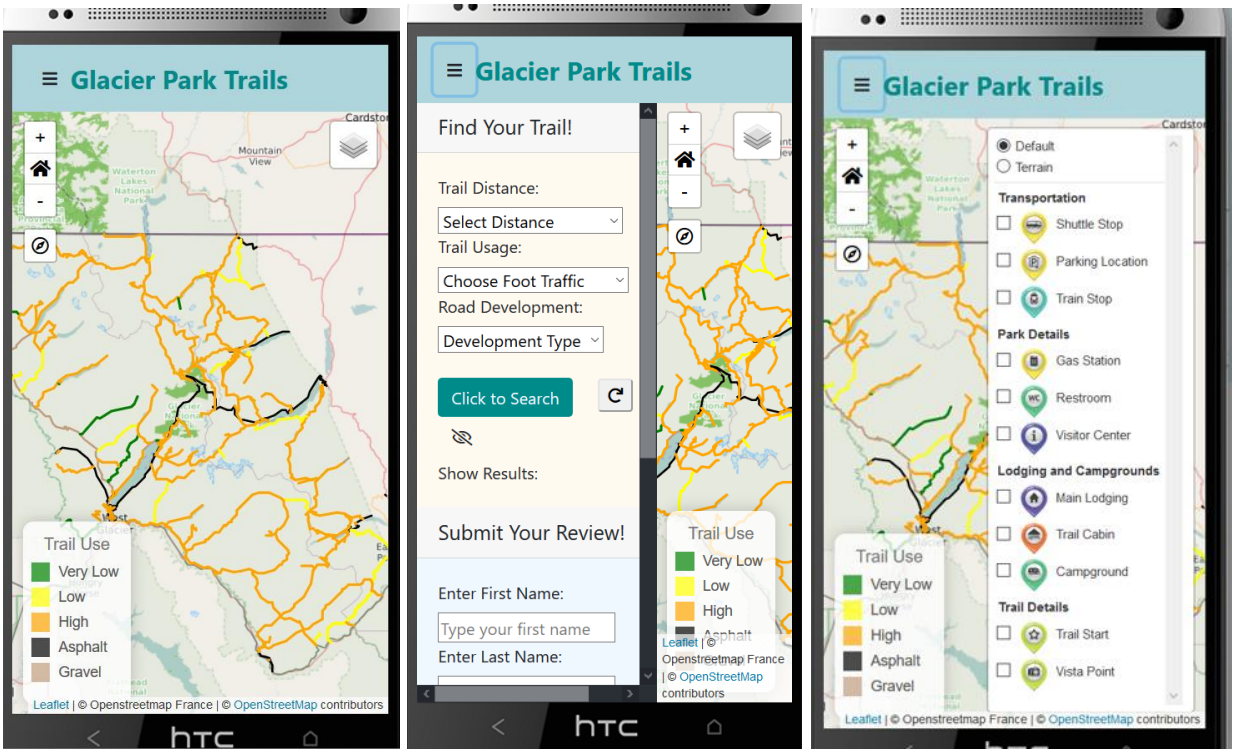
When opened in a web browser from a computer this is what can be seen right off the bat: Legend: depicts the trail use and road type for the user to easily see and understand the main details being presented on the map; Compass/GPS: allows he user to find their exact location to make points of interest and locations nearby easier to navigate to; Home/Zoom: standard for all leaflet maps this function allows for the map to be zoomed in and out of and to center the map to a specified location; Menu for Trails/Reviews: a pop-out section that allows for easy trail queries and user reviews to be submitted; Hyperlinks: one leads to the campground information for Glacier National Park and the other to a page about myself; Search Bar: a simple function that allows the user to search the internet easily; Layers: when scrolled over a drop down for map displays and points of interest appears.



Taking a closer look at the pop-out section and drop down for the map displays: Review Submission: we see some of the fields that need to be filled in such as first and last name, the trail, comments, and below that is the date the hike was taken on; Query Trail/Search: allows the user to search trails by distance, foot traffic of the trail, as well as the overall development type

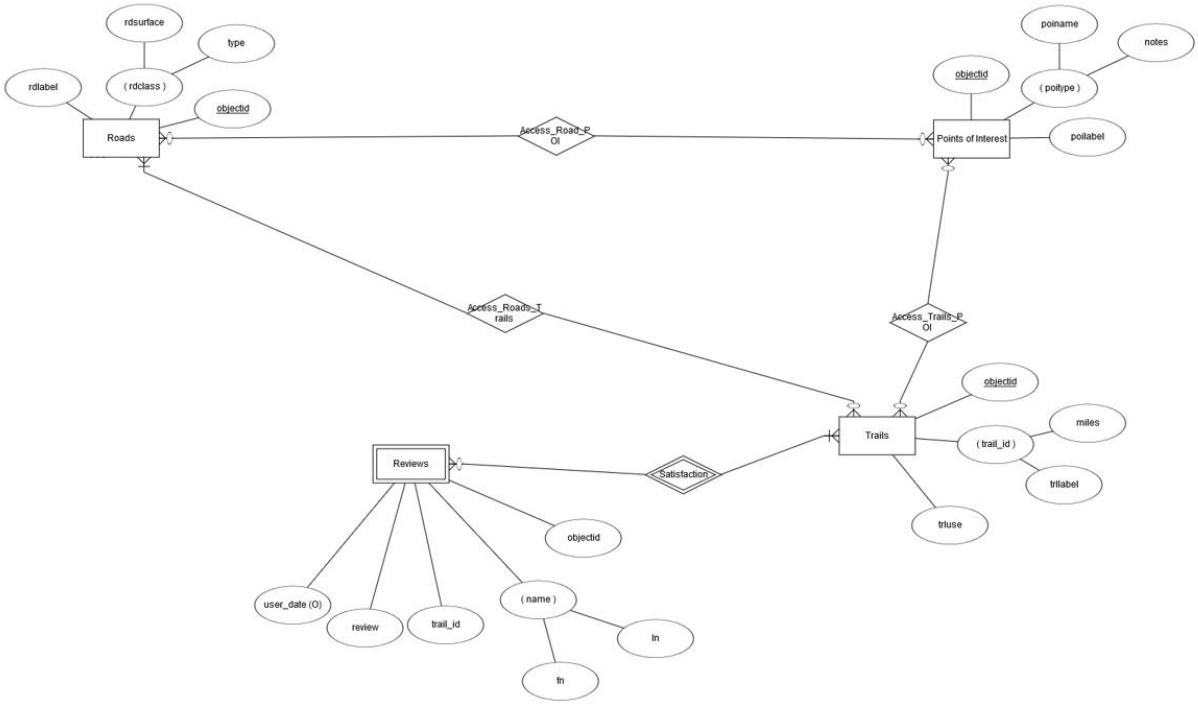
of the road/trail; Layers: simple pins drop down for things like trail details, lodging and campgrounds, park details, as well as transportation and a terrain map for the area.

With the digital age more and more individuals are looking up information online from a mobile device instead of a computer.



While the visual represenation of some details has changed the overall feel of the application has remained. Instead of being able to open the pop-up menu and the layers at the same time they need to be opened separately. The other key difference is the search bar that disappears since most mobile users would view it as a hinderance instead of a benefit. Other than these slight changes the application itself remains the same and is just as easily used in the mobile version as the computer version.

Entity Relationship Diagram (ER)



Logical Schema