Bomb Squad: Andy Shyklo, Abidur Rahman, Mark Ma, Tawab Berri
SoftDev
P01
2024-11-26
TARGET SHIP DATE: 2024-12-20

VERSION 0

Overview

We are making our spinoff of Google's Santa Tracker, except we are "tracking" the one and only Topher Mykolyk as he travels around the world on his motorbike and delivers presents to worthy devos. We will write an algorithm that calculates the likelihood of countries that Topher visits on each day, based on several factors such as holiday, population, weather, etc. We will incorporate visual elements such as a calendar of celebrated holidays all around the world, a map of where topher is on each day, and using our algorithm to predict where Topher is most likely to be.

APIS:

GeoDB Cities
Calendarific
National Weather Service

Program Components:

- Home Page
    1. A map of the world and a pin where topher is on the current day. The **GeoDB Cities** API will be useful in determining the longitude/latitude of Topher's location.
    2. The ability to switch to dates in the future / in the past.
    3. On the side, there should be predictions on where Topher might be on the next day, using our algorithm. The locations should be sorted from increasing to decreasing order in probability.
    4. Important holidays that are ongoing / coming up.
- Calendar Page
    1. Displays the holidays of a specific month and year.
    2. Able to switch months/years.
    3. Display the most likely country that topher will visit on each day.
    4. The **Calendarific** API will be useful
- Weather Page
    1. Given the year, month, and country, use the **National Weather Service** API to display the weather of a country for each day of a month in that location.
- Algorithm for obtaining Topher's location
    1. Assign a score for each country in the world.
    2. Use the following factor to calculate the score of the country for each day. Each factor should be assigned its own weight:
        - Population of the country. Can use the **GeoDB Cities** API.
        - Ongoing holidays in the country. Can use the **Calendarific** API.
        - Weather in the country. Can use the **National Weather Service** API.
        - Distance from Topher in the previous day. Can use the **GeoDB Cities** API.

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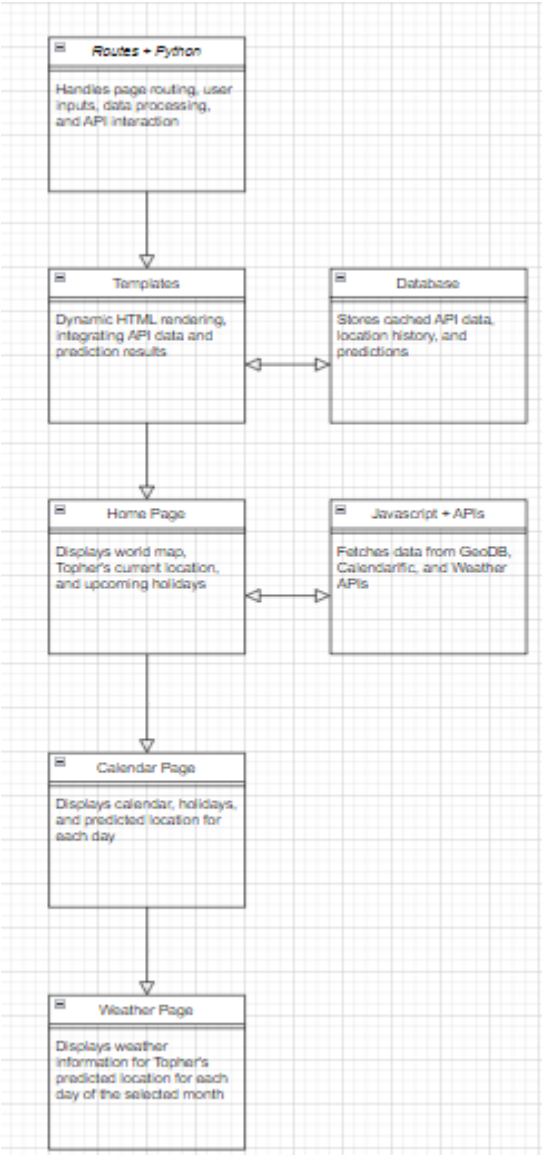
Program Component Connections:

- Routes + Python: Allow users to navigate the website, connecting the different pages. Python handles data retrieval from APIs, processes predictions for Topher's location, and renders dynamic content in HTML templates. It manages user inputs (e.g., date or location selection) and sends appropriate data to the frontend.
- Templates: Allow for dynamic web pages. Templates update in real-time to display Topher's current and predicted locations, relevant holidays, and weather information.
- Javascript and APIs: Minimal use of Javascript would allow our frontend frameworks to run properly as well as giving more flexibility in styling the website.

Component Map:



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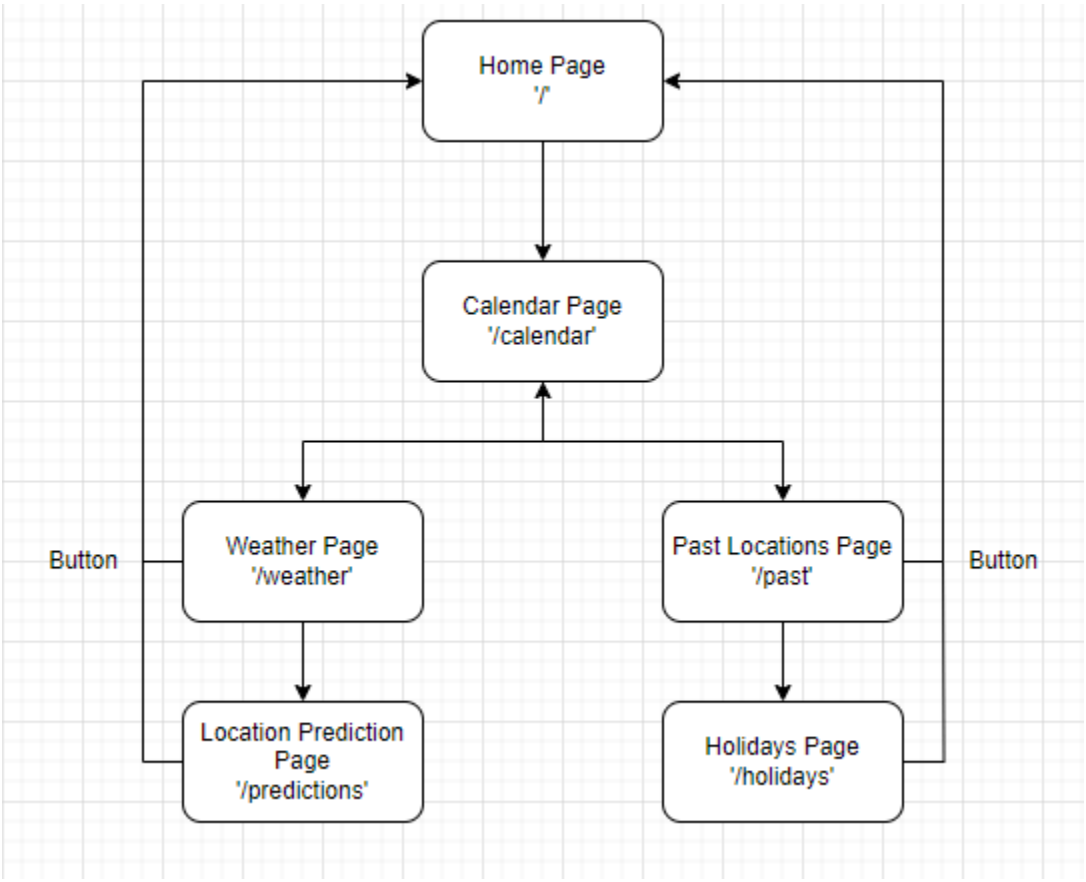
Database Organization:

- The database will consist of tables for “Locations”, “Location_History”, and “Holidays”. The “Locations” table stores Topher's location by date, while “Location_History” tracks past access dates and prediction probabilities. The “Holidays” table stores holiday data by country and date. The relationship between these tables allows you to efficiently track and predict Topher’s location, storing both predicted and actual locations, as well as holiday data that might influence his movement. This ensures that when a date is accessed again, Topher’s location can be retrieved without recalculating it.

Site Map:



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Task Breakdown:

- Andy
    - Oversees the project and assists other members in their tasks.
    - Organizes the overall structure and ensures the team stays on track with deadlines.
    - Fullstack; working on both the Frontend and Backend.
- Mark
    - Develops the Home Page:
    - Integrates the map to display Topher's location using GeoDB Cities API.
    - Adds the ability to switch between past/future dates.
    - Displays predicted locations for the next day, sorted by probability.
- Tawab
    - Implements Backend/Database functionality:
    - Facilitates storing dates and Topher's previous locations in SQLite databases.
    - Works on the algorithm to calculate Topher’s likely next location based on factors like population, holidays, weather, and previous locations.
- Abidur
    - Develops the Calendar Page and Weather Page.
    - Creates the interface for displaying holidays, weather, and Topher's likely next locations for each day.
    - Integrates the Calendarific API to show holidays for specific months/years.
    - Implements the National Weather Service API to display weather for a specific location.

Front-end Framework

We will use Tailwind as our Front-end Framework. Given the nature of our app, users will constantly access it on the go through a variety of devices. Tailwind's responsive design ('sm', 'md', 'lg', 'xl', '2xl') will help ensure that pages such as the Weather Page and the Calendar Page work seamlessly on both desktop and mobile screens, as well as large and small devices in general.