GROUP 13 BAYS: PROJECT

SFU TOOLBOX

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Link to Github repository: https://github.com/CMPT-276-FALL-2024/project-13-bays

OVERVIEW

One of the most important needs of students is finding available & suitable study space, and navigating to campus and classrooms. Students that are new to SFU, students that are not familiar with the tools, or students that don't like the SFU native tools are in need of an application that they can rely on when they need to commute to campus, locate a classroom, find an empty and suitable study space, or something as simple as checking the weather on campus, even at times they do not have their phone at handy. Furthermore, they need all these in the same place for convenience. In pursuit of finding a solution and answering the students' wants and needs, we came up with the idea of "SFU Toolbox" which brings together multiple features that all the students love and use every day, including a room finder, weather forecast, transit information, and checking the news or forums.

As mentioned above, the primary potential users of this application would be the newcomer students to SFU and students that are either not familiar with the tools or don't like the SFU native tools for their needs. The list of the potential users could also be extended with the inclusion of a secondary potential user group: the teaching staff. The teaching staff may need to check if a classroom is available, find the location of a classroom or check what the weather and transit is like at times.

SFU Toolbox will solve all these problems once and for all, as it will be the first resort students and teaching staff will use when they are in need. It will help the students find available study spaces like empty classrooms and show its info including the location, inform students about the weather and transit, and serve as an information source with the ability to find news and student forums.

PERSONAS

1. Alice is an 18-year-old freshman at SFU and a newcomer to the campus. Since high school, she has developed the habit of planning her daily schedule in advance. However, with the increasing workload of university life and the unfamiliarity of a new environment, she finds it harder to accurately plan her time. Someone recommended using apps like SFU Snap and SFU Room Finder to view daily course information and

classroom locations. But Alice quickly discovered that even though she could find basic information like the general location of classrooms and course times, the outdated and sluggish map system, along with un-intuitive interface designs, often left her lost. Additionally, she realized that in order to find a classroom, she had to remember the exact room name, which was challenging given her unfamiliarity with the school's room naming conventions. Even when she knew the class time and location, she found this information insufficient for planning her day effectively. For instance, in rainy Vancouver, she often forgot to check the weather before leaving, resulting in getting caught in the rain without an umbrella. Worse, she often missed the right bus due to confusion over bus directions or misestimating travel times to the bus stop from where she was, as she was unfamiliar with the transit system. Alice found herself constantly switching between different apps to gather the information she needed, often losing track of important details. She wishes for an intuitive, integrated app that could provide all the essential information she needs in a concise and straightforward way.

2. Bob is a 22-year-old third-year student at SFU. He is already familiar with the campus and the transportation system. As he faces increasingly challenging high-level courses and research projects, he needs plenty of uninterrupted study time each day. His class schedule leaves him with gaps ranging from 30 minutes to several hours, and he wants to make the most of this fragmented time. However, Bob finds the campus crowded during the day, and booking study rooms that fit his schedule is difficult. He wishes to search for currently available classrooms and their idle times across the campus, but he struggles to find this information in SFU's apps. Walking from room to room to check isn't feasible either. Since Bob has become familiar with what's happening around him, his attention has shifted to school-related news and discussions on various forums about topics that interest him. He spends some time each day browsing these discussions but often finds it distracting. He regrets wasting too much time on endless scrolling. Bob wishes for an app that could aggregate only the essential information and help him find the best places on campus to go at any given time.

APIs

1. **SFU Course Outlines API**: Provides detailed information about SFU courses, including course descriptions, classroom locations, and availability.
   Functions: Course info, classroom location, availability, room info, and search functionalities.
2. **Translink API**: Supplies transit information for the Metro Vancouver area, including buses, trains, and stops.
   Functions: Bus info, directions, arrival times, stop info, and search capabilities for transit routes.
3. **Google Maps API**: Offers mapping services and real-time data, such as locations and traffic conditions.
   Functions: Routes, traffic, campus hours, search, and real-time transit data
4. **Reddit/News API**: Enables viewing of Reddit's forums, retrieving posts, comments, and user discussions of SFU
   Functions: Information gathering, filtering for SFU-related discussions, and displaying relevant information.
5. **Weather API**: Delivers weather forecasts, temperature data, and air quality reports, helping users prepare for the day.
   Functions: Temperature display, forecast, air quality, and clothing suggestions based on the weather.

FEATURES

1. SFU Course Outlines API

Course Info: The API retrieves detailed course information, including course titles, descriptions, prerequisites, credits, and the names of instructors.

Classroom Location: Provides information about the physical location of classrooms where the courses are held. This feature helps students and faculty identify the exact building and room number, often providing maps for easy navigation within SFU campuses.

Classroom Availability: Displays the availability status of specific classrooms in real time, allowing students or faculty to see when rooms are occupied or free. This can be particularly useful for finding available study or meeting spaces when classrooms are not in use.

Search Functionalities: Allows users to search for classroom locations based on various filters such as distance, campus location, available hours.

2. Translink/Google Maps API

Bus Information: Provides detailed information on all bus routes and services in the Translink network. Users can retrieve specific bus route details, such as route numbers, starting and ending locations. It also provides service frequency, operating hours, and any route-specific advisories or changes.

Directions: Enables users to obtain transit-based directions from one location to another, including multi-modal trips involving buses and sky trains.

Real-Time Arrival Times: Displays live arrival times for buses, Sky Trains. This feature helps users track when the next bus will arrive at their stop in real time, reducing wait times and uncertainty. It also provides live delay notifications and updates based on traffic or service disruptions.

Stop Information: Provides detailed information about transit stops, including stop numbers, location

Alerts and Service Disruptions: Provides real-time alerts for service changes, detours, delays, or closures. Users can receive notifications about ongoing or upcoming disruptions affecting their chosen route.

U-Pass BC Renewal Reminder: Remind students to renew their compass card

3. Reddit/News API

This API enables users to retrieve and view discussions and articles from SFU Reddit and other news sites. It helps news stories and community discussions from these platforms, providing a comprehensive view of what's going on at SFU across different sources.

Information Gathering: The Reddit API allows access to public posts, threads, and user discussions on subreddits that are relevant to SFU, such as the /r/simonfraser/ subreddit.

Filtering for SFU-Related Discussions: The API enables filtering of Reddit posts and news articles based on keywords such as "SFU," "Simon Fraser University," specific SFU departments, campus locations, events, or course.

Displaying Relevant Information: The gathered data can be formatted and displayed in a user-friendly way, showing relevant Reddit discussions or news articles on a clean dashboard with custom themes. The content could be filtered into various sections such as Discussions, Campus News, Academic News, or SFU Life.

Content Ranking and Sorting: The API can rank Reddit posts or news articles based on popularity, such as the number of upvotes on a Reddit post, the number of comments, or engagement metrics from news articles. Users can sort the content by criteria like most recent, most upvoted, or most commented posts

4. Weather API

The Weather API provides real-time and forecasted weather data to users, helping them stay informed about current conditions and prepare for future weather events.

Temperature Display: Current Temperature: Displays the real-time temperature for a specific location.

Weather Forecast: Daily Forecast: Provides weather forecasts for the day, including high and low temperatures, precipitation chances, wind speed, and cloud coverage. Hourly Forecast: Offers a detailed breakdown of weather conditions hour-by-hour, helping users plan their day, such as knowing when it will rain.

Clothing Suggestions Based on Weather: Recommendations for Dress: Based on temperature, wind, and precipitation data, the API can provide practical suggestions for clothing, such as advising to wear layers, a raincoat, or heavy winter gear.

Geocoding for Location-Specific Weather: Location-Based Data: Allows users to input or select their location (e.g., a specific city, neighborhood, or campus area) to receive localized weather forecasts.

Automatic Location Detection: With IP address, the API can automatically detect the user's location and provide real-time weather and air quality data specific to that area. (default on SFU Burnaby Campus)

USER STORIES

SFU APIs

1. Room Availability

Bob used to waste a lot of time wandering the campus, hoping to stumble upon an empty classroom where he could study. More often than not, he'd find a room already taken, and by the time he found a free space, he'd have wasted most of his break. Now, with real-time room availability, he checks his phone, sees a list of free rooms, and heads straight to one without the hassle. No more wandering, just focused study time.

2. Room Info

With the Room Info feature, Alice now has access to detailed descriptions of each room, including what it's used for, where it's located, and when it's available. This helps her feel more confident navigating the campus and finding suitable spaces as a newcomer without wasting time wandering or guessing.

3. Room Location

Alice was constantly getting lost on campus, especially with SFU's tricky room naming system and poor map system. She'd spend ages trying to find the right room, and sometimes she'd even show up late or miss out on study time because of it. But now, she has a tool that shows her exactly where each room is, with step-by-step directions, so getting lost is no longer a problem.

Translink / Google Map API

1. Bus Info

Alice used to have trouble estimating how long it would take her to walk to the bus stop, often rushing or arriving too early. Now, with detailed bus info, she can not only see which bus to take but also get an accurate estimate of how long it will take to walk from her current location to the bus stop. This helps her better plan her time and avoid unnecessary stress during her commute.

2. Directions

Whenever Alice had to travel to an unfamiliar location, she'd often spend time trying to figure out which buses to take, where to transfer and which direction the bus goes. This process was time-consuming and frustrating, especially when she was in a hurry. Now, with directions integrated into her app, she gets clear routes and direction indications, helping her easily navigate the transit system without confusion.

3. Arrival Times

Alice used to get frustrated switching between Google Maps for bus arrival times and the campus map to navigate around SFU. It was confusing and often caused her to miss buses. Now,

with real-time arrival updates and everything in one app, Alice can easily check when the next bus is coming and plan her route within the campus without needing to switch between different maps, making her commute and navigation far more convenient.

Reddit & News API

1. Information Gathering

Bob used to waste time browsing multiple forums and websites just to keep up with the latest SFU news and discussions relevant to his studies and interests. It was a tedious task, and he often missed important updates. Now, with the app gathering all the latest SFU-related information from Reddit and news sources in one place, he can easily stay informed without spending extra time searching and getting distracted.

2. Filtering

Before, Bob had to wade through a lot of unrelated content and getting distracted when scrolling, which made it difficult to focus on what mattered to him. Now, with the ability to filter content by topics of interest, Bob can narrow down the information he sees, focusing only on relevant discussions and articles, making his time online more productive.

3. Info Display

Bob found it frustrating to deal with cluttered layouts on various forums and news websites, which made it hard to quickly locate important information. Now, with the app's clear and organized info display, Bob can easily scan through the latest relevant information. The streamlined interface allows him to quickly find what matters to him, making the process much more efficient.

Weather API

1. Temperature Display

Alice used to forget to check the weather before heading out, sometimes getting caught off guard by cold or rainy conditions. Now, with the temperature displayed directly in the app where she checks the course info, she can quickly glance at the current weather each morning, helping her plan what to wear or whether she needs to bring an umbrella.

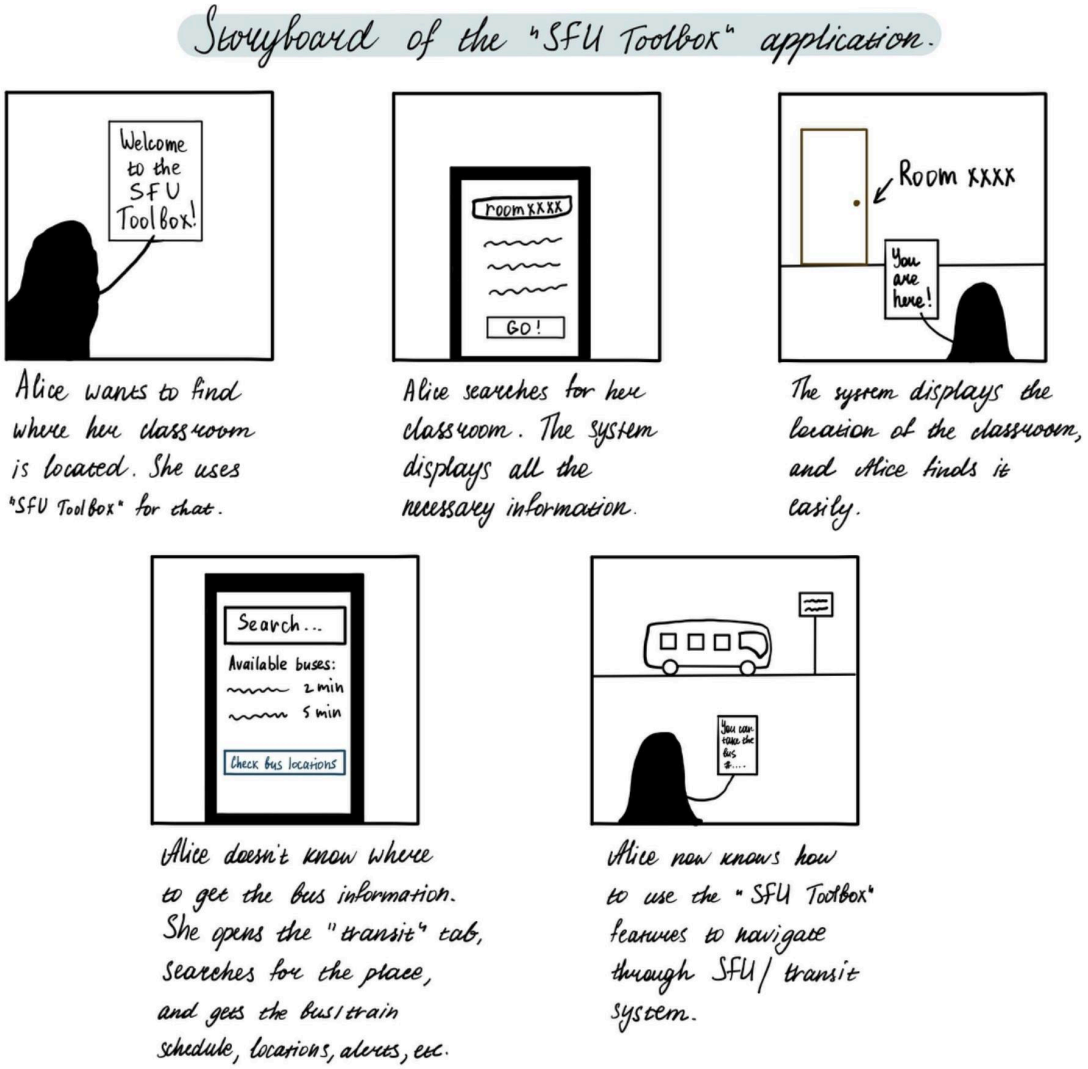
2. Open-Meteo Forecast

Alice often found herself unprepared for sudden changes in the weather throughout the day. She'd leave home in the sunshine only to get caught in the rain later. Now, with the Open-Meteo forecast feature, she can easily check the full weather prediction for the day, allowing her to stay prepared for rain or temperature changes.

3. What to Wear

Alice always struggled with deciding what to wear in Vancouver's unpredictable weather. Sometimes she'd underdress, thinking it would stay warm, only to freeze later. With the "What to Wear" feature, the app suggests the best outfit based on the weather forecast, helping Alice choose the right clothes and stay comfortable throughout the day.

STORYBOARD



FRONT-END TECHNOLOGY STACK

1. Next.js

- **Why**: Next.js is a good framework for building industry-level React applications. Given our app will involve integrating multiple APIs, its SSR (Server-Side Rendering) feature

will help optimize performance, allowing fast API calls and better rendering for dynamic data. Its flexibility makes it ideal for building complex, data-heavy applications.

2. TypeScript

- **Why**: TypeScript adds type system to JavaScript, which will help improve the reliability and maintainability. Since you're dealing with various data types, TypeScript will help prevent bugs by checking type safety and reducing runtime errors, making the development more predictable and easier to scale.

3. Tailwind CSS

- **Why**: Tailwind CSS is a CSS framework that allows for fast and responsive styling without writing complicated CSS in traditional ways. For a complex UI with multiple views, Tailwind provides flexibility and quick styling, which makes building a clean, modern, and responsive design easier.

4. Vue (Optional)

- **Why**: Vue has built-in modules and many third-party supports for smaller, isolated components. We can incorporate Vue for creating micro-elements if needed.