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Overview

Our project, Blue Pin, serves as a software that aims to enhance the BlueBikes experience for its users to promote sustainable behaviors.

BlueBikes is a great sustainable alternative as a sharing mobility tool. It provides opportunities for more people to take advantage of the public transportation system instead of driving private cars. It provides a solution for the last mile problem in public transportation and encourages effective resource utilization as a sharing platform. However, there is room for improvement. Though BlueBikes brands itself as a sharing tool, it still remains a shy service provider.

BlueBikes app primarily focuses on accessing the bikes, and completing a trip. The brand focuses on a "fun and affordable way to get around". Our project aims to put more emphasis on the sustainability and community building advantages of opting out to bike sharing. BlueBikes mostly lacks the aspects of bikesharing beyond the practicality. BlueBikes has provided some data visualization of their contribution on their website. But since the data is collected in and represented in a general, rather than personal way, it could be distancing for individual users. We want to focus on making BlueBikes' impact more tangible, engaging, and personal so more people will opt for this sustainable alternative. Studies have shown that by increasing the actual impact of sustainable behavior of the individuals, it is more likely to encourage sustainable behavior and turn it into a habit. Also, a sense of community would be beneficial to motivate people. Hence, for our Blue Pin project, we will use two primary strategies: gamification and community building.

Conceptual Design

1. Trips

Purpose: Log the bike rides the user took through BlueBikes and keep track of start, end locations, date and participants. These recordings allow gamification and community building combined with the other features of the app.

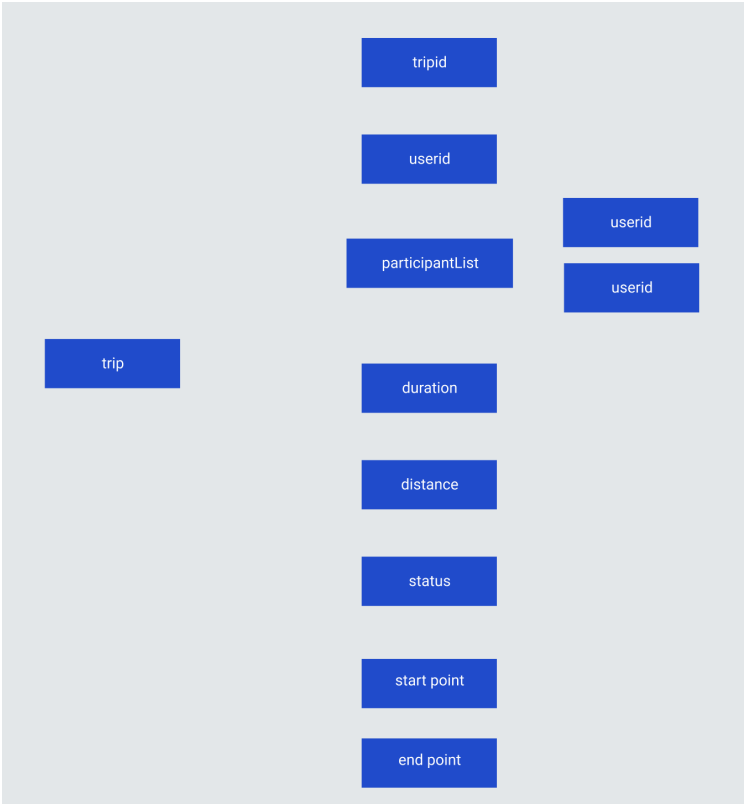
State:

Actions:

- start a new trip → startTrip(u: User, t: TripId)
- End trip → endTrip(u: User, t: TripId)
- Join an existing trip of another user → joinTrip(u: User, t: TripId)
- Browse trips to join → browseTrip(s: String)
- Get participants list → listParticipants(t: TripId)

Operational Principle:

- startTrip(userId, TripId); //tripId would be an internal dictionary key and values would be start, end locations (assigned after end trip), distance, participants (assigned after joins by listParticipants), status
- endTrip(userId, TripId); //userId is an internal identifier for each user
- joinTrip(userId, TripId); //here the tripId belongs to a trip created by a different user
- browseTrip(keyword); //keywords can be starting location, end location to find trips by other users around you to join
- listParticipants(TripId); //a function to see all users that took the trip including the one who started and the others who joined by browsing



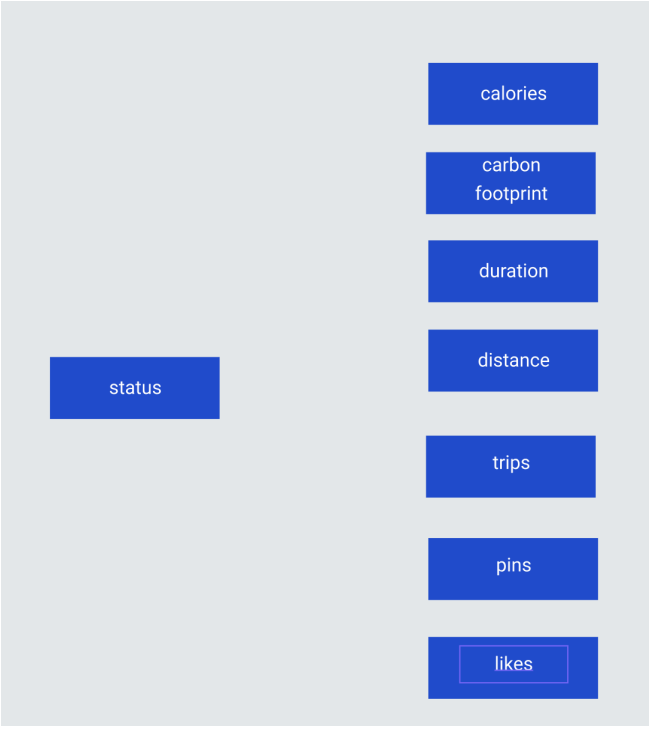
2. Status

Purpose: Have a class to keep track of the performance of users including their cumulative statistics.

State:

Actions:

- calculateCalories(u: userId, t: tripId)
- countCalories(u: userId)
- calculateCarbon(u: userId, t: tripId)
- countCarbon(u: userId)
- countDistance(u: userId)
- countPins(u: userId)
- countLikes(u: userId)



Operational Principle:

- calculateCalories(userId, tripId); //given a recently completed trip (by tripId) access trip's distance

information and user's bio-info (by userId), formulate approximate calories burnt

- countCalories(u: userId); //keep track of cumulative sum of calories burnt for the user by accessing calculateCalories results and summing them up through userId
- calculateCarbon(u: userId, t: tripId); //given a recently completed trip (by tripId) access trip's distance information and user's bio-info (by userId), formulate approximate carbon emission saved
- countCarbon(u: userId); //keep track of cumulative sum of carbon saved by the user by accessing calculateCarbon results and summing them up through userId
- countDistance(u: userId); //cumulative sum of all distance gone by the user
- countPins(u: userId); //cumulative sum of all pins posted by the user
- countLikes(u: userId); //cumulative sum of all likes received in pins belonging to the user → these status values can be a dictionary associated with user

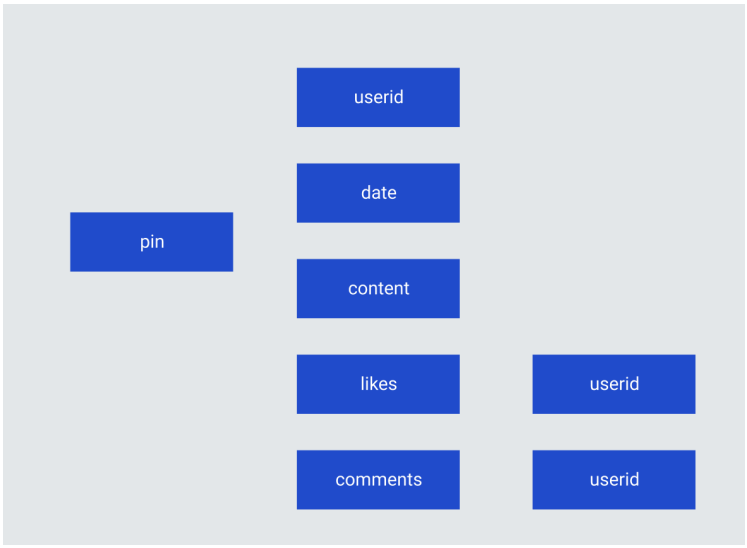
3. Pins

Purpose: Allow sharing of trips and data visualizations to followers on a feed to increase engagement and motivation.

State:

Actions:

- post(s: pinId)
- edit(s: pinId)
- delete(s: pinId)
- like(u: userId, s: pinId)
- showPins(u: userId)
- comment(u: userId, s: pinId, s: content)



Operational Principle:

- post(pinId);
- edit(pinId);
- delete(pinId);
- like(userId, pinId); //userId is the id of the user liking the pin, pin belongs to a different user
- showPins(userId); //shows the collection of pins available from "following" = following(userId)
- comment(userId, pinId, "great trip!"); //author is userId, pin is pinId, comment is the string filled in to the form - gets posted underneath the pin

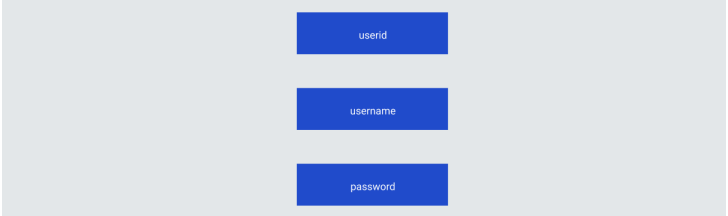
4. User

Purpose: Allow the user to create a profile and store important bio-information and contacts information to be used in other concepts calculations.

State:

Actions:

- createAccount(s: username, s: password)
- authenticate(u: userId)



- updatePassword(s: password)
- updateUsername(s: username)
- deleteAccount(u: userId)
- setInfo(s: category, int: value, u: userId)
- following(l: list of userIds)
- followers(l: list of userIds)

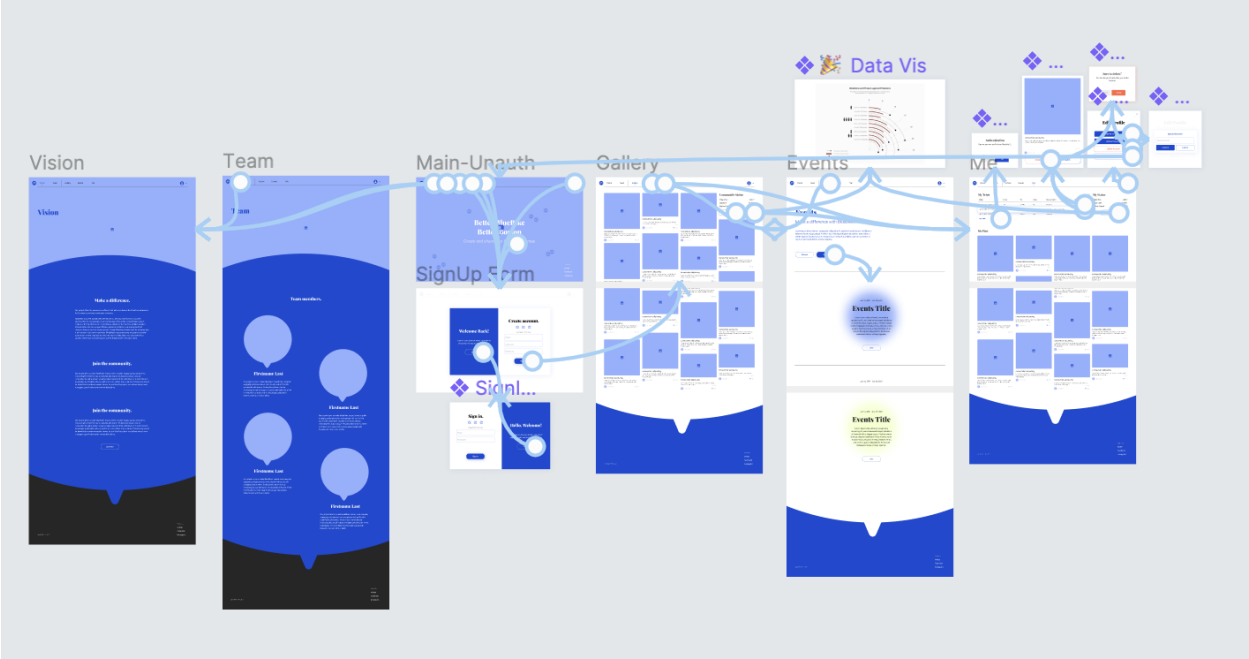
Operational Principle:

- createAccount('satoshi','satoshi123');
- authenticate(userId); //function to get BlueBike data from the API
- updatePassword('satoshi321');
- updateUsername('6170staff');
- deleteAccount(userId);
- setInfo('Weight', 125, userId); //bio-info set into the user dictionary
- following(followingList); //a list of userIds -- directed graph of following → these are the people that you will see the pins of
- followers(followersList); //a list of userIds -- directed graph of followers → these are the people that will see your pins

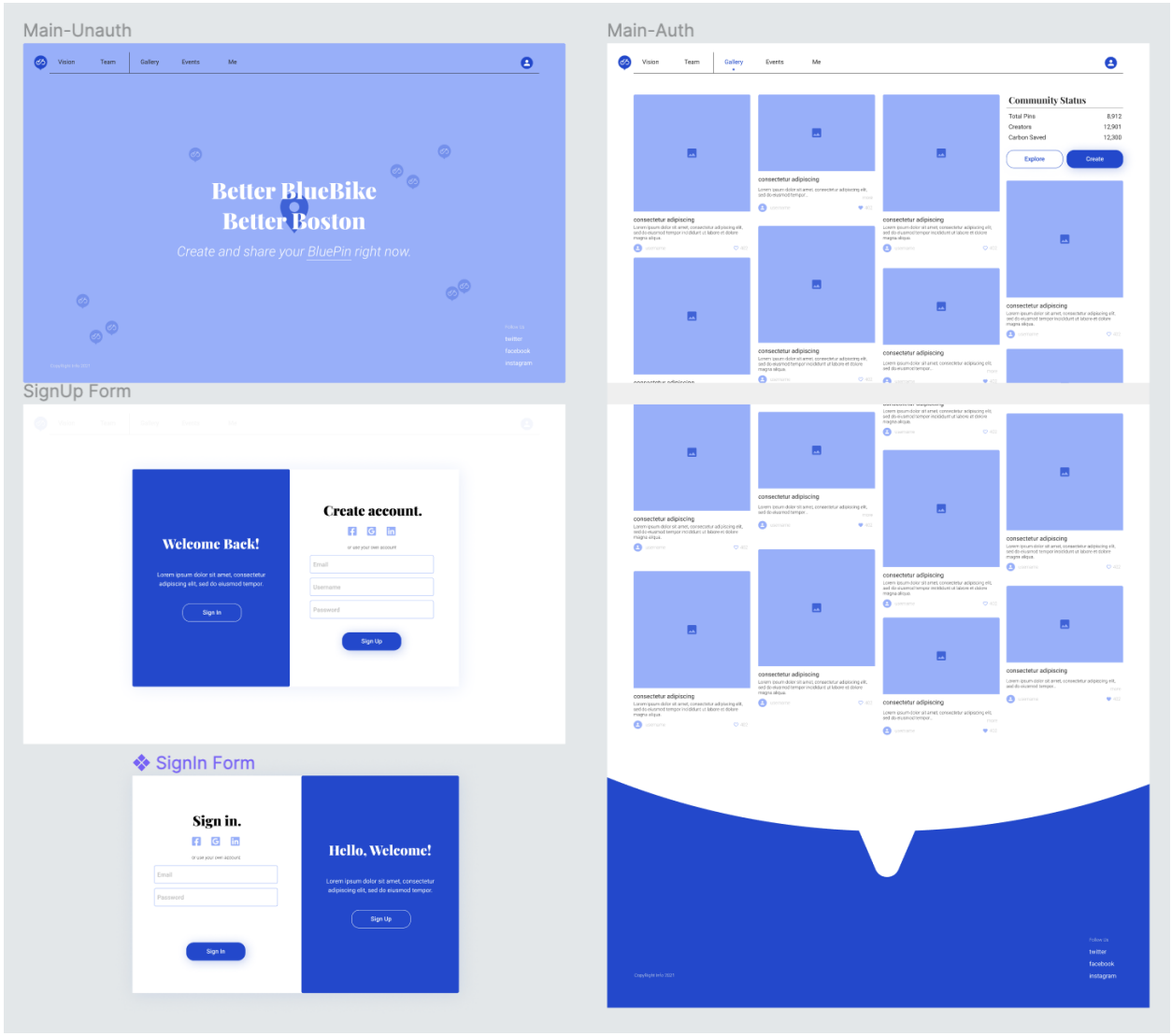
Sketches

The work is done in Figma. Here is the link to the file:
https://www.figma.com/file/ewwuvpe2rV0K70n00wAKCp/6.170_Final?node-id=10%3A603

Relationship map

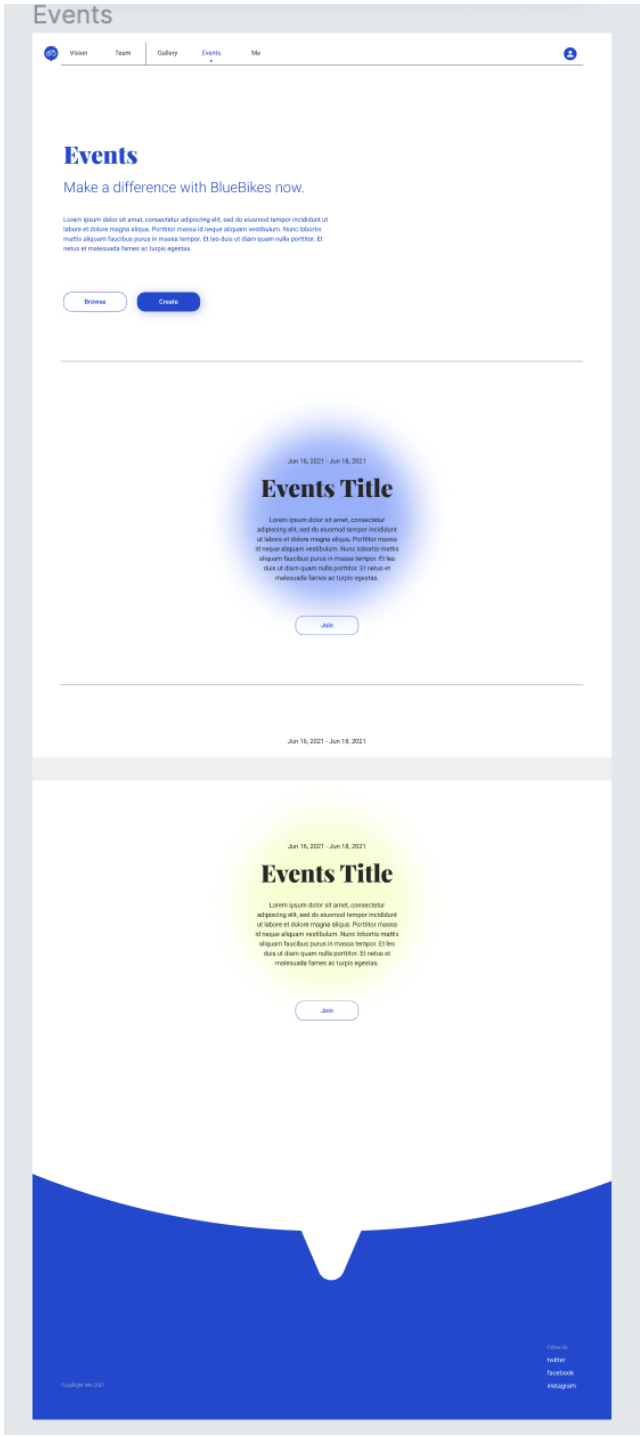


Main Pages(unauthenticated and authenticated)

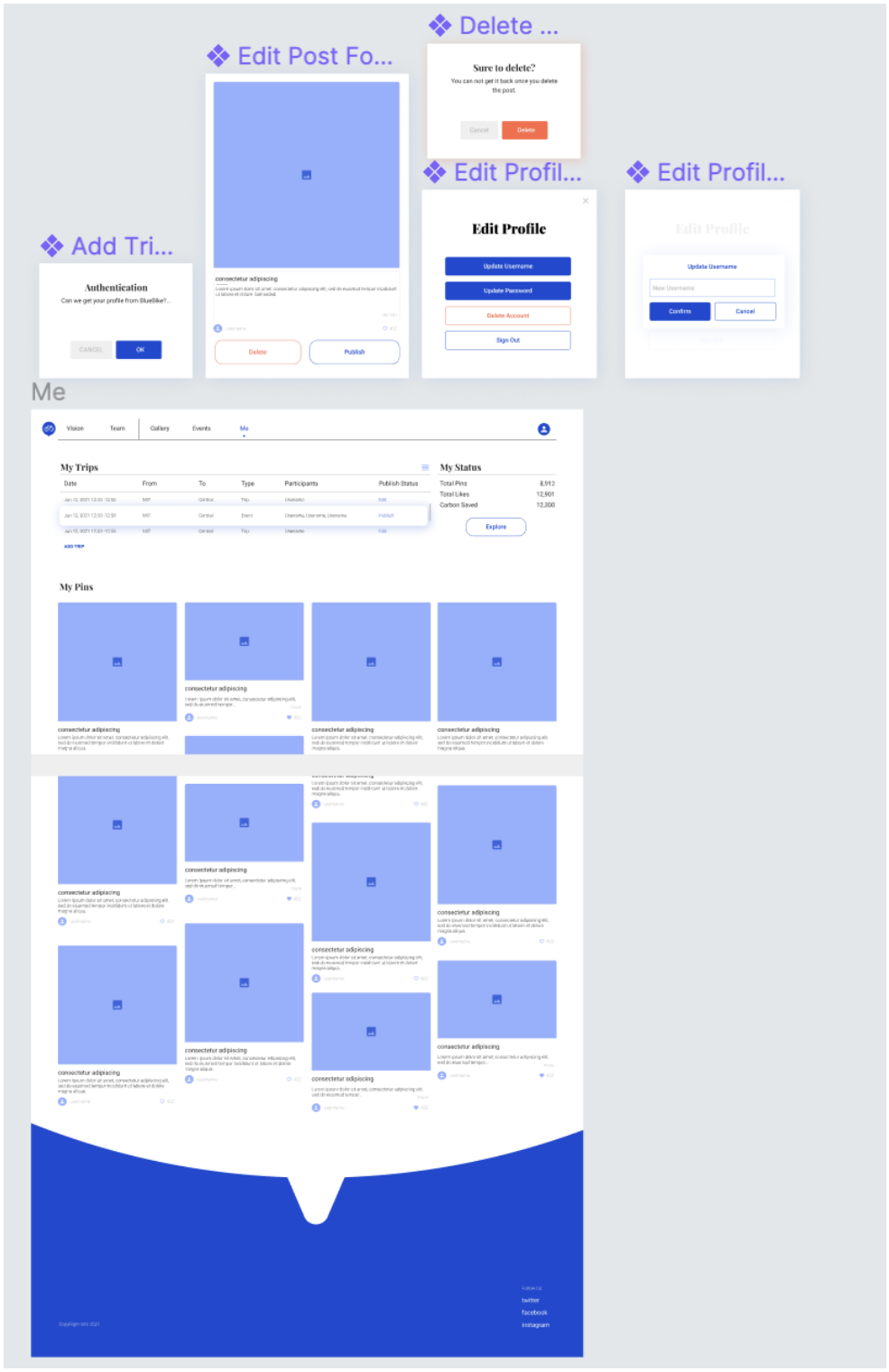


Project Info Pages

Events Page(TBC)



About Me Page and Transitions



Review of Changes

- We took out the bio-information and calorie tracking features we originally thought about. We took the advice of our mentor and decided to put our main focus on community; this way we put a larger emphasis on sharing generative arts in the pins. We limited our tracked information to location, time and carbon emissions to create interesting visualizations instead of users posting as much information about trip statistics.
- We added an explore section where a user can see data visualizations for the whole community. This way our app is beyond posting and liking, but offers new engaging insights.
- We also added an explore section for each individual user as well where they can see their own impact in the community to motivate them with concrete and fast feedback.
- We decided to keep the data visualizations minimalistic and focus on creating the events concept. Events are not a main concept in the above conceptual design. They are still under trips, but have a page of their own where the user can join an event (a trip at a certain time frame with multiple participants), and they can import the trip to their own history..

Usability Heuristics for UI

1. **Visibility of system status:** The tab the user is on gets underlined in blue, the like button turns into a filled in heart to show already liked posts.
2. **Match between system and the real world:** We use commonly used words such as ‘trips’ to describe logs of bike rides. We use familiar concepts such as likes, publish, explore, pins to communicate our concepts.
3. **User control and freedom:** A user can unpublish or unlike a post.
4. **Consistency and standards:** We use the words sign in and sign up. Profile is located at the top corner of the page. To access user account related actions, the user needs to click on the profile icon similar to most social media sites. Main menu is the header.
5. **Error prevention:** User is warned when they are trying to access a page (Gallery/me/events) that are only available to signed in users.
6. **Recognition rather than recall:** Main menu is a header always at the top of the page.
7. **Flexibility and efficiency of use:** This principle does not apply to our project as we focus on quickly importing trips, creating a generative art and posting it.
8. **Aesthetic and minimalist design:** We have a very minimalist page design and follow a simple white and blue color scheme.
9. **Help users recognize, diagnose, and recover from errors:** There are no error codes, instead the user is prompted to what to do such as “CLICK HERE” in color and bold.
10. **Help and documentation:** This principle does not apply to our project right now as we have only a few features, there is no additional documentation.

Design Commentary

- Structure Design: Adapts to the needs of diverse user groups
    - We structure our pages based on the user group.
    - For guest users, we have “Vision” & “Team” to help them understand what our app is about
    - For registered users, we have
        - “Gallery” & “Events” for users who enjoy community and inspiration from others - need pressure/motivation from others
        - “Me” for users who may be more comfortable have their own pace and get motivated by themselves - no pressure from others
    - No matter what style the user works, he/she may find a comfortable/effective way to use our app
    - Alternative would be divide the pages in terms of functionality, for instance, forcing users to start a new trip within the “events” page which may inevitably exposes users who are uncomfortable to peer pressure to a high-motivated community
- Constraint Design: Data Usage Under Control & Permission
    - Pull BlueBike’s trip info under user’s permission
    - Freedom to choose which trip to be published
    - Freedom to edit/unpublish the post anytime
    - Only share the generative-art of the insensitive info including carbon footprints, duration, miles etc. not the routes to keep privacy
    - Guest users whose identity cannot be verified by us are not allowed to view galleries, so that we can further protect the privacy of our users
- Visual Design: Consistent style and Minimalist layout
    - Components with similar “pin” pattern - match with our icon & app name “bluepin”
    - Color scheme - blue & white
- Interaction Design: healthy interaction inspires healthy community
    - Only allow “Like” a post, instead of Comments, Downvote, Follow to avoid negative impact (hate comments, cyberbullying) from other users - false sports app interaction is highly related to body shame
    - Users can only see a overview/collective data visualization of the community as a whole instead of other user’s progress individually to avoid peer pressure - they can only see their own accumulative data visualization in their profile, which motivates them but not putting any extra burden
- Generative art: How random should it be?
    - In our current implementation the generative art of a post is randomly generated. The user cannot choose the detailing of the styling and every reload results in a new image, but still similar to each other since they use the same data.
    - We considered whether the user should be able to choose a general styling to not reload the art every time, but decided this randomness would promote more frequent use of the app, make the data more interesting, and add more excitement and mystery to the user experience.
- Privacy and Access: Who can see the gallery?

    - An important question was if a user who is not signed in can see the gallery feed. Currently they need to sign up or log in to see the community posts.
    - We could let users see the gallery without an account to get a feel of the platform, however this felt like violating the community building aspect and potentially create safety issues since it would broadcast users data publicly.
- Events: What is the clearest and most meaningful way to implement the events page?
    - Trips cover most features we want, so how can events bring new insights? We discussed whether events should be a completely separate concept where users have two different sets of activity on the platform: trips for their individual bike rides and events for activities at set times with multiple participants.
    - In the case of separate concepts, it can be more confusing to the user as an event is essentially a trip with other participants and can be harder to track direct progress. We decided to implement events as a set of trips the user can choose to import to their profile. This approach can be easier to use and events can emphasize keeping the community engaged in local activities.

Ethics Protocol Analysis

Possible futures of our app:

- Good: BluePin motivates the Boston community to use BlueBikes as many times as possible and holds an inspiring community together where people have friendly competition to contribute to saving the environment.
- Bad: BluePin becomes a tool for people pressuring each other or making each other feel bad about their athletic capabilities, it promotes diet culture instead of sustainability, people stop using the app.

Stakeholders:

- Boston community
- bikers
- local residents
- commuters
- fitness influencers
- disabled people
- people of different ages
- students
- the environment
- drivers

Value-laden design decisions & Our design choices:

1. **What is being tracked?**

Possible Choice	Values promoted (and for whom?)	Values demoted (and for whom?)
Track only number of miles and duration.	Outcome Lens: Promotes a good tracking opportunity for using BlueBikes purely for sport, has less distractions, and is easier to use.	Process Lens: It does not go far enough to motivate people, it acts as more of a habit tracker.
Track trips, carbon emission saved, calories, pace, fitness level...	Outcome lens: Has the most in depth analysis for users to improve their sustainable habits and fitness level	Outcome Lens: Shifts attention away from sustainability and focuses more on fitness and bio-info, disadvantages people who do not fit into the mainstream sports world.
Track trip data, carbon emission saved, and calories only.	Process Lens: the focus is not divided into many fitness stats, sustainability, habit tracking, and a small amount of 'fitness' information is offered Outcome Lens: a good compromise between option a and b	Process Lens: users still need to enter weight, age kind of sensitive information

We chose to implement option three, as it offers a good balance between habit tracking of using bikes and having personal fitness goals to motivate people. We decided that while sharing pins, calorie data does not need to be publicly shared.

2. **Privacy settings**

Possible Choice	Values promoted (and for whom?)	Values demoted (and for whom?)
Allow every pin to be public	Outcome Lens: Higher community engagement	Process Lens: Privacy concerns

Limit pins to followers	Process Lens: Better privacy by limiting the number of people who sees the pin	Process Lens: Privacy concerns Outcome Lens: Emphasis placed on gaining followers, shifting attention from sustainability to popularity
Limit pins to friends	Process Lens: Pins are only seen by people the user has chosen, great for privacy	Structure Lens: Limits the community to a person's social circle and excludes the greater community of Boston

We chose to implement both followers and friends features in our app. This way a user can choose to better protect their privacy, while still connecting with the greater Boston community in a way they seem appropriate for themselves.

3. **How is my gallery organized?**

Possible Choice	Values promoted (and for whom?)	Values demoted (and for whom?)
Put most liked first	Process Lens: Content that is liked by more people can be thought of as content people are interested in more, and this way the gallery is more engaging to users.	Outcome Lens: Lack of community support to less established/new users Structure Lens: Proportionately disadvantage disabled/elderly/beginner users
Put most recent first	Process Lens: Gives everyone an equal chance to be at the top of the gallery	Outcome Lens: Order may seem random and might not give a motivating goal to share with greater community

We chose to implement putting the most recent posts first in the gallery to emphasize the community aspect of the app, and focus on seeing how other people are choosing a sustainable activity at the same time as you. We wanted to avoid our app prioritizing more popular bikers and disencouraging newcomers.

4. **How can users interact with posts?**

Possible Choice	Values promoted (and for whom?)	Values demoted (and for whom?)
Likes	Process Lens: A positive reward for the users, makes the platform more engaging and can have direct encouragement from the community	Outcome Lens: Can create anxiety around how many likes a post got, if someone is 'popular' or 'liked' enough
Upvote and downvote	Process Lens: User can participate more and have more agency	Outcome Lens: introduces negative feedback to our platform, can be used for bullying, discouraging people Structure Lens: why is a trip downvoted? Was it too short, too boring? Disadvantages beginners and disabled people in their journey
Reposts	Outcome Lens: Possible more rewarding than likes, would increase engagement and encouragement since your 'Me' page would grow and have more generative art	Outcome Lens: Safety concerns - the data of your following is now shared to your followers that they didn't approve

We chose to implement only likes as an interaction option. This way we can still have some positive reinforcements on our platform, do not include any negative ones, but also still allow users to keep their privacy controlled.