

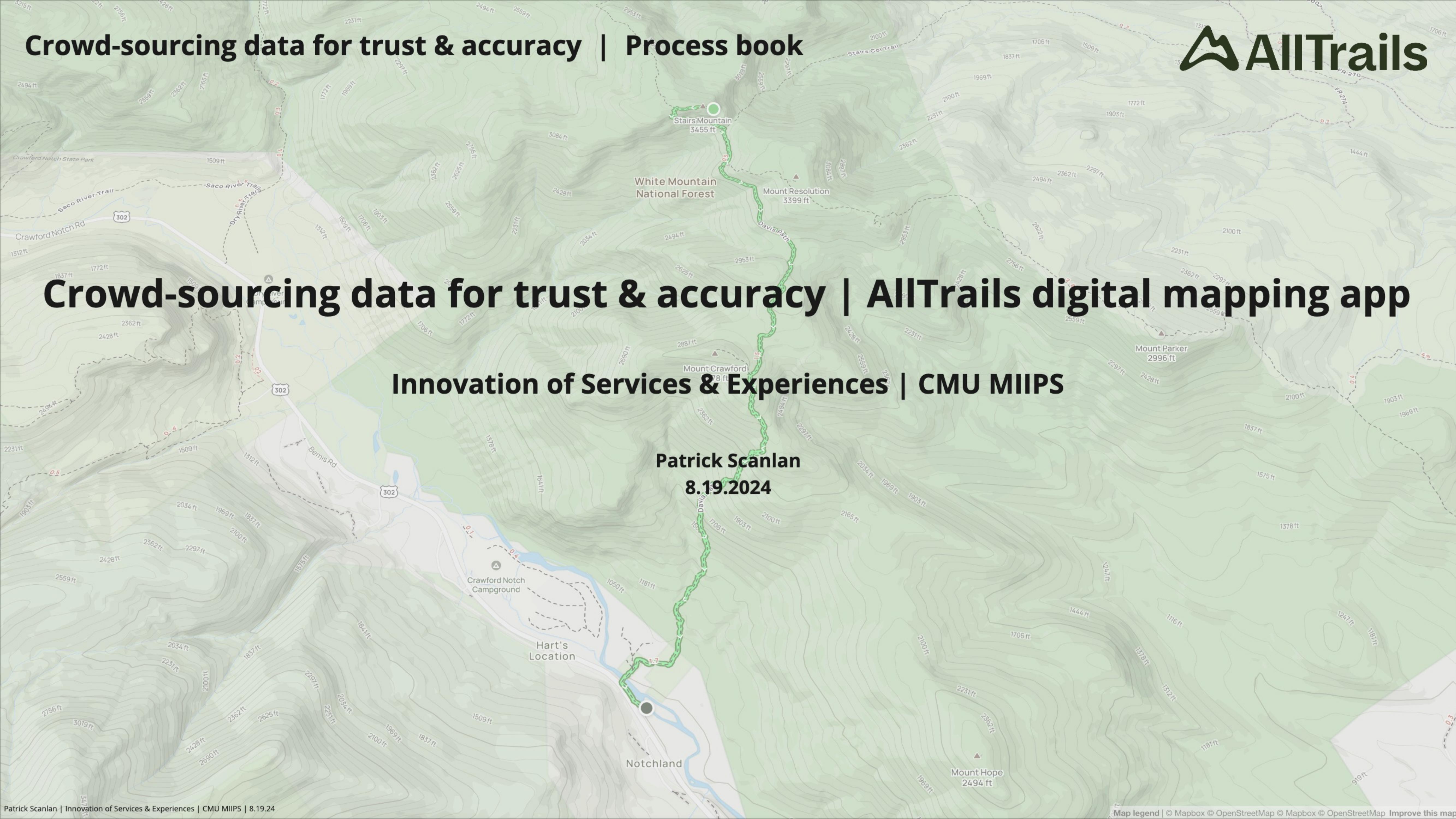
Crowd-sourcing data for trust & accuracy | Process book



Crowd-sourcing data for trust & accuracy | AllTrails digital mapping app

Innovation of Services & Experiences | CMU MIIPS

Patrick Scanlan  
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# Project goal



## Project Goal:

To explore the service offerings, identify opportunities to enhance the user experience & co-creation of value for AllTrails, and then to build a feature concept that reflects this opportunity.



AllTrails provides **65 million users** with access to a vast **crowd-sourced database of trails for outdoor activities**, including hiking, running, biking, and more. The app is for all levels and offers detailed trail information, user reviews, photos, and GPS tracking features.

## Key Features & Impacts:

- A standout hiking app with name recognition across the outdoor community
- **Over 400,000 trails** with filters by activity type, difficulty, distance, and user rating
- GPS tracking for real-time navigation and the ability to **record and share routes** with friends and the greater community
- Robust **community engagement feature for sharing** experiences, photos, reviews, and meeting new people
- A **subscription model** offers a free version with a limited feature set and a paid version with more advanced features for regular users
- Integration across other apps and devices

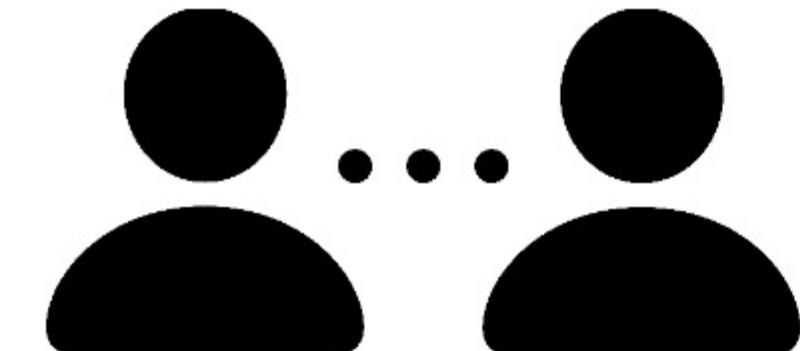
# Four research methods contributed to a holistic understanding of the current user experience and provided key insights into service gaps & challenges



User Surveys



Desk Research



1 : 1 Interviews



Guerilla Research

## Select Data Points

*"AllTrails has sent me to locations claiming to be the trailhead, but it was actually 30 miles away."*

*"Because of user generated data, no one has verified the data is correct. There are loads of inaccurate trails and related information. Performing a quick search for hikes in Lerderderg State Park, I found a heaps of inaccuracies."*

*"AllTrails helps me feel more comfortable being a lone woman on a trail, exploring new routes with little information."*

*"I've encountered bad AllTrails intel including bushwacks and herd paths labeled as designated trails, trails on private property, misnaming of trails, summits, and features, and lousy hike descriptors."*

*"The routes for AllTrails are uploaded by users. I have found this to be hit-or-miss and could lead to a sub-optimal hiking experience - or worse. If a user follows a poor route and that user's route becomes popular, other users of the app will blindly follow a route that may not be the best experience."*

*"I love mapping apps where I can draw inspiration from others."*

*"AllTrails has led me down false routes and has been off by milage estimation by more than a mile. I've gotten lost because of this."*

# Research findings highlighted the main pain points and informed the guiding design questions



Crowd-sourced data offers valuable benefits, such as community-driven inspiration, but...

**the app relies on unverified, user-generated data which presents significant challenges related to accuracy and safety and can undermine the entire user experience.**

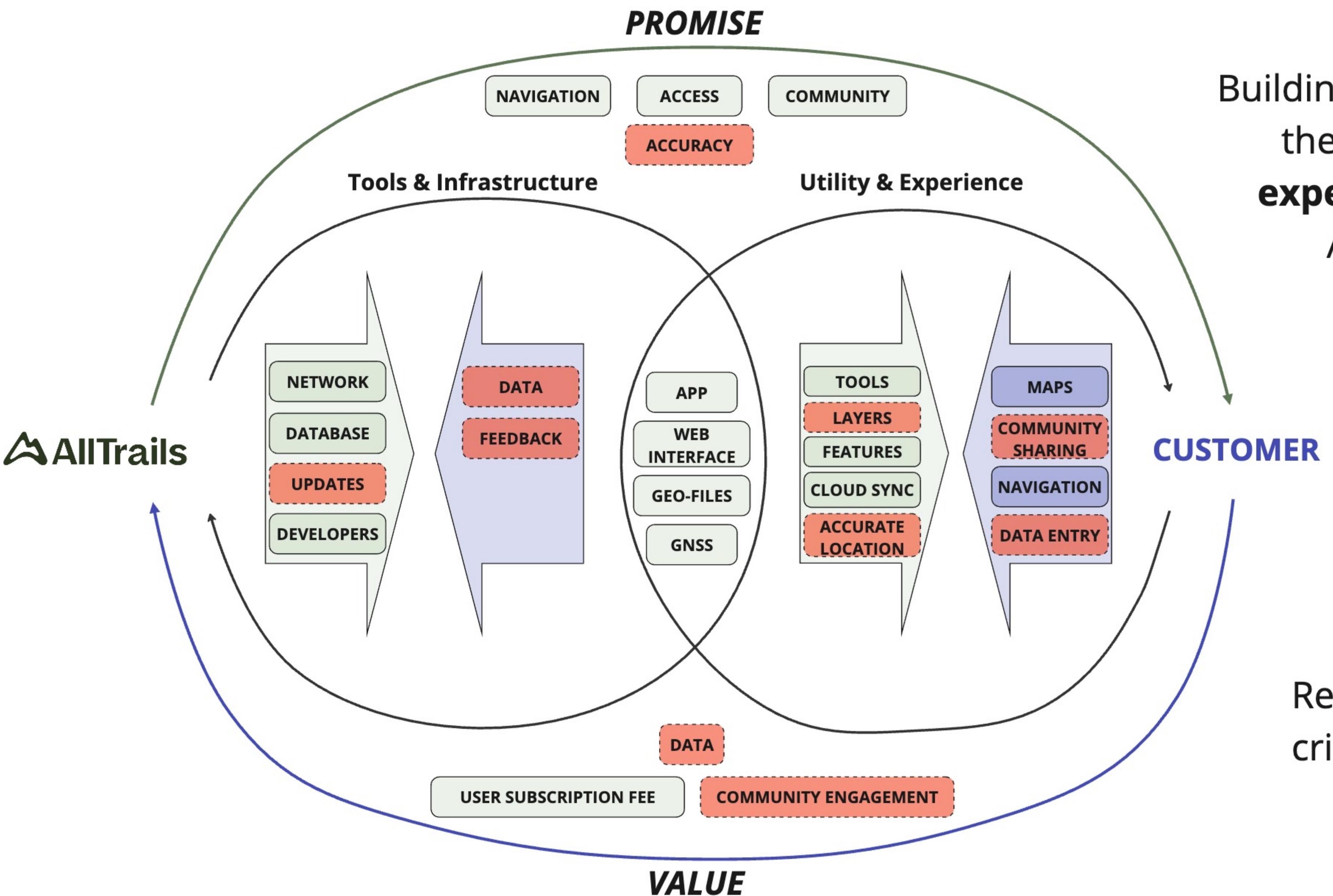
**How might we...**

**...create a system that provides high-quality, accurate information and is resistant to misinformation?**

**...empower users to contribute to high-accuracy, high-integrity information?**

**...more effectively filter inaccurate information before it is shared widely?**

# Ecology mapping for value & opportunity



Building a service ecology map outlined the **exchanges of information, expectations, and value** between AllTrails and its customers

Research findings highlighted critical **OPPORTUNITY AREAS**

# Evolving opportunity areas and jobs-to-be-done into actionable service enhancements



## Jobs-to-be-Done

Develop verification mechanisms or integrate trusted sources to **improve the accuracy and safety of trail data.**

**Increase transparency** by letting users know when data has been verified or needs updates.

Implement a **user-ranking system or trusted reviewer program to add credibility** to trail reports and experiences shared on the platform.

## Ideation goals

### Leverage existing architecture:

- Crowd-sourced data model
- Large, active user base
- User profile and social component

### Desired outcomes:

- Steady increases in accuracy over time
- Steady decreases in misinformation over time
- 2% user engagement in the first year

### Priority user pain points:

- App leads users off the trail
- Distance, time, or difficulty metrics are inaccurate
- Poor information for access keeps users from starting intended activity

# A high-level feature-set aligned critical opportunity areas with the jobs-to-be-done and ideation goals



<u>Must-Have</u>	<u>Nice-to-Have</u>
<ul style="list-style-type: none"><li>• <b>Reporting system for inaccuracy and poor info</b><ul style="list-style-type: none"><li>• <i>Enable in-app reporting with post-activity UI that quickly captures critical information about the activity. Must be simple and un-intrusive.</i></li></ul></li><li>• <b>Verification system to validate user-generated contributions</b><ul style="list-style-type: none"><li>• <i>Leverage reporting system data to solicit feedback from other users who followed the same trail. Build a model that builds accuracy confidence over time with rolling feedback.</i></li></ul></li><li>• <b>System ability to store, parse, and analyze new dataset</b><ul style="list-style-type: none"><li>• <i>First two features require a robust database, ideally enabled by machine learning, to understand accuracy based on crowd-based user input over time.</i></li></ul></li><li>• <b>Incentive for participation</b><ul style="list-style-type: none"><li>• <i>Features rely on user inputs, making incentives important for engagement. Stellar UI is a critical first step for this effort.</i></li></ul></li></ul>	<ul style="list-style-type: none"><li>• <b>Visible user status identifying contributors in social profile</b><ul style="list-style-type: none"><li>• <i>Use badges or scores to display users as community contributors to the service.</i></li></ul></li><li>• <b>Trail libraries of trails that need verification</b><ul style="list-style-type: none"><li>• <i>Create a list of trails that specifically need user verification. This could be integrated into the user profile as a challenge to encourage participation.</i></li></ul></li><li>• <b>Social &amp; community features around increasing trail accuracy</b><ul style="list-style-type: none"><li>• <i>Encourage social meetups to further drive engagement and community involvement.</i></li></ul></li><li>• <b>Gamification elements to drive engagement</b><ul style="list-style-type: none"><li>• <i>Create specific challenges for users to verify trails or correct inaccuracies, rewarding them for their effort with points, badges, or subscriptions.</i></li></ul></li></ul>

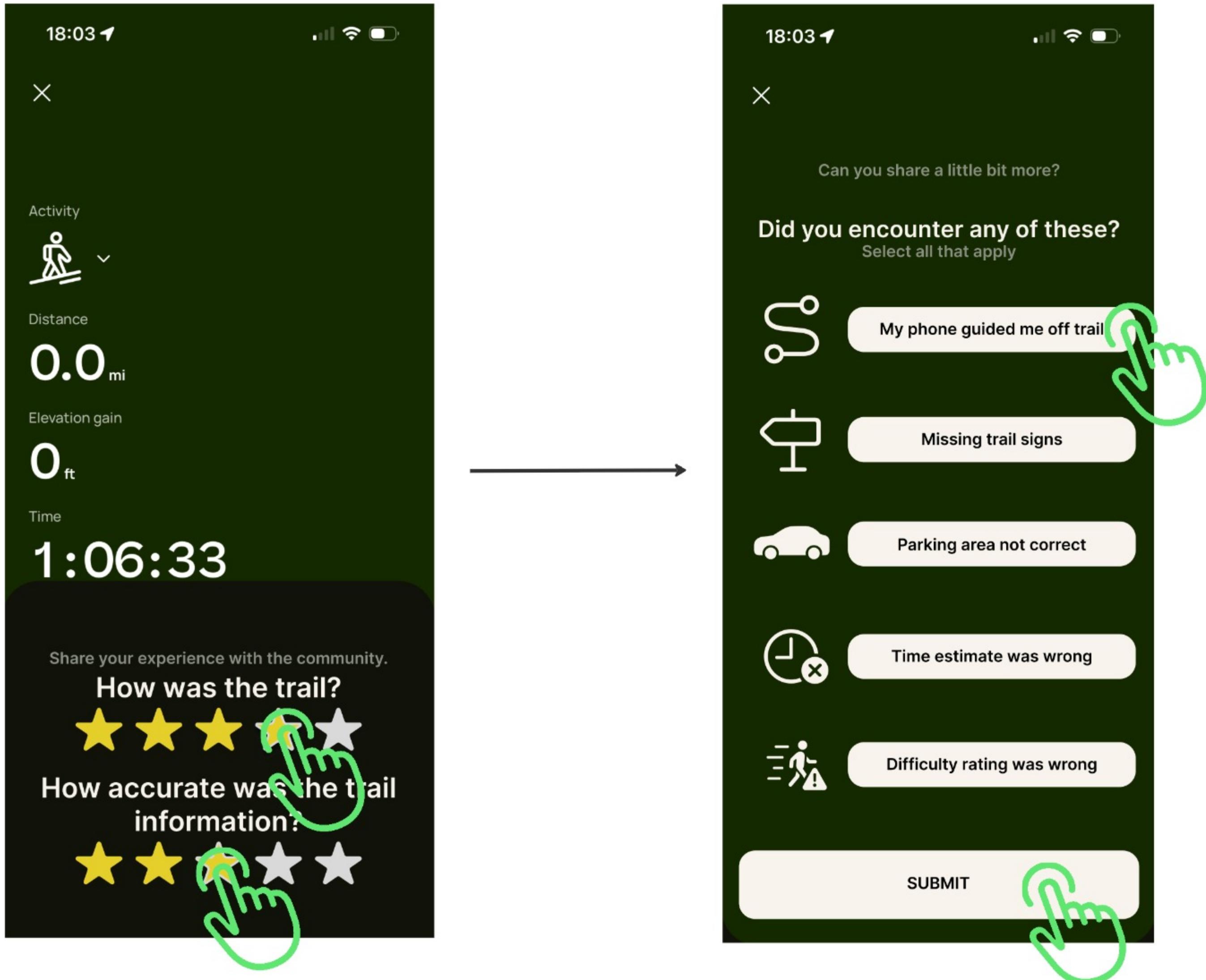
# In-app rating & classification system contribute critical data to increase accuracy



At the end of an activity, users have the chance to **rate the experience and accuracy** of the AllTrails route.

This helps **build an accuracy model for each trail** that is publicly available in the system.

A simple questionnaire captures higher fidelity information that can then be passed into the broader verification system.



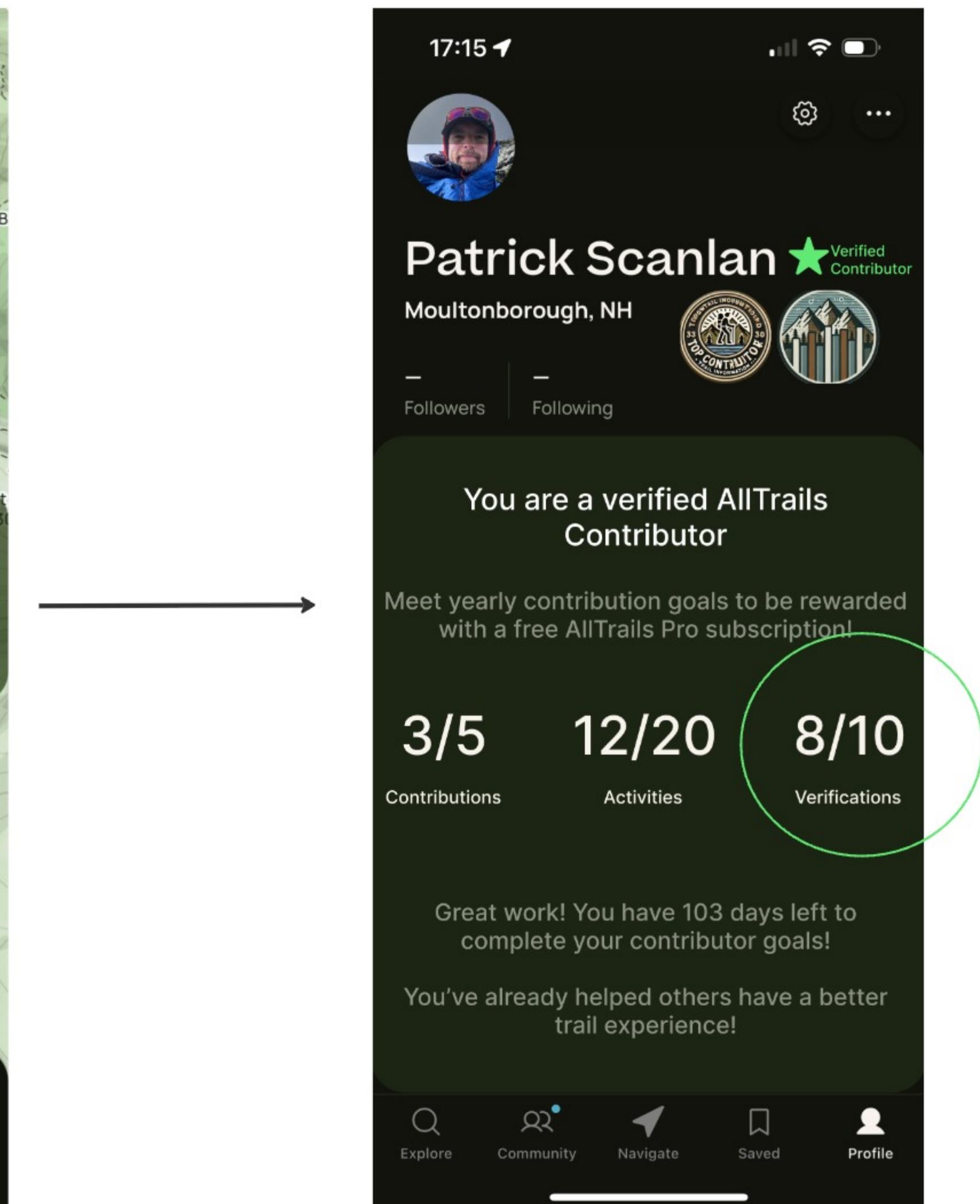
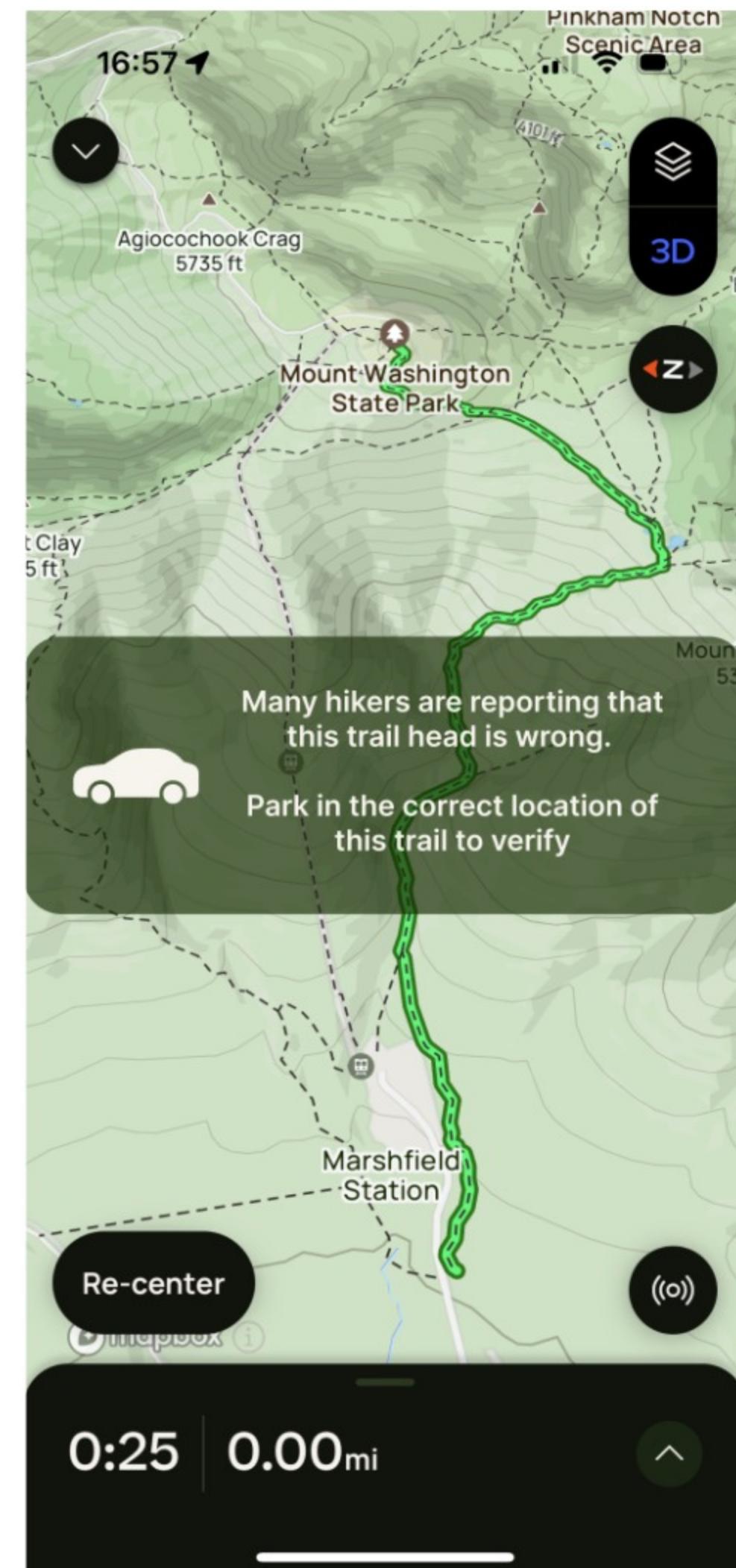
# In-app verification system leverages crowd-sourcing to increase accuracy & establish information integrity



Contributing users are prompted when they encounter trail information that has been flagged as inaccurate.

**Over time, this builds information integrity as flags are verified by multiple users.**

Like contributor data, this **verification data is added to the app** and is reflected in the Contributor's profile as a step completed towards contribution goals.

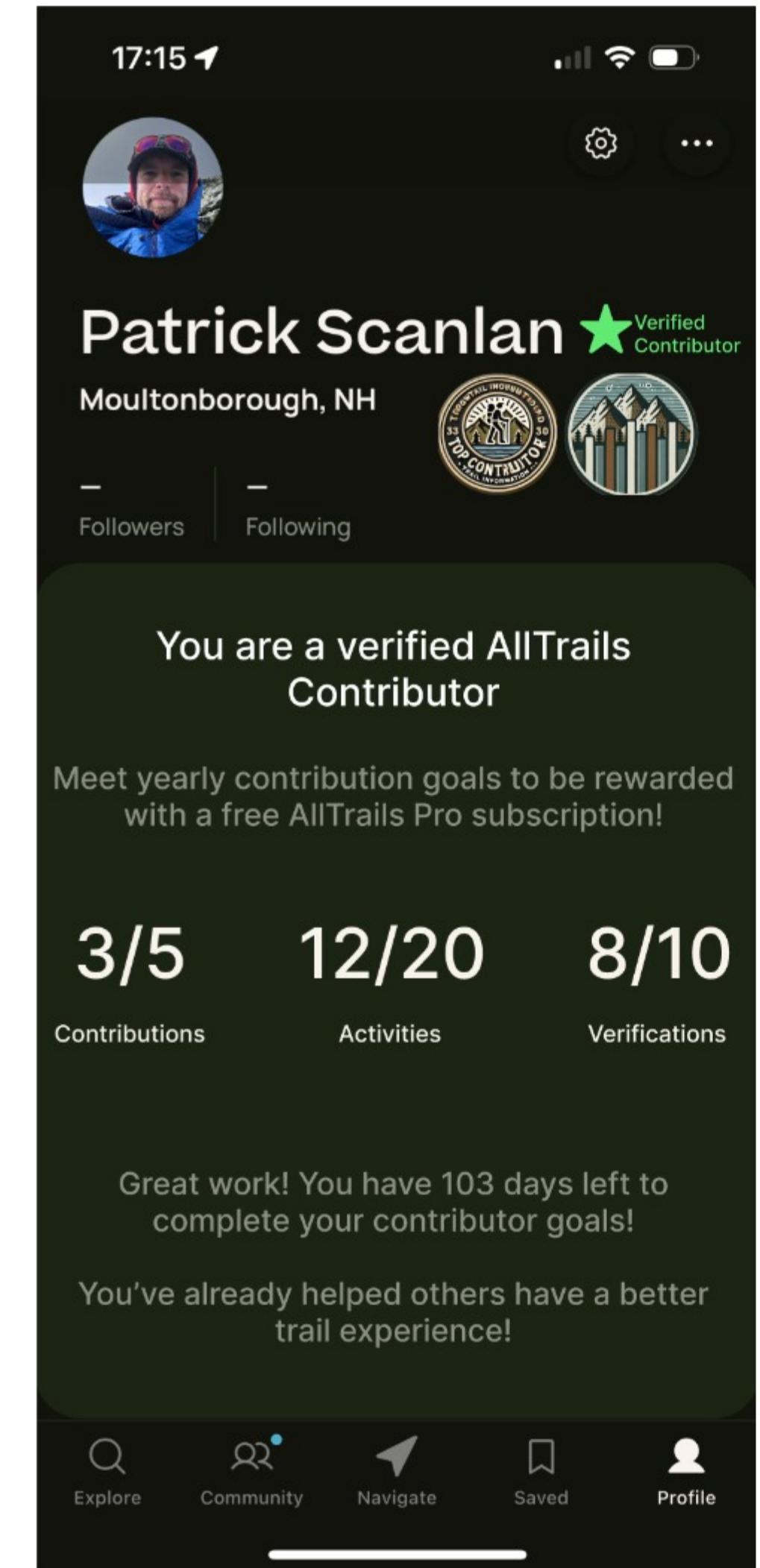


# AllTrails can incentivize the contributor model to increase user engagement and data volume



A redesigned user profile shows the status of contributors and outlines the incentive model to encourage users to contribute enhanced data.

**Participants could be offered a AllTrails+ subscription in return for their effort, time, and data to support increased geo-accuracy and informational accuracy.**



# Key insights from prototype testers drove the iteration process and validated the jobs-to-be-done and core feature-set



## Positives:

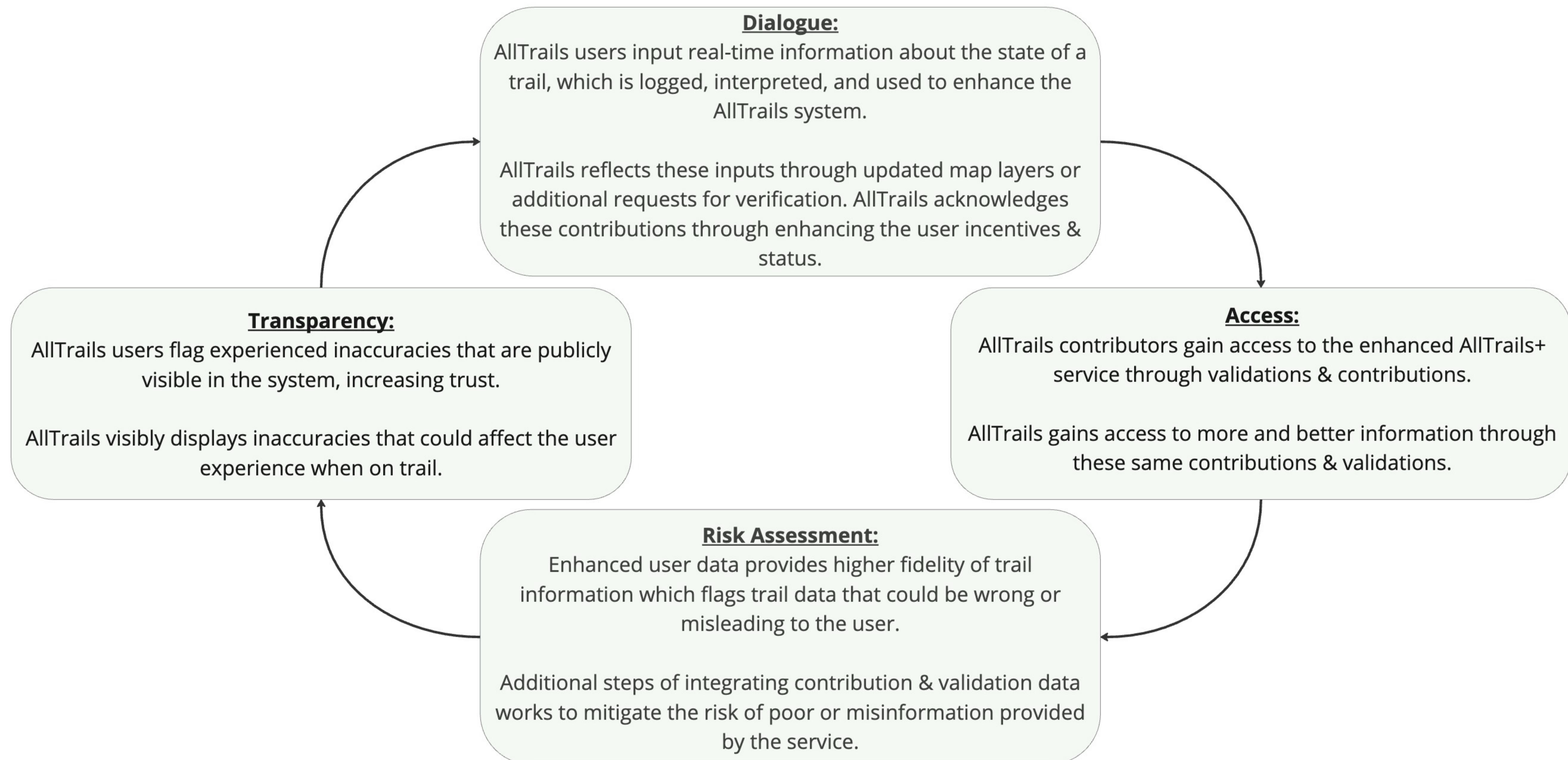
- The system for earning a Pro subscription through contributions was extremely motivating and increased interest in participating as a contributor.
- The badges and progress towards goals added an element of gamification that was attractive.
- The process of reporting inaccuracies and validating crowd-sourced data is straight-forward relatively simple to understand.
- Testers were intrigued by the AI elements that assist with data accuracy. Those familiar with AI systems could draw a clear link between the data contributed and how it would be used to enhance the system.
- Testers appreciated the requirement for multiple users to verify the same issue before updating the data layer or receiving credit.
- Testers felt that the system would continue improving with time due to the continuous feedback loop.



## Constructives:

- Could be some more clarity around the contribution goals in definition and scope.
- Some testers questioned how flagged inaccuracies were parsed from periods of poor GPS signal.
- More incentive could be added by notifying users when their data has successfully updated the data layer and contributed to the positive experience for others.
- Testers questioned the need for a system that handles false reports or false claims which could further add to the problem.

# A DART model summarizes the service enhancements through the lens of value co-creation



## Data Inaccuracy and Safety Concerns

! The reliance on unverified, user-generated data leads to significant inaccuracies in trail information, creating potential safety risks for users.



## Implement a Data Verification & Contribution System

✓ Introduce mechanisms that allow users to contribute information that identifies inaccuracies and recommend solutions.

## Trust and Transparency Issues

! Users are concerned about the credibility of the data, and there is a clear need for transparency regarding which information is verified and which is not.



## Increase Transparency and User Feedback:

✓ Make reported inaccuracies visible to users. Allow users the opportunity to verify corrections of inaccuracies, increasing accuracy over time.

## Opportunity for Community Engagement

! AllTrails has a large, active user base, but there is a missed opportunity to leverage this community more effectively through data validation, ranking systems, and incentives.



## Use Gamification and Incentives for Data Contribution

✓ Encourage users to contribute to data accuracy by introducing gamified elements, like earning an AllTrails+ subscription or enhancing profile status.

# Appendix | Full prototype with narrated user journey



I am an avid hiker who uses the AllTrails digital mapping app to track hikes and outdoor activities.

I recently signed up to be an AllTrails Contributor because I am active on the platform and I want to help the trail data for my area be accurate without misinformation that could lead others astray.

A screenshot of the AllTrails mobile application. The top status bar shows the time as 17:15. The main header displays the user's profile picture, name (Patrick Scanlan), location (Moultonborough, NH), and title (Verified Contributor). Below the header are sections for Followers and Following. A large callout box highlights the user's contributions: "My contributions help me attain social status within the community and also allow me to earn a free AllTrails Pro subscription if I meet the yearly contribution goals." The central part of the screen shows the user's 2024 stats: 3 Contributions, 99.4% Accuracy, and 8 Verifications. At the bottom, there are tabs for Feed, Photos, Reviews, and Activities, with Feed selected. The navigation bar at the very bottom includes icons for Explore, Community, Navigate, Saved, and Profile.

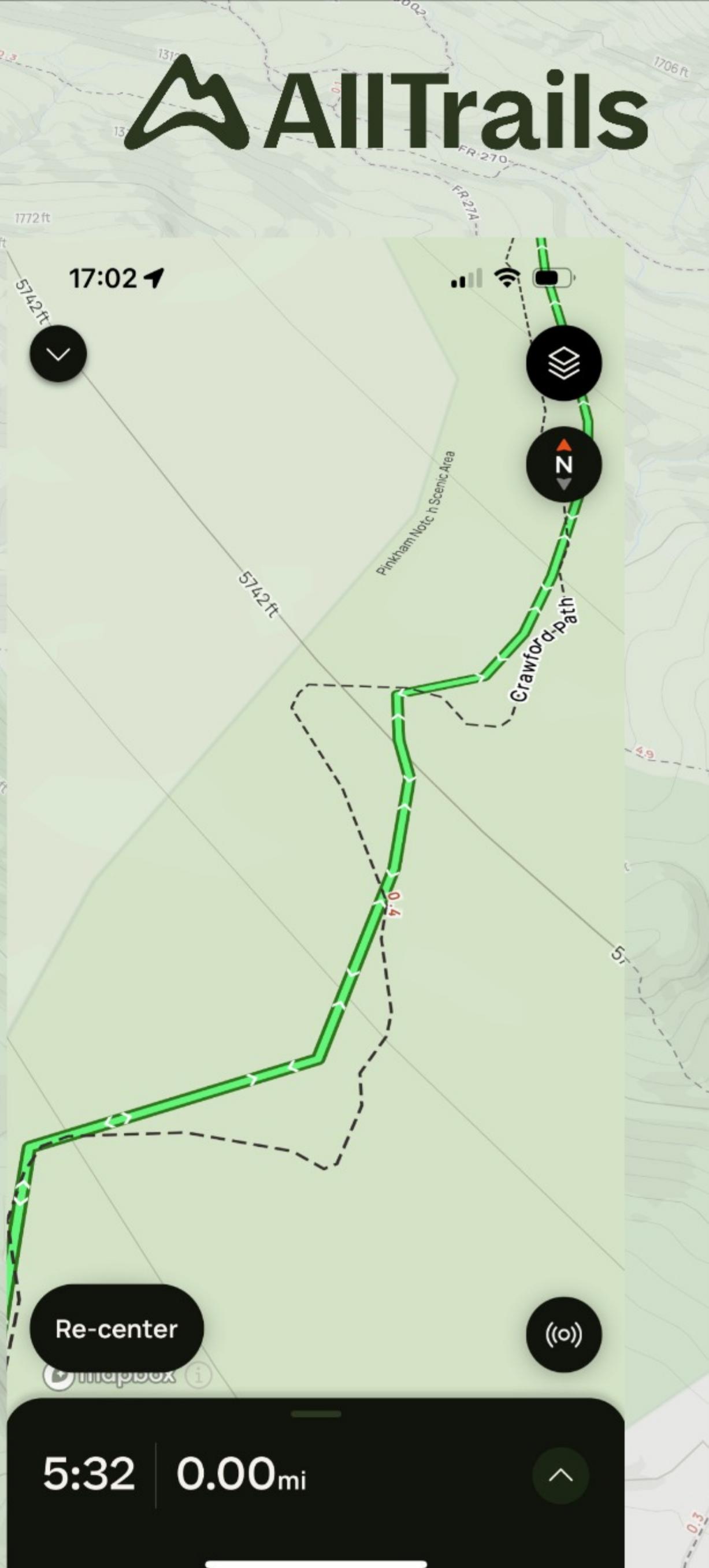
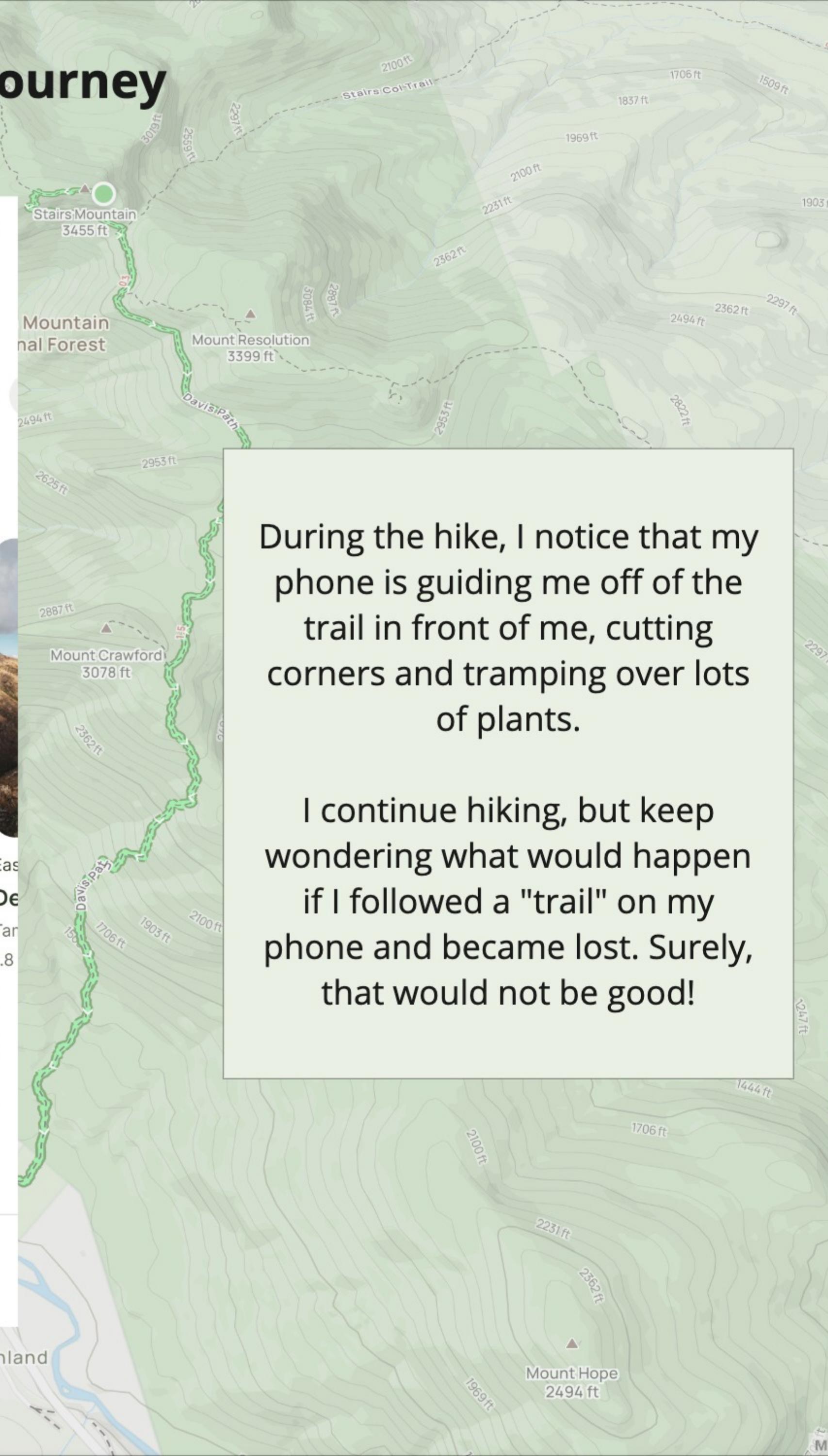
A screenshot of the AllTrails mobile application showing the user is a verified contributor. The top status bar shows the time as 17:15. The main header displays the user's profile picture, name (Patrick Scanlan), location (Moultonborough, NH), and title (Verified Contributor). Below the header are sections for Followers and Following. A large callout box states: "You are a verified AllTrails Contributor. Meet yearly contribution goals to be rewarded with a free AllTrails Pro subscription!" The central part of the screen shows the user's 2024 stats: 3/5 Contributions, 12/20 Activities, and 8/10 Verifications. At the bottom, there are tabs for Feed, Photos, Reviews, and Activities, with Feed selected. The navigation bar at the very bottom includes icons for Explore, Community, Navigate, Saved, and Profile.

# Appendix | Full prototype with narrated user journey



On my day off from work, I choose to go on a local hike nearby - the Snake, Vista and Creekside Loop.

The screenshot shows the AllTrails app interface. At the top, there's a search bar with 'Find cities' and filter buttons for 'Sort', 'Distance away', and 'Activity'. Below this, a section titled 'Top trails nearby' displays a thumbnail image of a lush forest trail with a waterfall in the background. A green hand icon with a circular path around it is overlaid on the image, indicating a potential deviation from the trail. The trail is described as 'Easy · ★ 4.1 (190) Snake, Vista and Creekside Trail Loop' by 'Donna Meagle'. Below the description is a button to 'Help make these trails better' with a 'Contribute to trail accuracy' link. At the bottom of the screen are navigation icons for 'Explore', 'Community', 'Navigate' (which is highlighted in blue), 'Saved', and 'Profile'.

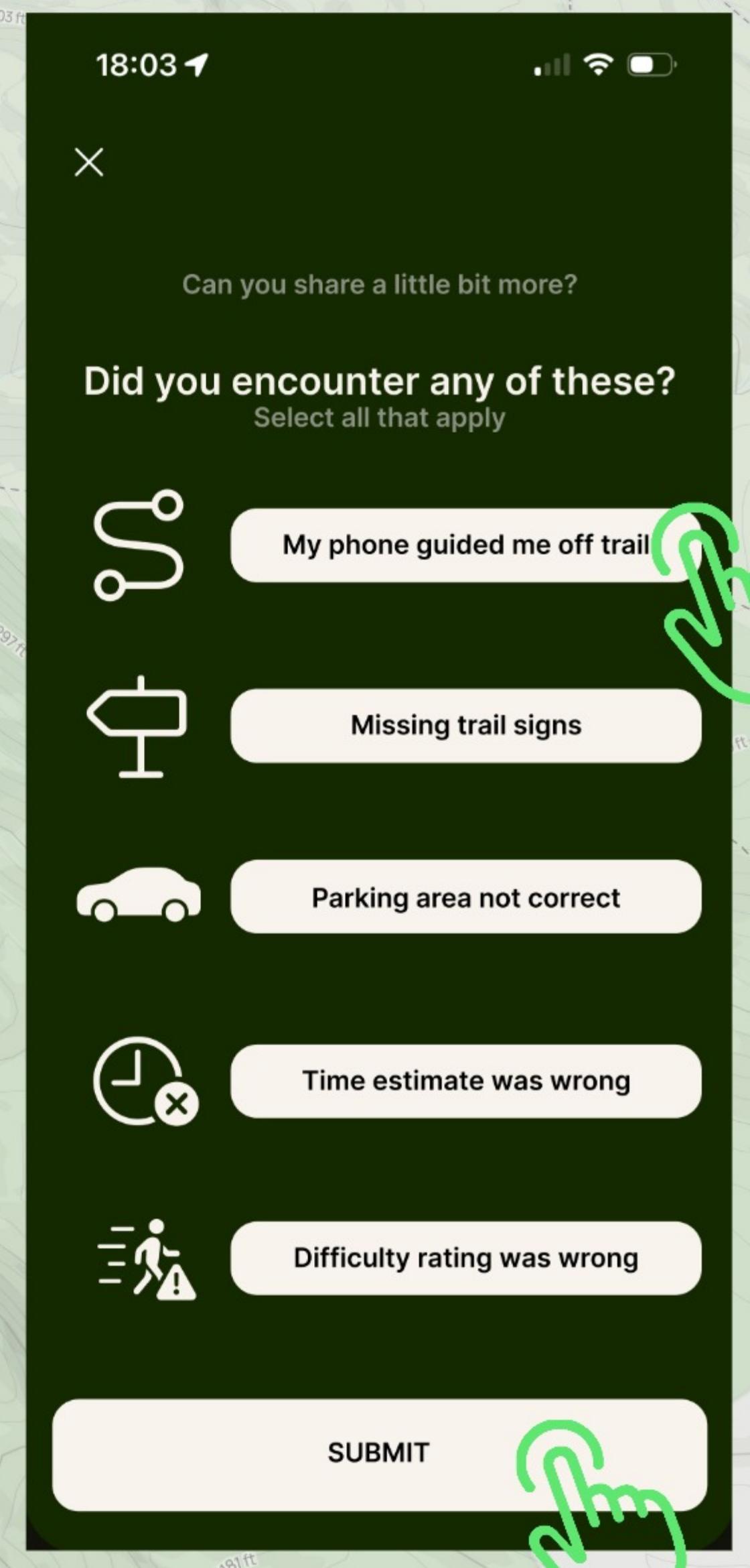
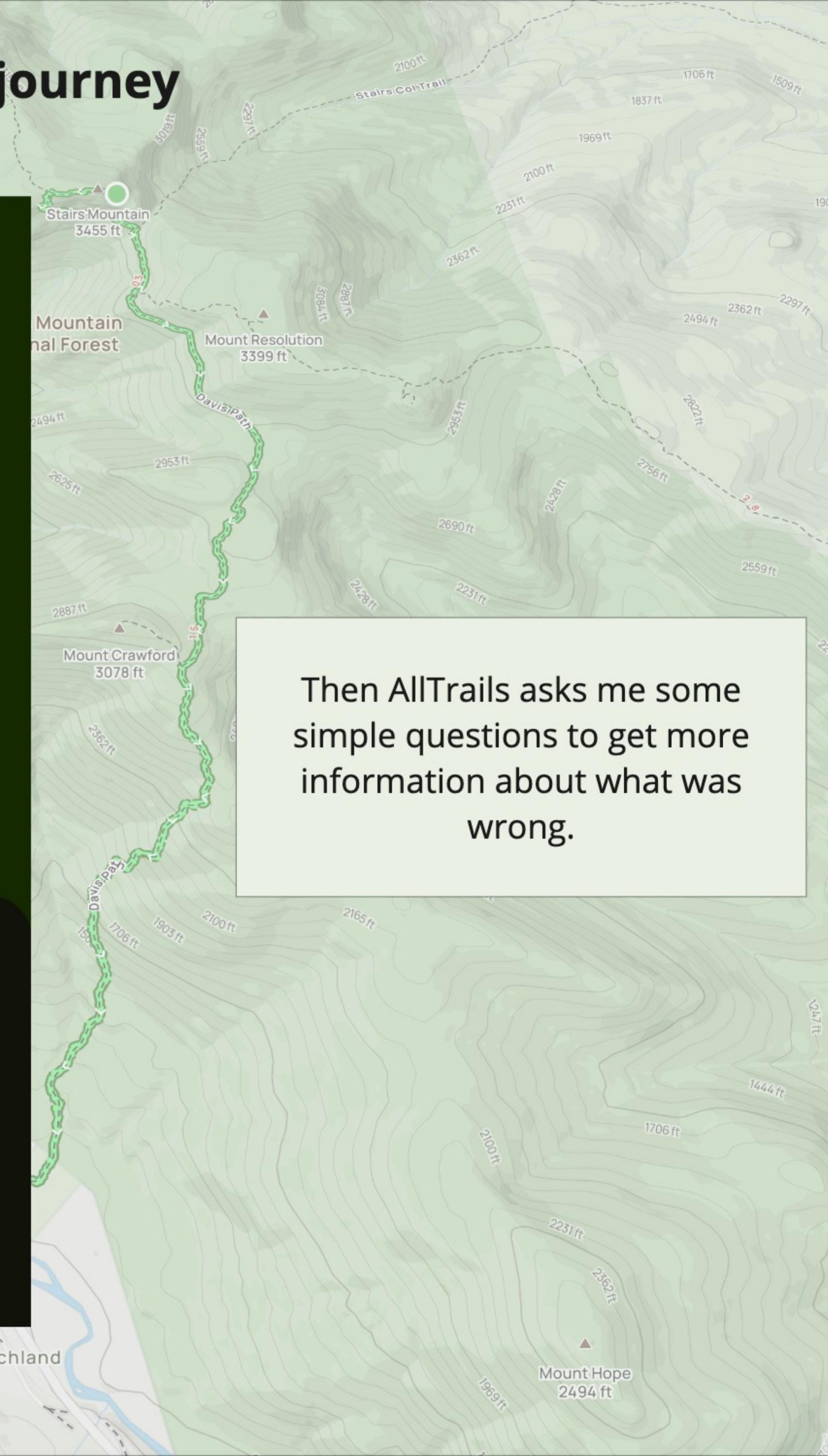
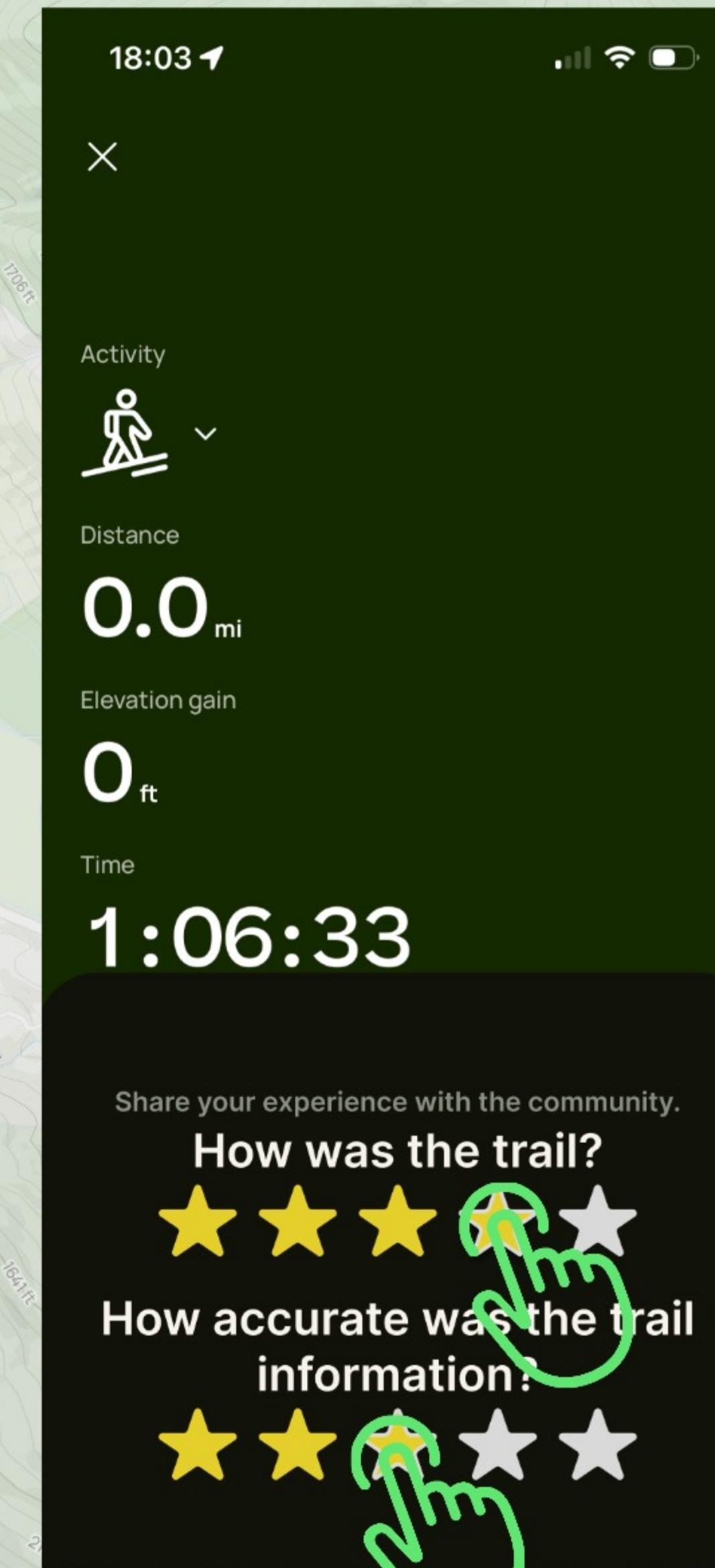


# Appendix | Full prototype with narrated user journey



At the end of my hike I have the chance to rate my experience and the accuracy of the AllTrails route.

Remembering what happened earlier, I rate this hike 3 stars for accuracy.



# Appendix | Full prototype with narrated user journey

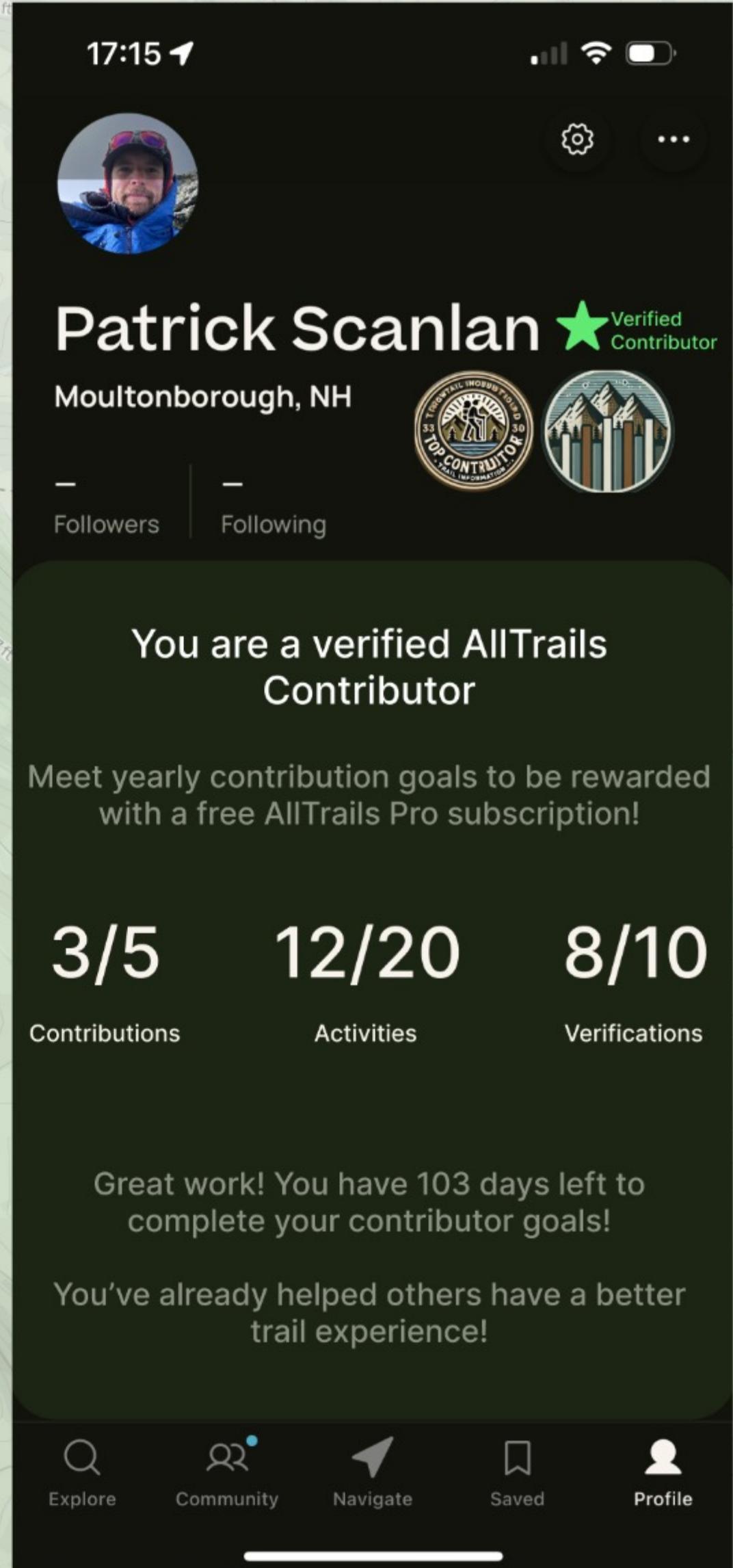


I answer the questions and then notice that the built in AI engine recognizes exactly where the route was incorrect.

I confirm that I encountered this problem and AllTrails uses this data to refine the routes in the future for other hikers.



Since I made a contribution, I am one step closer to my yearly goal. My contributions are updated once the same problem has been verified by other AllTrails users.



# Appendix | Full prototype with narrated user journey



The following weekend, I decide to go on another hike while also working towards my verifications goal.

I select the menu of trails that need better or verified information.

9:41

Find cities

Sort ▾ Distance away ▾ Activity ▾

### Top trails nearby

 Easy • ★ 4.1 (190)  
Snake, Vista and Creekside Trail Loop  
Donna Meagle  
1.3 mi • Est. 26m

 Help make these trails better  
Contribute to trail accuracy

 Map



### Best views nearby

Explore Community Navigate Saved Profile

The valleys and deep hills hike looks great and I can easily verify some information quickly when I park, even if I decide to not do the entire hike.

Stairs Mountain 3455 ft, Mount Resolution 3399 ft, Mount Crawford 3078 ft, Davis Path, Notchland, Mount Hope 2494 ft.

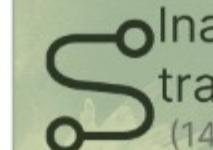
9:41

Find cities

Sort ▾ Distance away ▾ Activity ▾

### Trails that need your help

 Accuracy ★ 2.4 (172)  
Valleys, deep hills and low valleys  
Ulee Danssen  
1.5 mi • Est. 32m

 Inaccurate trail (145)

 Inaccurate parking (114)

 Map

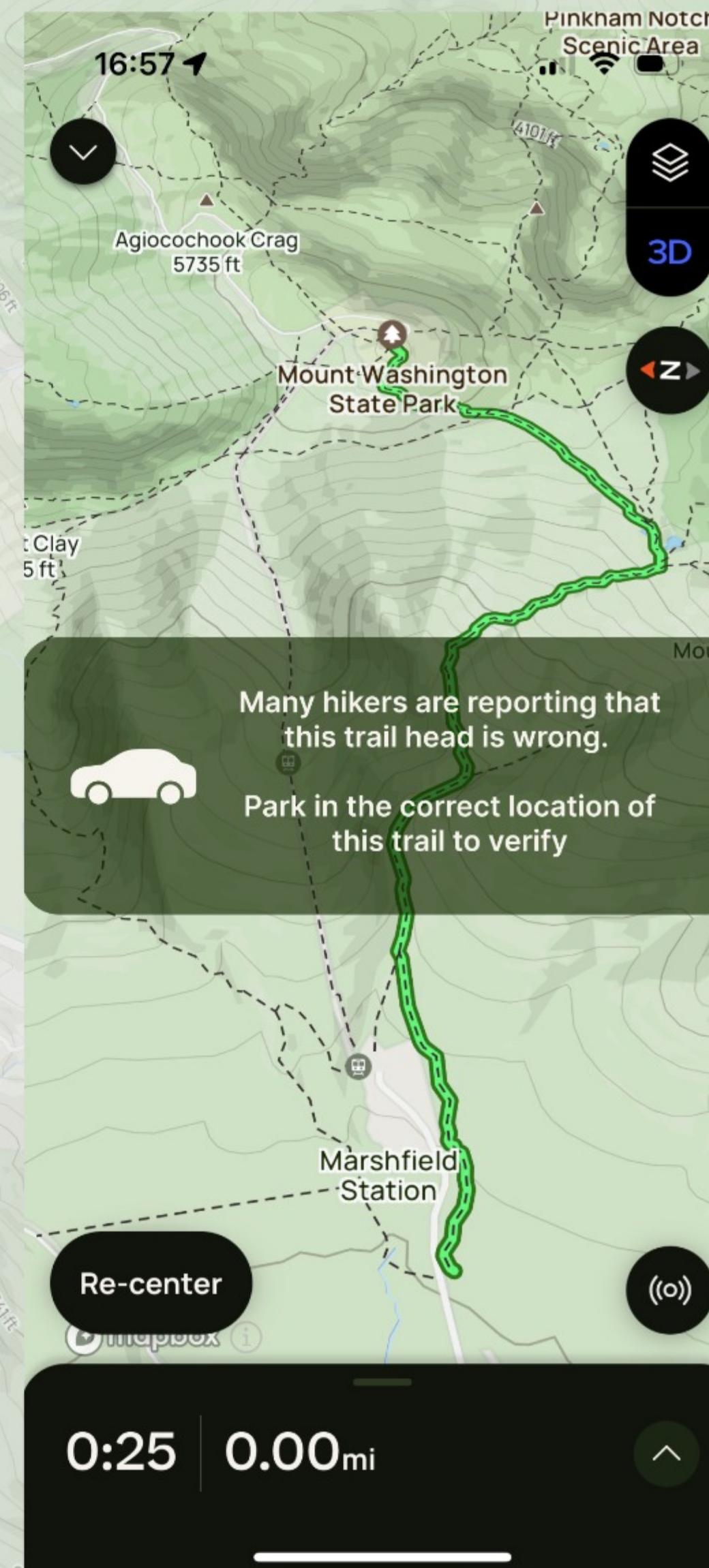


Explore Community Navigate Saved Profile

# Appendix | Full prototype with narrated user journey



When I arrive at the correct parking, AllTrails prompts me to confirm that the parking location is accurate.



Like contributor data, this verification data is added to the app and is reflected in my Contributor profile as another step completed towards my goal.

