

A COMPREHENSIVE MOBILE APPLICATION TO ASSIST THE BEGINNER SNOWBOARDER IN DISCOVERING RESOURCES, AID, EQUIPMENT, AND COMMUNITY SUPPORT

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ABSTRACT

The problem aimed to solve in this project is a lack of easy to find information and resources in the snowboarding community. Generally, it is common to find information that includes a lack of snowboarding information, resources, how-to-videos, gear item listings and deals, and available resorts when looking for information as a new snowboarder. To solve this problem, we want to make an easy to use mobile app that has informational resources and posts about snowboarding topics as well as listings for great gear items and resorts, including those with current deals or sales. One of the most prominent challenges we faced while developing this app was connecting our FireBase database with the FlutterFlow application, as our app needed a database to store the gear and resort documents. To connect the FireBase database, we needed to set the corresponding variable in the Firestore within FlutterFlow. In addition, many icons or containers need to have an action that is linked to the firebase and I need to call it in the backend query. To ensure that our FireBase database worked accurately with our FlutterFlow app through the Firestore, we performed tests to ensure that each field in each item in the database was accurate and responded correctly with filters. The result from these tests, we found, was that our filters and fields worked flawlessly, enabling a well-working database set up with our app. Our app is a great solution to the problem we stated because it encompasses a great array of snowboarding related topics and resources, providing an all around informative experience for the user.

KEYWORDS

Snowboarding, Mobile APP, Firebase, FlutterFlow

1. INTRODUCTION

Many novices encounter many difficulties when they first come into contact with snowboarding and they sometimes cannot find good solutions. Those mistakes can be shown on accident that cause injuries, without a professional instructor or the gears purchased may be the wrong size, etc. This results in many people leaving a bad impression when they first come into contact with snowboarding. "Day-ticket holders were the most injured of all customer-types, with most injuries occurring as the result of falls on marked, green/easiest terrain [1]." Giving the beginner some correct guidance will definitely avoid these accidents.

People will face many problems if they shop in a physical shop, for example, there will be limited selection: physical stores may have a limited selection of snowboard gear compared to what is available online and shoppers may miss out on a broader range of brands, models, and styles. Higher prices can be another major issue: online retailers often offer competitive pricing and discounts that may not be available in brick-and-mortar stores. Without the option to shop online, customers might pay more for their snowboard gear. To illustrate further, Limited Availability is the most common problem in the physical stores, it may run out of stock on popular items during peak snowboarding seasons, while online retailers often have larger inventories. Finally, online resources for snowboarding tutorials, resources, and gear deals are convenient and can help individuals stay safe, find entertainment, and save money. Overall, an online framework for snowboarding resources benefits both buyers and sellers. However, in my personal experience starting out as a new snowboarder, online shopping can be generally overwhelming, as there are a lot of options and not much information readily available about all of them. This problem can be fixed with a convenient mobile app, as more people can easily access information about skiing, leading to increased safety awareness and saving time when purchasing equipment.

Operating a comprehensive snowboard app presents a host of advantages for both business proprietors and customers alike. Firstly, it offers a broad reach, transcending geographical limitations by connecting with a global audience. This means that you can market and sell snowboarding gear not only to local enthusiasts but also to individuals residing in regions where physical stores are scarce.

Secondly, the convenience factor cannot be overstated. Customers can seamlessly browse and shop for snowboard gear from the comfort of their homes or while on the move. The need for arduous trips to physical stores is eliminated, a particularly invaluable benefit for those living at a considerable distance from the nearest ski resort or snowboarding shop. Additionally, the readiness of information to build actual snowboarding skill is much more convenient to the new snowboarder. This allows the new snowboarder to have an easier time learning new things about snowboarding, including essential information like how to stay safe while snowboarding.

Moreover, the digital landscape allows for an extensive product variety. You can effortlessly offer a diverse range of snowboarding equipment, including boards, boots, bindings, clothing, accessories, and safety gear, without being constrained by physical space limitations.

Furthermore, the advantages extend to the availability of the online shop, which operates 24/7. This constant accessibility ensures that customers can make purchases at their own convenience, regardless of their time zone, potentially leading to increased sales.

In addition, the utilization of online marketing tools enables precise targeting of specific customer demographics and interests. This results in more effective outreach efforts, ensuring that your ideal audience is reached.

The scalability of such a platform is also a noteworthy benefit. As the snowboarding business grows, expanding online shops to accommodate a broader range of products and an expanding customer base is a relatively straightforward endeavor. good ski resorts are very popular, a unified data collection can be achieved on this app Secondly, this app brings a lot of convenience. It can introduce the functions of different snowboards and then filter what users need. This can help users find their favorite gears more easily, which undoubtedly saves a lot of time.

Additionally, the digital realm facilitates easier competition analysis. Monitoring and analyzing the pricing and offerings of competitors can be done with agility, allowing for swift adjustments to remain competitive.

Furthermore, online businesses offer a level of flexibility that traditional brick-and-mortar stores struggle to match. They can be operated from various locations, affording business owners greater freedom.

Lastly, integration with social media platforms enhances direct engagement with potential customers, further bolstering the reach and impact of your snowboard app.

2. CHALLENGES

In order to build the project, a few challenges have been identified as follows.

2.1. How to unify and manage gears data

When I started planning this app, I thought there would be many challenges, but what worried me most was how to unify and manage gears data. I know that product Variations is really hard to organize. Snowboard gear often comes in different sizes, colors, and specifications. Managing these variations and presenting them clearly to users can be challenging. Secondly, if I want to have a good comparison, I need to include prices from different websites and input a lot of data to give the best choice. Snowboard gear apps may have extensive catalogs with numerous products, each with multiple attributes. Managing a large volume of data can be challenging, especially if you have a wide range of gear options. This worries me and I don't know if this can be achieved. Lastly, Real-Time Updates are my worries too. Users expect real-time information, especially for product availability and pricing. Ensuring that data updates occur promptly can be demanding. To solve this problem of managing this amount of data, it would be a good idea to use a stable and easy to use database framework.

2.2. Ensuring data security

One key component in this application is the creation and management of user accounts, which entails addressing challenges such as ensuring data security as well as balancing user privacy and functionality. Ensuring user data is secure and protected from breaches or unauthorized access is paramount. Implementing robust authentication and encryption mechanisms is challenging but necessary. Luckily these resources are so critical that they have become common and I was able to use a Fire Base database, which is secure and easy to use. Additionally, optimizing user experience while maintaining security and functionality was a task in it of itself. This is because both of these tasks are time consuming by themselves and can actually affect each other sometimes. Based on the above issues, I could potentially continue to work on the user experience and try to understand the user needs, behaviors, and preferences through data collection. This could allow me to customize content and recommendations and upgrade the user interface to make the experience of using the app even better. I would spend more time on the user experience because the security of this app is already very good because it is a Google Fire Base database.

2.3. Deciding good videos

Because this is a comprehensive App, I think it is very important to include learning content. My hope is that everyone can see high-quality, practical, complete and screened teaching videos on it. The problem for me was how I could get good videos for users to be able to see on the app. This was a big challenge for me, because deciding what videos were considered good to share is difficult. We also needed to be able to maintain a high standard of quality for text, images, videos, and any interactive elements. Also, clarity and structure is very important too to ensure the

organization of the content logically with a clear structure, including headings, subheadings, and bullet points. Lastly, A User-Friendly Navigation can make users easily navigate through the learning content with a user-friendly interface. In the future, given more development time, we would like to develop a way to implement a content quality to ensure that the learning content is accurate, up-to-date, and relevant to the target audience. We would like to do this through a ranking system, using likes and dislikes. An easy way our app can sort through videos in our database would be a simple search action at the top of our how-to video page in our app.

3. SOLUTION

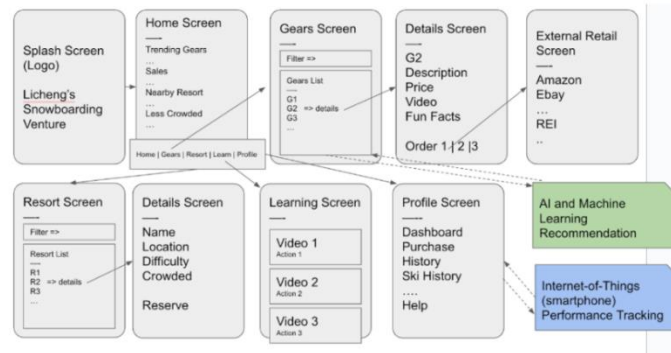


Figure 1. Overview of the solution

The primary structure of our snowboard gear app is designed to offer users a comprehensive and seamless experience when it comes to exploring, purchasing, and managing snowboarding equipment and related information. It encompasses several key components and features. Users begin by creating accounts, providing essential information such as usernames, emails, and passwords. The app boasts a well-organized display of snowboarding gear, spanning boards, boots, bindings, clothing, accessories, and safety equipment, all categorized for easy navigation. Each product is accompanied by detailed pages, offering comprehensive information, including specifications, discount or not, and pricing of specific brands on the Gears Page. To simplify the search process, the ability to filter and sort using options are in place, enabling users to refine their choices. Furthermore, users can access a wealth of knowledge through snowboarding guides on the Learning screen, which include videos. To stay updated with industry trends and events, the app provides blogs and a news section on the Resource Page. New users start by being welcomed by the login screen where they can login or sign up. Upon logging in they are then greeted by the Home screen, in which there are buttons and links that allow them to access all of the other pages directly.

The three major components that are implemented in our application are Flutter, Flutter flow, and Firebase. The Flutter runtime is the backend to the application, and with it is the Flutter flow UI designing utility. Using Flutter flow alongside Flutter allowed me to easily create user-friendly screens and widgets. Additionally, the Fire Base database allowed me to store the gear links and be able to access them from my application.

When creating a snowboard gear app, data input is a crucial aspect that can present several challenges. These challenges primarily revolve around gathering, organizing, and managing the data related to snowboard gear effectively. Managing a large volume of data can be challenging, especially if you have a wide range of gear options. To fulfill this need, we used the Fire Base database to provide a simple and secure solution. The Fire Base database in our program allows the app to store and access links to snowboarding gear.

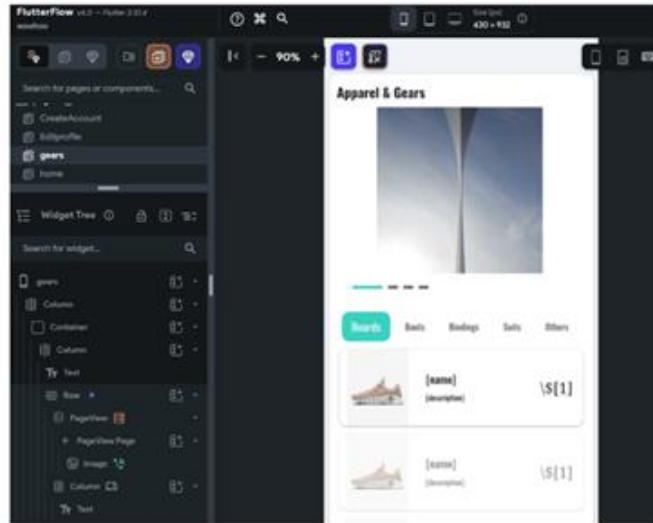


Figure 2. Screenshot of the Flutter Flow 1

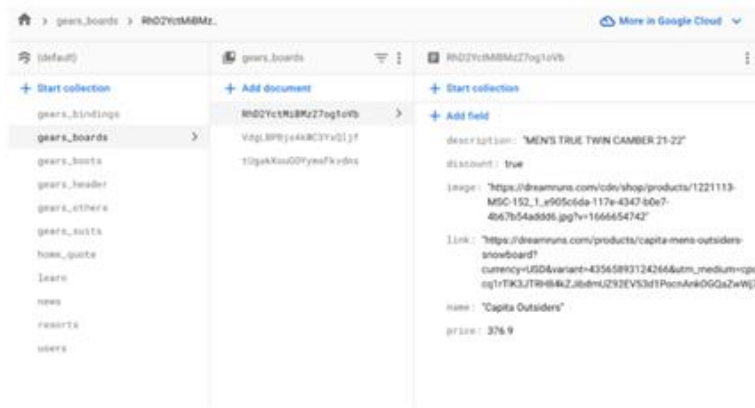


Figure 3. Screenshot of code 1

The picture above depicts the interface the Fire Base database has for easily viewing and maintaining the contents of the database. The user interface for the Fire Base database is easy to use and allows for a lot of control while maintaining simplicity. In Firebase, a "collection" typically refers to a collection of documents in Cloud Fire store, which is one of the database services provided by Firebase. The collection is the information that is input into the backend query in Flutter flow ,which is the way that we can easily get the information from the database. In the collection there are several documents, each document refers to single item information, for example each board has their own document and their own ID. In each document, there are fields that can add the detailed information about the single documents. In our database there are multiple collections for each category of gear, and in each collection there are documents for each individual piece of gear. Inside the fields of each document of a gear, there is data about the gear like name, shop link, image, and price. In order to set up a collection in Flutterflow, there is a section in the UI that is called "Firestore." Inside of that section there is an option which needs to input collecting input field that takes a collection from a database, in which we put our collection we set a would like Flutterflow to draw from.

Another key component to the app is the navigation bar located on the bottom of the screen. The navigation bar allows for the user to move through all of the different screens in the app in an easy way. Users can easily access different sections or features of the app by clicking on the appropriate menu items or icons. To implement the ease of use navigation bar, I simply used the built in function that FlutterFlow has in it's UI.

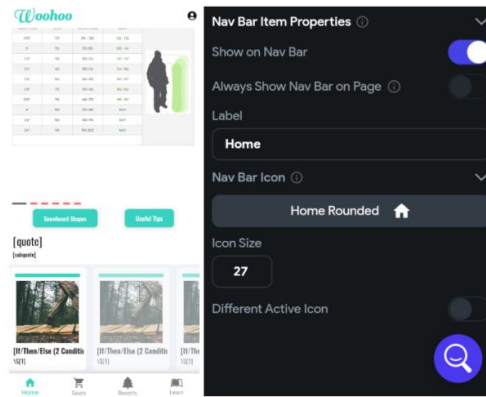


Figure 4. Screenshot of home page

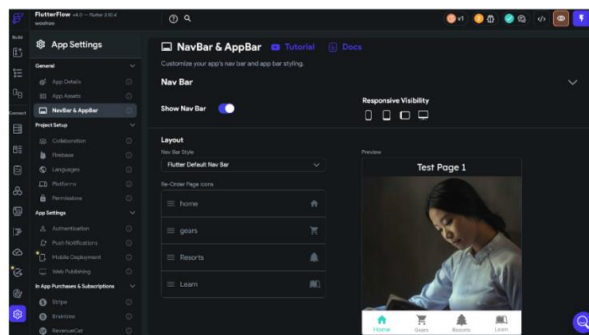


Figure 5. Screenshot of Flutter Flow 2

As seen in the first picture, the navigation bar sits at the bottom of the screen and allows the user to move through the different screens of the app. In order for the user to get to the desired screen, they must tap on the icon of the screen they are trying to get too. To create the navigation bar in my app, I turned on the nav bar setting in the Flutter flow settings, which enabled the navigation bar and the nav bar item properties tab to appear in the app. In order to set an appropriate icon and the page the item will move the user to in the app, the nav bar item properties tab contains all of the settings required. Lastly, customization for the navbar can make the user match the app's theme, and the nav bar item properties tab has been configured to set the layout, color scheme and style that best matches the of the app.

In the app, the learning page contains a column of Youtube Player widgets that showcase youtube videos that are educational about snowboarding or are just snowboarding related. To implement the youtube video resources page, we used the Youtube Player widget that Flutter flow has available. The Youtube Player widget also enables Flutter Flow to show the video on the app and generally makes accessing videos easier. The YouTube Player widget is also particularly easy to configure with a database such as Firebase.

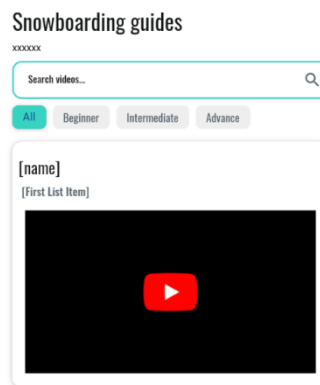


Figure 6. Screenshot of video

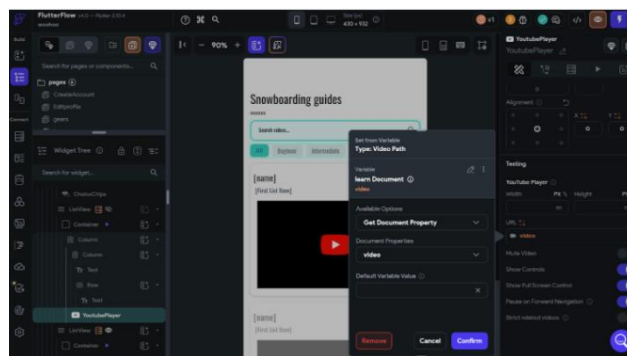


Figure 7. Screenshot of FlutterFlow 3

The YoutubePlayer widget in the app is a user interface element that embeds and displays video content within the app's interface. The YoutubePlayer widget is commonly used to enhance user engagement, provide information, and deliver multimedia content seamlessly. The YoutubePlayer widget also allows the user to find the youtube link easier than the video widget, making it easier to find more resources for the user. In the app, the YoutubePlayer widget is configured in the YoutubePlayer settings tab to grab youtube video links from the FireBase database and display them on the resource screen. The YoutubePlayer widget was configured to grab links from the database in the YoutubePlayer widget settings as seen in the image above. The end result after implementing the YoutubePlayer widget, is the user is able to scroll through and play youtube videos on the learning page of the app.

4. EXPERIMENT

4.1. Experiment 1

A good spot to test in my app is the filtering system. The filters on the resorts page can give the user faster results to find resorts that are in different states. The challenging part is to make sure that all of the data is filtered correctly, because the input of the list of the resorts can be a big number.

In the experiment, we will iterate through every combination of filters and check to see that every resort that appears matches the filters. The reason the experiment is designed this way is because it is the simplest and easiest way to check to see if the filter system works in the app. This will be

the easiest solution because simply turning on the filter and making sure each resort matches does not require any backend work or data checking.

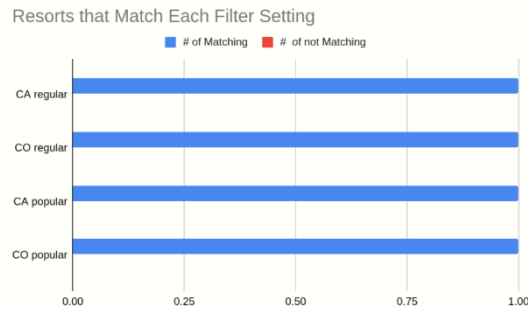


Figure 8. Figure of experiment 1

The first thing we noticed in our data, is that there were no results in which there were any filters that produced a number of not Matching. While this outcome isn't necessarily surprising, it is good to know that the filtering system works accurately with the filters already in place. As for a median and mode, because there was no number of not matching found in our data, they are both simply 1.00 or 100%. The reason we think this was the outcome is because we set the string type in the FlutterFlow Firestore to match the related fields in FireBase perfectly, so the filters work without mistake. Ensuring that the fields match between FlutterFlow and FireBase is what determines the outcome of these results, so ensuring that they match is critical to the app. A good filter in an app is a fundamental element that can greatly impact the user experience, efficiency, and overall success of the application. It empowers users, supports content discovery, and allows for a more customized and efficient interaction, ultimately contributing to user satisfaction and the app's effectiveness.

Another important aspect of the app is the gear section, specifically, how each gear item is stored in the FireBase database with a lot of different fields. It is important that each gear item has all of its fields set correctly because otherwise they may not display correct information about the item. The plan for this experiment is to test that every field in the database is set properly in each item in the list. To test this, we will use test mode to test whether my app finds each field in each item successfully. The reason the experiment is set up like this is because it is convenient in test mode to see the fields in an item and whether they are accessed from the database or not. The list of fields we will be checking include the price, external links, brand and discount status. In our data collection, we will mark down which items have no problems with their fields and which do.

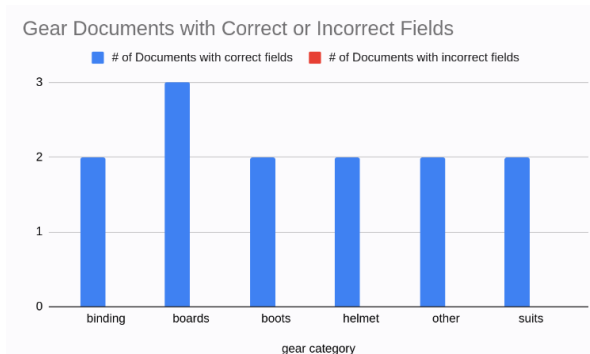


Figure 9. Figure of experiment 2

After performing our experiment, we were able to see that all of our fields were inputted correctly, and would work as expected in our app. This is good to know because if a field of an item was inputted incorrectly the item would not show up with the information provided in the field. Fortunately, our highest value in each bar is the “# of Documents with correct fields,” because we had no Documents with incorrect fields. The reason our items showed up so accurately in our app according to the data within their fields, is because we had no errors inside of our firebase database. With this knowledge of how accurately our field data was set up, we now know we can implement new fields in our product page to give the user more information about the item. Additionally, we also now know that we can effectively add more items to our database without worry of them not being sorted accurately.

5. RELATED WORK

SNOWBOARDER Magazine has a website that contains a bunch of useful articles, gear postings, event information, and how-to videos all made available on the site. The magazine provides a valuable source of information and education on snowboarding topics that is readily available to anyone who visits the site. However, nowadays many people focus more on their phones instead of visiting a website looking for information or resources, as a result, a magazine website may not be as effective as a mobile app. What our solution is better is as a mobile app, the app is now easier and universal.

The Ultimate Snowboarding Guide is a website that provides a great amount of information, tutorials, and blog posts for those interested in snowboarding. However, while the website does have a lot of useful information, it is all closed and doesn't provide any outside sources or information like our app does. Also, the app does provide a lot of useful information for how to choose the correct gear or resort, however, it doesn't provide actual resources or links to good gear items or resorts like our app does. Additionally, websites are not widely accessed nearly as much as mobile apps and therefore do not have a higher usage rate than mobile app websites. Also, apps can provide a more consistent and immersive user experience. Mobile apps have access to device features like GPS, camera, and push notifications, offering a tailored and feature-rich experience.

The Backcountry app is an outdoors gear shop in the form of a mobile application that includes a selection of snowboarding gear, clothing, and equipment. While the Backcountry app does display to its users its own brand gear items, it does not make available other listings that could be better from other sources or shops like our app does. Additionally, the Backcountry app does not provide the level of information that our app does, leaving some users with potential confusion about gear items or how to use them. Our app, unlike the Backcountry app, offers a wider selection of gear from various websites and apps, allowing users to make informed comparisons and enabling them to find the best deals. Furthermore, our app provides comprehensive information, reducing any potential confusion about gear items and their usage. SNOWBOARDER Magazine has a website that contains a bunch of useful articles, gear postings, event information, and how-to videos all made available on the site. The magazine provides a valuable source of information and education on snowboarding topics that is readily available to anyone who visits the site. However, nowadays many people focus more on their phones instead of visiting a website looking for information or resources, as a result, a magazine website may not be as effective as a mobile app. What our solution is better is as a mobile app, the app is now easier and universal.

6. CONCLUSIONS

While we are happy with our app and how it works, it is mostly just a framework at the moment and, if put into production, would need to have some improvements made. The first limitation that would be improved upon given more time would be the amount of gear in the Fire Base database. Currently, our Fire Base database only has a few items in it. Expanding the Fire Base database with more gear items is essential to provide the user with the most diverse selection of gear items. Moreover, a more comprehensive database caters to a wider range of user needs, ensuring that a user can find the information that they need about a wide array of topics. One thing that definitely needs fixing if we had more time is the need for a liking system for the items in the database. This liking system would be implemented in the Fire Base database with two fields, "like count" and "dislike count," and would save the popularity of each item.

Because our app is still in development, we do have many parts that can be improved upon. However, our app has still been prepared for the users in each individual function, and still solves the problem that we sought out to fix. Even though our app is still in a developing stage, it still meets the requirements of providing a wide array of snowboarding information, gear and resort listings, and educational material.

In each of the experiments performed, we were testing to see if there were any discrepancies in our database fields that could cause an item not to appear and if the filters that are set up in Flutter Flow were able to accurately sort them. For each experiment, we used the Flutter Flow test mode and essentially looked through every gear item and filter available to see if they were accurate for both tests. For each experiment, to record the number of matching and not matching, we went through every field and filter combination and recorded the amount of matching and not matching. After testing, we noticed that we had zero instances of not matching across both tests, which shows that we had accurate input on each field and were able to accurately sort them with each filter. The reason that our results came out this way is actually because Flutter Flow and the Fire Base database are handling the filters and fields together for us, leaving not much room for error.

In each of the solution's methodologies that we took a look at, each tried to solve the problem of making either snowboarding information or gear available to a user who is looking for it. In today's digital landscape, the effectiveness of a magazine website, such as SNOWBOARDER Magazine, may be limited as people increasingly turn to mobile apps for information. Similarly, although The Ultimate Snowboarding Guide offers valuable information, its closed ecosystem lacks the diverse range of external sources and data access that our app provides. Additionally, the Backcountry app primarily showcases its in-house gear items, missing the comprehensive range of listings from various sources and shops that our app offers. As opposed to the first two of the works listed previously, our app attempts to put all of these together in the form of a mobile application that has plenty of snowboarding information, outside resources, and gear items made available to the user. Our app aims to be a one stop shop for everything snowboarding related.

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