



CPSC 481 - FALL 2020

AR CLIMBING APP STAGE 4

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Reviewers: Daniel Doran, Richard Williams

Portfolio: <https://cpsc-481---project-portfolio.web.app/>

Repo: https://github.com/lysterjason/CPSC-481-Term-Project/tree/stage_four

DESCRIPTION AND TASKS



Since the inception of our application, the main idea has not wavered much. As of Stage Four, our application is still an augmented reality (AR) mobile application that solves the problem of rock climbers not being able to find routes that they wish to climb. The user would point their device at a wall, and specific climbing routes would then be outlined on the phone via AR. If the user would like to add a new location, they can do so by drawing the route out in the AR mode while pointing their device at the wall. When there are many different routes at the user's location, the routes can be filtered by grade, name, and rating. Once the user climbs the route that they found through the application, they can both ratings and tips.

In this stage, we turned our low fidelity prototypes from the previous stage into high fidelity prototypes. We prototyped the following tasks:

Vertically Prototyped High Fidelity Tasks

1. Adding a new route in AR mode
2. Viewing route reviews and adding your own route review
3. Viewing information about a route such as location, rating, difficulty, route information, and route tips
4. Viewing other user's profiles to see their name, profile picture, location, and favorite climbs.

Horizontally Prototyped High Fidelity Tasks

1. Viewing routes at a location in AR mode
2. Viewing a map at a location of your choice and seeing the climbs that are in that area, along with a brief preview of climbs you click on.
3. Being able to log in or register to the application

Where we are
TODAY

For our heuristic evaluation, we split our group of five into two separate groups. We first had three evaluators (Josh, Rulan, and Jason) who conducted the heuristic evaluation on the high fidelity prototypes (Appendix A, B, C). Once these were done, we had two reviewers (Daniel and Richard). They reviewed the heuristic evaluations and classified the problems that the evaluators discovered, ranking them by severity (Appendix D, E). After this process was complete, we came together as a group and identified some changes that must be made in the next iteration of our high fidelity prototypes.

Findings from the Evaluation Process

After the three evaluators had filled out their heuristic evaluation table, it was clear to see that there were gaps in the initial high fidelity prototypes that were breaking some principles that the heuristic evaluation looks at. The first of these rules that was unanimously broken between the groups was "Help and Documentation". All three evaluators separately agreed that some elements of the AR mode were confusing, especially for a new user. Adding a new route was also a touch point that broke this same principle, as it was noted in multiple evaluations that there was no guidance on how to actually create the route. This was not the only heuristic rule that the AR mode was violating however. There was strong sentiments echoed in the "Match between system and the real world" rules as well. Some comments included some users may not even fully understand what the AR mode is, or what the AR route lines even mean. The next part of the evaluation that was commented on by each

person filling out the table was that, forms within the application do not have proper validation on them. This violates the rule of "Error Prevention", as well as "Help users recognize, diagnose, and recover from errors".

Findings from the Review Process

After all three evaluations were done, our two reviewers both ranked the severity the issues that were identified. We saw very common themes between both reviews that were done, even though they were done independently. First, we saw that both reviewers classified "Match between system and the real world" and "Help and documentation" as the most severe rule violations. They also ranked the second most high severity as "Help users recognize, diagnose, and recover from errors" with regards to the lack of client side validation on the fields within the application.

Iterating based on the Heuristic Evaluation

After seeing the rule violations and identification of which were more severe, we made the following changes to our application:

1. Added tutorial on how to use the AR mode in order to solve the confusion issues with AR, and added tooltip to add routes screen with instructions
2. Greyed out submit buttons on invalid forms to help with error prevention, as well as more descriptive popups in attempt to submit invalid form
3. Gave shadow drop to AR routes to make them more identifiable and clear more confusion from the screen

Our Heuristic EVALUATION

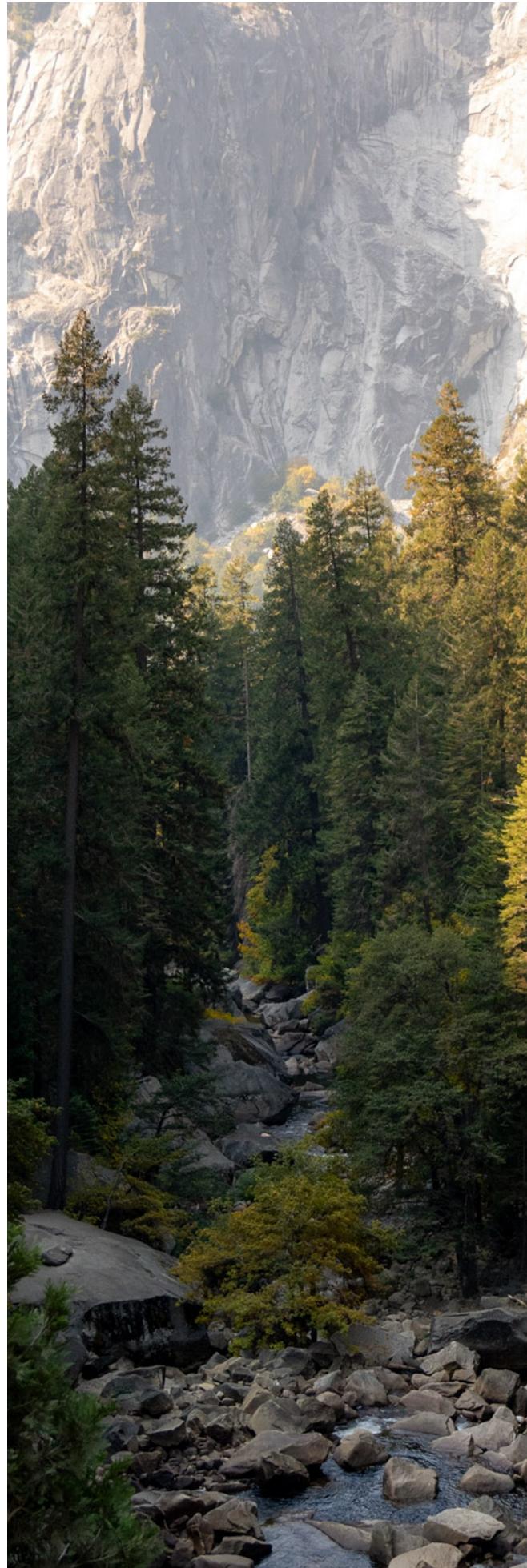
REFLECTION

Overall, the heuristic evaluation process went very well for us. It allowed us to identify issues individually, get other members to verify those issues and prioritize them, and then from there we made our high fidelity prototypes better.

What worked well for us was that we were able to identify common issues within the application that we did not previously talk about. It was interesting to see all of the evaluations come to a lot of the same conclusions. This verified that some problems were actual problems that not just one user would experience, but a lot of users would run into if we did not fix them. Another part that went well was the review process, as both reviewers also were able to see that some issues were imperative to fix. We also saw that some parts of the review were different, which is a good perspective still because it shows that not all users are the same.

The heuristic evaluation was not perfect however. One part that we noticed was there was some limitations when it came to fixing what the evaluators wanted. For example, some processes were noted to be inefficient, such as double clicking to get out of a route. This was an issue that came up due to the prototyping application that we used. If we could have, we would have fixed this issue but unfortunately it was out of our reach. This was not the only occurrence of this problem so it did put a damper on our high fidelity iteration a little bit.

Overall, the heuristic evaluation process was a very beneficial one for our team. We ended up improving our prototype for the better and found issues that just one person alone would not have. If we were to do this process again we would look for evaluators and reviewers who were not part of the development of the application. Our group did wonder if our knowledge of the application, as its creators, may have made our results biased in some way. The only way to confirm this would be to do the process over again but with an independent group.



Appendix A: Josh's Heuristic Evaluation - Part 1

Rule of Thumb:	Is this rule being applied? How So?	Is this rule violated? How so?	How can this rule further improve usability, utility and desirability?
1. Visibility of system status	This rule is being applied when the user is doing such things as setting a favorite, in which if it is marked as a favorite, the heart would be filled in red instead of being outlined, the same applies to the rating a user gives when writing a review, with the number of stars being filled in indicating the rating they give.	This rule is not being violated, as the user gets an indicator and/or response from the application when doing certain actions, such as viewing favorites, applying filters, etc.	This rule helps further improve usability since it shows the user that the actions they do within the app are implemented in a quick and timely fashion.
2. Match between system and the real world	This is being applied in the application as many of the screens use terms that are known to the common user. (My Profile for their Profile, Using stars for indicating the rating they give when reviewing a certain route, Having a heart button to mark favorites)	This rule is slightly violated when it comes to AR Mode, as not every user will understand what AR (Augmented Reality) means and will be confused on what particular function it does.	By having AR Mode being renamed to something common users are familiar with in the real world, it would help improve the applications utility and desirability.
3. User control and freedom	The user will have a back button when viewing screens such as viewing other profiles, reviews, and route info screens. In addition, the user can quickly get to a certain function via the bottom taskbar.	There is no violation of this rule found in the application since the user can quickly get to other locations by means of the bottom taskbar, in addition, certain screens have a back button to quickly take them to the previous screen.	By giving the user control and freedom to reach certain actions as required, it gives the user lots of utility and desirability when using the app.
4. Consistency and standards	All icons used in the application for things like search, history, home, etc., use the same icons found in other apps to represent those said functions.	This rule is not violated, as there were no cases of any similar actions acting differently, and any different actions acting similar to another function.	With the icons and actions being consistent, it helps increase the usability of the app as users will be less likely to be confused with actions and icons being standard.

Appendix A: Josh's Heuristic Evaluation - Part 2

Rule of Thumb:	Is this rule being applied? How So?	Is this rule violated? How so?	How can this rule further improve usability, utility and desirability?
5. Error prevention	There are no instances in the app where this rule is being applied.	This rule is violated as there are no indicators on the text fields indicating which ones must be filled in.	By adding an indicator such as an asterisks to indicate required fields, it will prevent the user from making errors such as creating routes with no information. This would help improve the app's usability as it would eliminate things like new routes being flooded with little or no info in the app.
6. Recognition rather than recall	The favoriting and history system allows the user to quickly recognize which routes they have recently climbed/viewed.	This rule is not violated, due to the history and favoriting system allowing the user to quickly access routes they have climbed/viewed without searching it up.	With the user being able to quickly recognize which routes they have climbed/viewed, it greatly shows off the app's usability and desirability.
7. Flexibility and efficiency of use	The user can quickly get to certain functions via the bottom taskbar, in addition, the user can quickly access route info either by the route history screen, other profile's favorites, or the favorites they have marked down on their profile.	This rule isn't violated since the user can quickly get to other locations by means of the bottom taskbar, and in addition marking routes as favorites is efficient since only one tap is required to mark a favorite, always being located on the top right of the screen when viewing route info.	By having the system being flexible and efficient for users to use, it increases the app's utility, desirability and usability.
8. Aesthetic and minimalist design	This rule is applied by having a color palette that avoids anything super bright like red or yellow, and all info text is presented in a clean and legible font.	This rule is not violated since less desired info such as route tips is only found when you go to the screen describing the locations in detail, and does not impact the key info that is being presented within the menus,	By having our design to be aesthetically pleasing and trying to have a minimalist design, it increases our user's desirability to continue using the application that we have created.
9. Help users recognize, diagnose and recover from errors	There are no indicators/warnings to help the user recognize and recover from certain errors.	This is being violated in the Add Route Screen, as there is no error indicator/window to detect when there are missing required fields in the Add Route Screen.	By adding error indicators/pop-ups when an error is committed, we can help improve the usability of the app by reducing the chance of users making fatal errors within the app.
10. Help and documentation	This is being applied on how key labels/features (ex: Write A Review, Search) are self-descriptive of the	There is minimal explanation on how to use certain features, most notably when the application is in AR mode.	Adding some tips or short blurb on how to use features would help improve usability for the user.

Appendix B: Rulan's Heuristic Evaluation - Part 1

Rule of Thumb:	Is this rule being applied? How So?	Is this rule violated? How so?	How can this rule further improve usability, utility and desirability?
1. Visibility of system status	This rule is being applied as the system changes when the user interacts with it. For instance, the navigation bar will highlight which screen the user is currently on. The heart icon will also change color when clicked on to indicate that the user has favourited that route.	This rule is not being violated as the user gets feedback whenever the status of the system changes.	This rule ensures that a user will always know what the current status is, and if they should wait or continue. Otherwise, there would be no way for the user to know whether or not their action went through.
2. Match between system and the real world	This rule is being applied as we use familiar concepts and icons such as a magnifying glass for search, a clock icon for history, and a compass icon for explore.	This rule is being violated in the AR screen as not every user may understand how to use AR. This can be fixed in stage 5 by adding a tips icon to show the user how to use AR mode.	This rule ensures that the user has an easier time learning how to use the application. This adds usability and intuitiveness to the application.
3. User control and freedom	This rule is being applied as you are able to confirm when you perform actions such as adding a new route or a new review. You are also able to click on a back button in pretty much any screen you enter.	This rule is not being violated as the user is always given the option to confirm when adding something to the system. You are also able to use the navigation bar/back buttons to move throughout the system.	This rule ensures that the user has the freedom to navigate through the system as well as more control over their actions.
4. Consistency and standards	This rule is being applied as all of our buttons and icons are consistent throughout the application. The same navigation and top bar are also used everywhere. Transitions between screens are also consistent.	This rule is not being violated as we use the same standards throughout all of the tasks that we have prototyped.	This rule ensures that everything in the system is to consistent standards and that nothing is confusing for the user.

Appendix B: Rulan's Heuristic Evaluation - Part 2

Rule of Thumb:	Is this rule being applied? How So?	Is this rule violated? How so?	How can this rule further improve usability, utility and desirability?
5. Error prevention	This rule is being applied as there is a popup that shows up if you are trying to submit a review or a new route without filling in all the required information.	This rule was initially violated, but popups were added to ensure that there was proper error prevention.	This rule ensures that the user understands when something is missing so that they can fix this, instead of them submitting something wrong.
6. Recognition rather than recall	This rule is being applied as the user can quickly find old/favourite routes by looking at their profile and history pages.	This rule is not being violated as all relevant information is shown to the user instead of requiring them to remember specific details and entering it into a search	This rule ensures that users have a better experience when using a system, as it adds to the overall usability and functionality.
7. Flexibility and efficiency of use	This rule is being applied as the user is able to efficiently navigate through the application regardless of if they are a novice or an expert. Actions such as creating a new route and adding a review are simple.	This rule is not being violated as there is no functionality that is difficult to perform or understand.	This rule ensures that all users have a good experience when using the application and that nobody is stuck based off of their experience level.
8. Aesthetic and minimalist design	This rule is being applied as we have a colour theme that is nice and simple to look at. We show the user the most relevant information at all times to minimize clutter.	This rule is not being violated as we are not using ugly design choices and we only display information that is currently relevant to the user.	This rule ensures that users actually enjoy using and looking at the system. It also increases usability as things are easier to navigate.
9. Help users recognize, diagnose and recover from errors	This rule is being applied as pop ups appear when the user makes an error with adding a new route/new review. This pop up tells the user what the error is to help them fix it.	This rule was originally being violated but pop ups were added to ensure that users recognize and can recover from errors such as missing fields.	This rule ensures that a user is able to continue even if an error occurs. This increases the overall usability of the application.
10. Help and documentation	This rule is being applied as every field, button, and icon is there to document what its purpose is.	This rule is being violated in the AR screen as the user may not understand how to navigate through AR. This could be fixed in stage 5 by adding a tips	This rule ensures that the user is able to use and navigate through the system with ease. This improves the overall usability, as well as increases the user's desire to actually use the application.

Appendix C: Jason's Heuristic Evaluation - Part 1

Rule of Thumb:	Is this rule being applied? How So?	Is this rule violated? How so?	How can this rule further improve usability, utility and desirability?
1. Visibility of system status	Yes this rule is being applied. For example, when a climb is going to be favorited, clicking the favorite button immediately changes the color of the button and shows that the system acknowledged the action and changes its status.	No this rule is not being violated. In all of the components where elements can be clicked, feedback is given immediately so the user knows that the system is functional and responding to their actions.	This rule can improve usability because it shows the user that the actions they are taking are being acted upon and applied within the application. It also improves usability by showing the user that the system is available for their use.
2. Match between system and the real world	This rule is applied because universal elements are being used throughout the application such as rating systems, icons, maps, and profile features such as profile pictures.	This rule is being violated just on the AR screen. This is such new technology that a user may be confused on how it works and what the icon means because they have not seen it anywhere else.	This rule increases the usability and desirability of the app. This is because through providing the user with features that they are already familiar with makes it easier to use and quicker to pick up.
3. User control and freedom	This rule is very clearly being applied through the navigation icon bar on the bottom. No major functionality is ever hidden from the user and the main features they are looking for is never nested within other screens, giving them full freedom to use the features that they want as soon as possible.	This rule is never being violated because at no point will the user be stuck on a screen, they can simply use the tab bar, or the top navigation controls to navigate through the application as they please.	This rule is huge for all three characteristics. If a user does not have the freedom or control to use the application as they want, they will not find it has any utility, desirability, and therefore usability.
4. Consistency and standards	This rule is also clearly being applied. Not only through the same navigation bar on each page, the cards used for the climbs look the same in history and profile, therefore the user is familiar with the format and they are never looking in different places for relevant information.	This rule is not being violated. There is a consistent set of icons, cards, rating systems, and fonts throughout the application.	Having consistent components and elements throughout the application helps the user become more familiarized with features so they do not have to recall what each new element does, therefore increasing desirability and usability.
5. Error prevention	There is good error prevention in the application. For example if I try to submit a form with no field filled in it initializes a warning modal that tells me to fill it in.	This rule is being violated however, because there are no validations employed to single for fields. For example I could enter any amount into the route length field without it being checked.	This rule certainly increases all three characteristics as well. This is because the user would always like to have a seamless experience within an application and knowing that they can rely on the application without any speedbumps is crucial.

Appendix C: Jason's Heuristic Evaluation - Part 2

Rule of Thumb:	Is this rule being applied? How So?	Is this rule violated? How so?	How can this rule further improve usability, utility and desirability?
6. Recognition rather than recall	This rule is being applied because all of the features that the user records in the application are saved and they can view next time they are in the application. Therefore they do not need to remember what they were doing in the application previously.	This rule is not being violated in the application. The only way a user forgets something in the application is if they forget to favorite a climb and want to go back and see it. A "previously viewed" could help solve this problem.	Being familiar with the system and not having to recall how systems work leads to more efficient and less frustrating use. This highly increases the desirability, and useability of the application.
7. Flexibility and efficiency of use	This rule is being applied based on the fact that the application can be very flexible in its use, and can be used purely for reviewing, information, creating climbs or directions. The user is not bound to any feature in particular.	This rule is violated when in the AR view. If I click on a route and I want to see another route, I must click twice, once to exit the current climb and another to see the route. As a use this is inefficient and slightly annoying.	Being able to perform a task in a reasonable amount of time and in a way that is not bound by too many constraints makes the user satisfied and not frustrated, therefore improving desirability.
8. Aesthetic and minimalist design	This rule is nicely followed throughout the application. Cards are used with nice margins that are visually pleasing and forms are nicely laid out with different UI components to allow with sleek and simple information filing.	This rule is slightly violated only on the route information screen. There is just a lot of text on some of the descriptions and so it is just a wall of text.	This rule can improve the desirability for the user as they will likely want to continue using that application if it is clean and good looking. It also increases usability as a minimal, clean design makes the application easier to use.
9. Help users recognize, diagnose and recover from errors	There are nice modals on fields to warn the user that the information they filled out is incorrect which helps them diagnose why they can't submit a form.	This rule is violated in the fact that if I save a route or a review and I lose connection or it is incorrectly saved, I am never notified and I will not know.	In the case of an error, letting a user know the actions that they can take to reverse or prevent the error from happening again increases the desirability and useability of the application by quite a bit.
10. Help and documentation	There is some help through descriptive labelling and smart verbiage but other than that, help and documentation is very minimal.	This rule is violated in the AR drawing screen and the AR screen. There is no help and it can be very confusing for a user who does not know what those screens are for.	This rule can increase utility and usability as being able to get help on the actions you would like to take and learning how to perform them makes the application more useful and robust.

Appendix D: Daniel's Heuristic Review

#	Issue	Heuristics	Severity	Possible Solution(s)
1	User may be confused about AR (What it is/how to use it)	2,10	2	Add tutorials for how to use AR mode, both to view routes as well as edit them.
2	User provided values are not validated	5,9	2	Notify the user if tried to submit with empty fields (Already Done) Check if values "make sense" and tell the user if not. Either a popup when submitting or highlighting invalid values.
3	Switching routes in AR mode is inefficient.	7	1	This seems like a limitation of figma? Allow switching of routes without first closing the current route
4	Lots of text in route descriptions.	8	1	Enforce a limit of how much text will be shown before dropping the rest behind a "Read More" button.
5	No feedback on errors while uploading	9	3	Inform the user that there was a network problem and store the route for later upload.
6	No history of previously viewed hikes	6	1	Add "previously viewed" as another history pane either, probably an extra tab on the history tab

Appendix E: Richard's Heuristic Review

#	Issue	Heuristics	Severity	Possible Solution(s)
1	Users may not understand how to use some of the features in AR mode.	2, 10	2	<p>Add 'tips' icon that explains how to use AR mode</p> <p>Give some indication that routes can be tapped to see details (maybe add some drop shadow for depth, or an icon in the middle of each route).</p>
2	Users may not understand what "AR mode" is at all?	2	1	Change the icon in the bottom menu to a custom one?
3	Add route screen has no indication for required and optional fields.	9	3	<p>Have some client side validation with visual indicators (maybe borders around invalid fields).</p> <p>Submit button greyed out until form is valid.</p>
4	Can not jump directly from one route detail screen to another in AR mode. Must tap twice, once to close details of the last route, and again to bring up details of the new route.	7	4	Allow users to directly select another route with route details of another route already showing.
5	There is no history of previously viewed routes. If a user forgets to favorite a route, they may forget it.	6	1	Add features to show logs of previously viewed climbs.
6	Route details screen is not aesthetically pleasing. Is just a wall of text in some cases.	8	1	<p>Not sure what to do here as the text is an important part of the functionality that must be delivered to the user.</p> <p>Possibly do some research on how to present large amounts of text in an aesthetically pleasing way.</p>
7	User is not notified if a route is not added because it is incomplete or because they are not connected to the network	9	2	<p>Add a warning notification displaying the error when adding the route.</p> <p>For loss of connection maybe indicate that it will be posted later (like Instagram?)</p>
8	Add route AR screen has no indication of how to draw a new route	10	3	Add documentation or indications to the add route ar screen showing the user how to draw a new route