Error! Bookmark not defined.

1. Paper-based prototype

1.1 Sign-Up form screen

The sign-up screen contains the required information for a user to fill out the sign-up form to create an account (see Figure 1). In order to sign-up the user must fill out the form that contains 15 input fields, that includes user credentials, general information, and favourite things. To make it easier for the user to fill out the form we structured the form vertically with relatively large field and margin between them to decrease changes of erroneous entries. However, the number of user fields required for the user to fill in increases cognitive load and effort necessary to finalize the sign-up process.

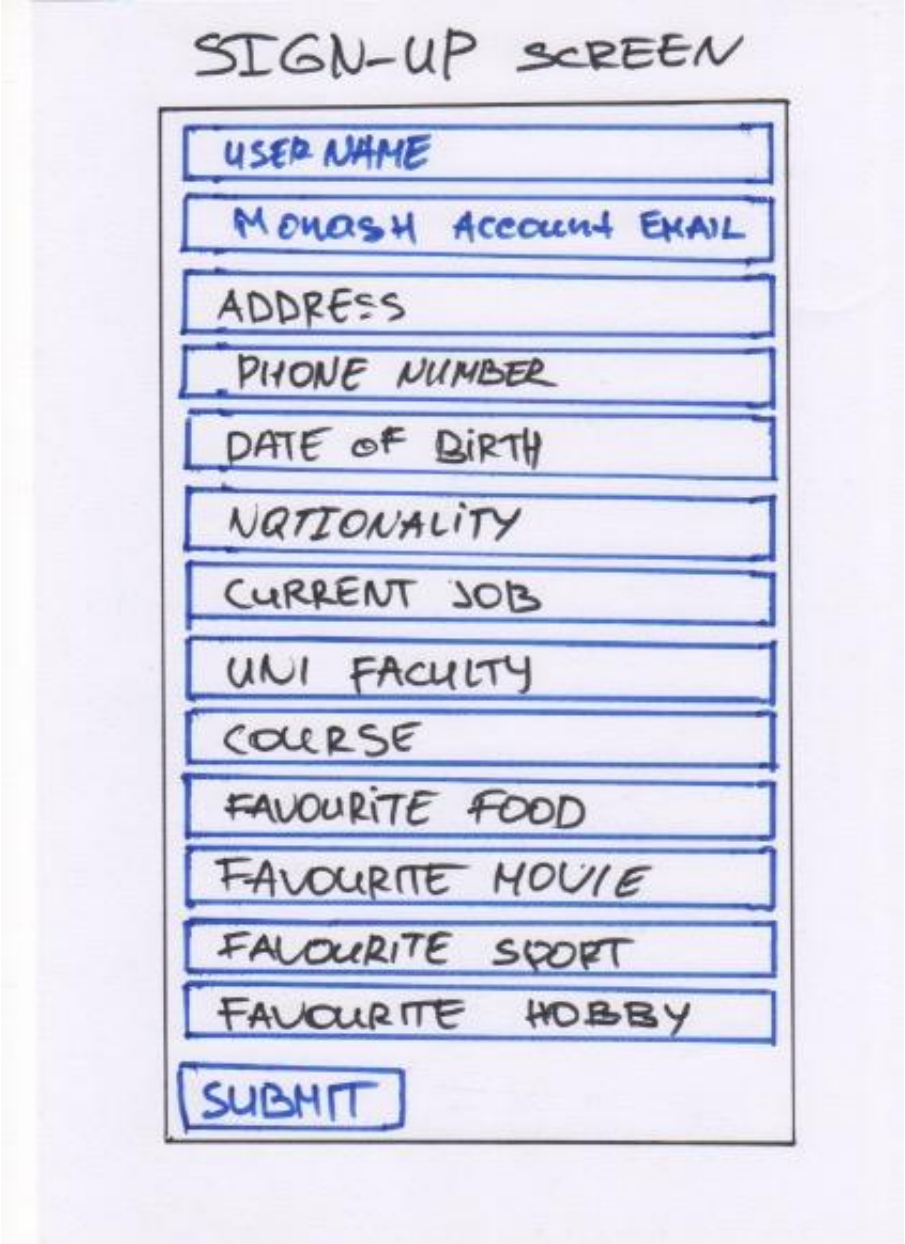


Figure 1. *The paper-based prototype of Sign-up form*

1.2 Search for a friend screen

Figure 2 depicts the search for a friend screen, It contains inputs for search criteria. The form consists of two main areas, simple search input for quick searches with only one criteria, and advance search option which is hidden from the user unless he clicks on “advanced search” button. The form consists of five search criteria. In order to reduce the load and reduce clutter on the form, the advanced form initially is hidden from the user. The mapping between the search element and search action is done through the use of icons.

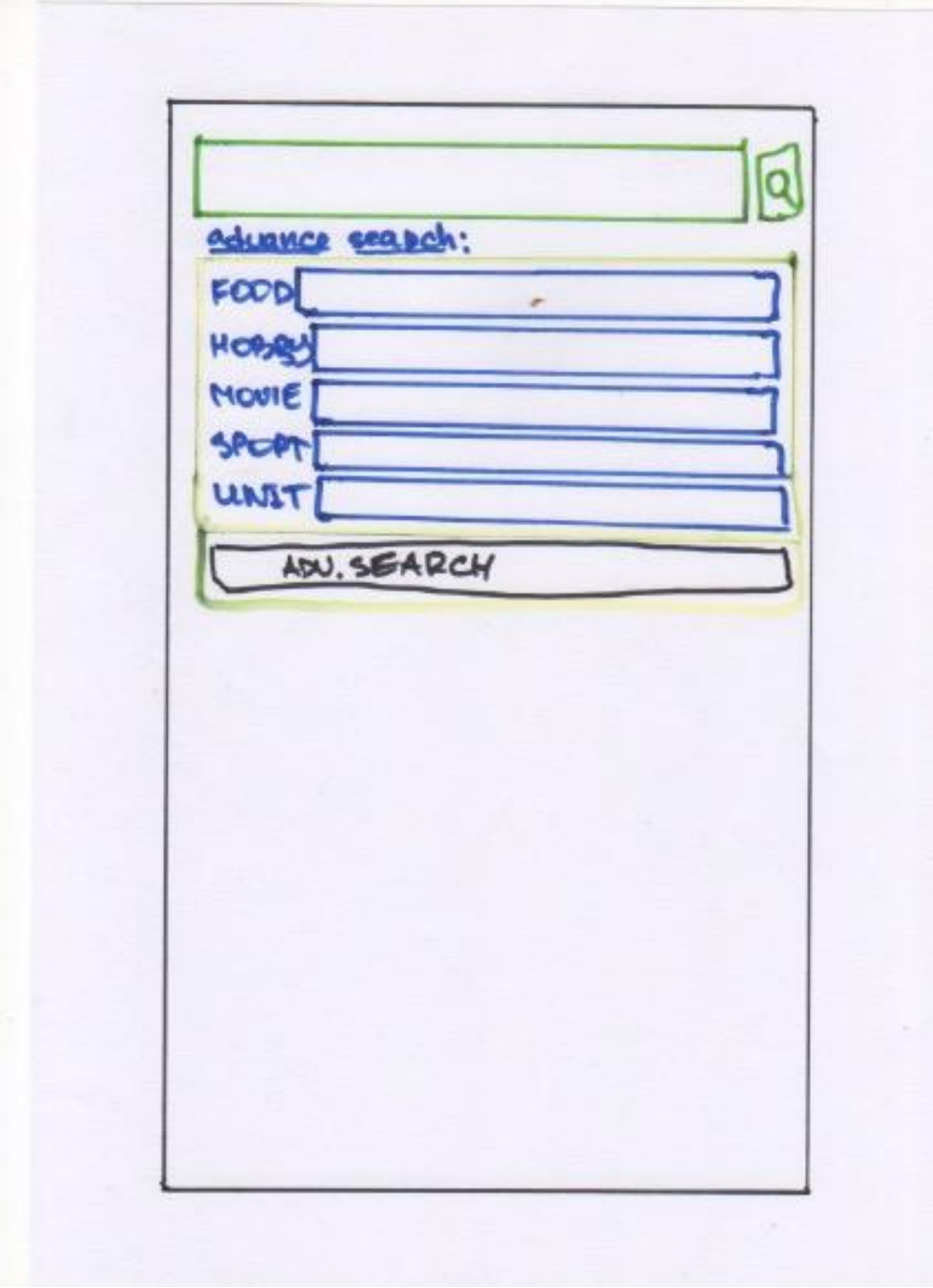


Figure 2. *Search for a friend Paper-based prototype*

2 Digital prototype

2.1. The login screen

2.1.1. Alternative options for different type of users

The first guideline implemented in the app is to provide the existing users of the app with an option to Sign in with the credentials and an option for a novice user to register to the app via Sign Up feature (see Figure 3).

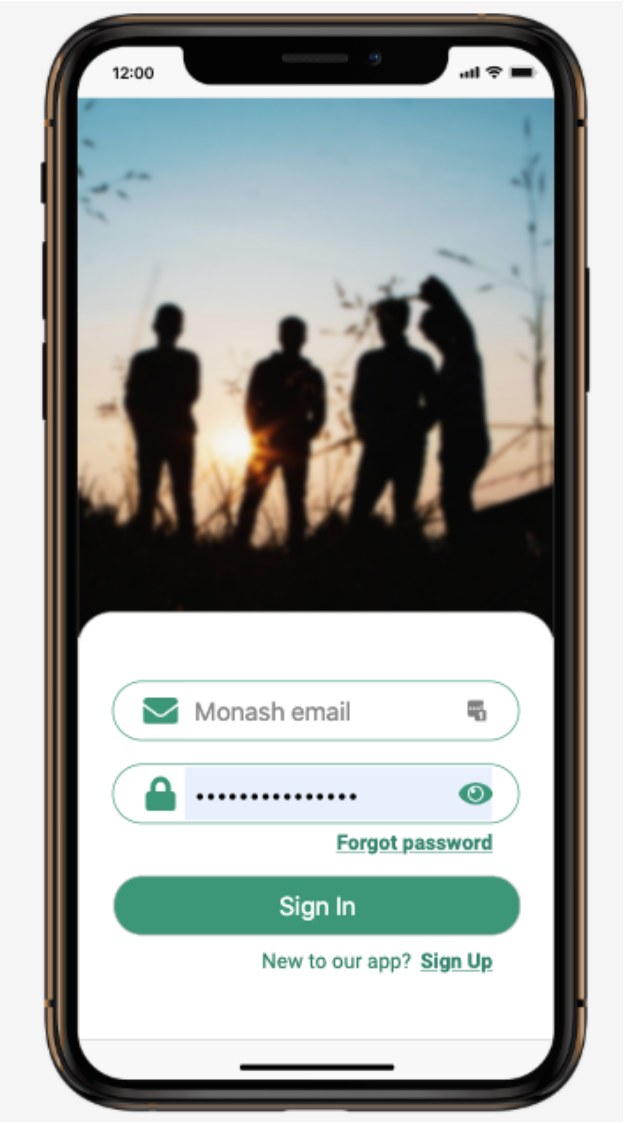


Figure 3. *Login screen with login and signup options.*

2.1.2. An option if the password is forgotten

According to (Nielsen, 1992), humans are prone to forget and make errors. Having a limited capability to recall abstract alphanumeric sequence, many people forget their password. Thus, to aid a user in times of cognitive load forgot password link will allow him to reset the password and securely log into the application. The figure 3 above displays this

feature which is placed as a signifier and is provided as a hyperlink below the password input field with verbiage “Forgot Password”.

2.1.3. Option to Hide/Show the password

The login form of the app is used quite frequently and it poses a high risk of the user typing the password in the presence of other individuals who can easily view the password. Due to the current trends in the cyber industry, it is often considered as the best practice to hide the typed input in the password field (see Figure 4). Additionally, the login screen of the app is designed to tackle typing errors while a user inputs the password. This guideline forms the motivation of adding show password feature in the password field in case the user wants to be sure of the typed characters.

Figure 4. *Hide and show password on the login screen.*

2.1.4. Sign-in forms have only a few inputs

The Sign-in screen is the first and most important interaction a user has with the application. By nature, humans do not like to enter too many details into the forms, as the form is just a step towards moving to the end goal of providing access to the main functionality of the app. So, the sign-in screen is restricted to primary elements of Sign In/

SignUp (see Figure 5). This guideline would eliminate any unnecessary cognitive load on the user and conserve the pleasant mood of the user towards access to the main feature of the app.

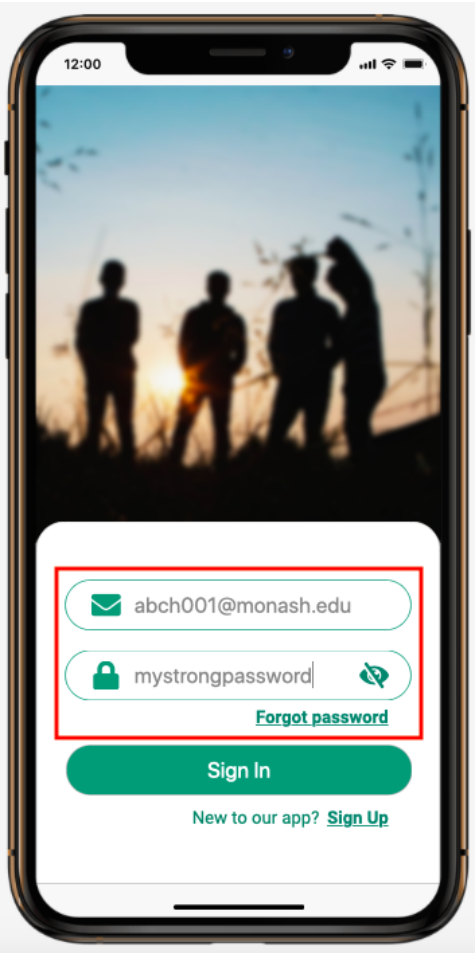


Figure 5. Signup available input fields

2.1.5. Logical order of the form

The details on the app screen should be presented logically from the perspective of the user rather than that of the application or the database. The user expectation from the app is to have a smooth transition while navigating through the content. Giving this due regards, the app follows a logical order where the user is first presented with the login field having email and password text box, followed by the forgot password hyperlink and the login button. In a similar way, the Sign-Up link is provided for the novice user (see Figure 5).

2.2. User profile screen

2.2.1. Vertical layout of the form with Inline text

While navigating through forms on a mobile application the user expects a smooth transition between the various input fields. The vertical labelling provides ease of navigation between the different fields and aids the user to input the correct information across each text field (see Figure 6).

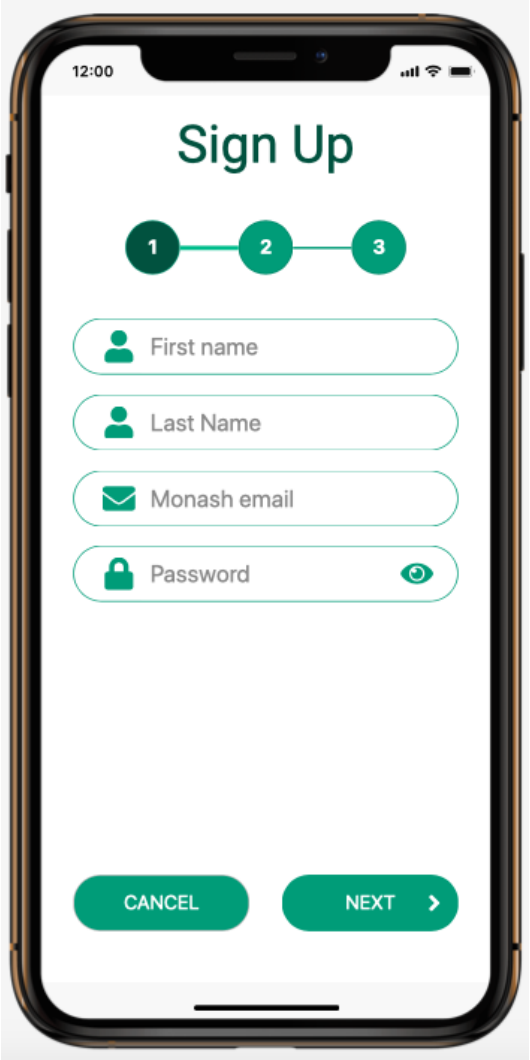


Figure 6. *Vertical position of element on the sign-up form*

2.2.2. Match the user's knowledge in the head with knowledge in the world

The figure 7 shows that the address field is made to fetch the complete address of the user including the postcode, state and country just by starting to type the initials of the address in the Address text field. This guideline enables the user to enter the address with ease.

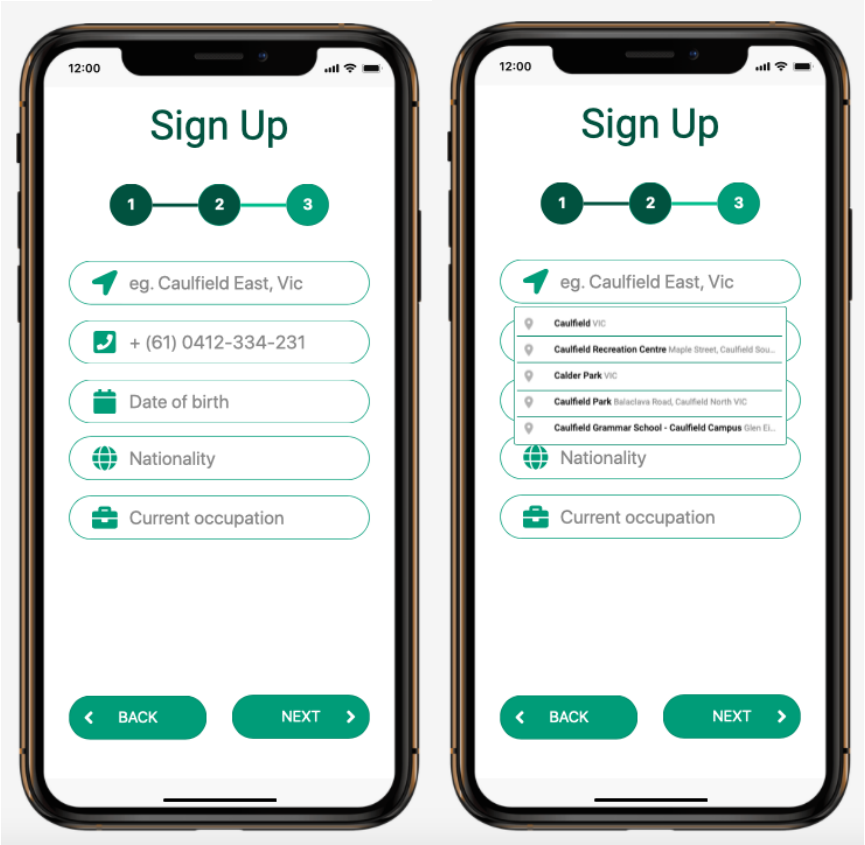


Figure 7. *Address dropdown suggestion list.*

2.2.3. Differentiate grouped items

The signup form contains a large number of inputs with two types of answers required slot-in and gathered. We decided to split the form into three parts i.e. In 2014, Kumar and Hussein conducted a study which users have indicated that all menus and its elements should fit into one screen. User information, user contact details and user preferences (see Figure 8). First two input groups require slot-in answers and the last group requires gathering. This reduces visual clutter, structures data gathering, and reduces user's frustration.

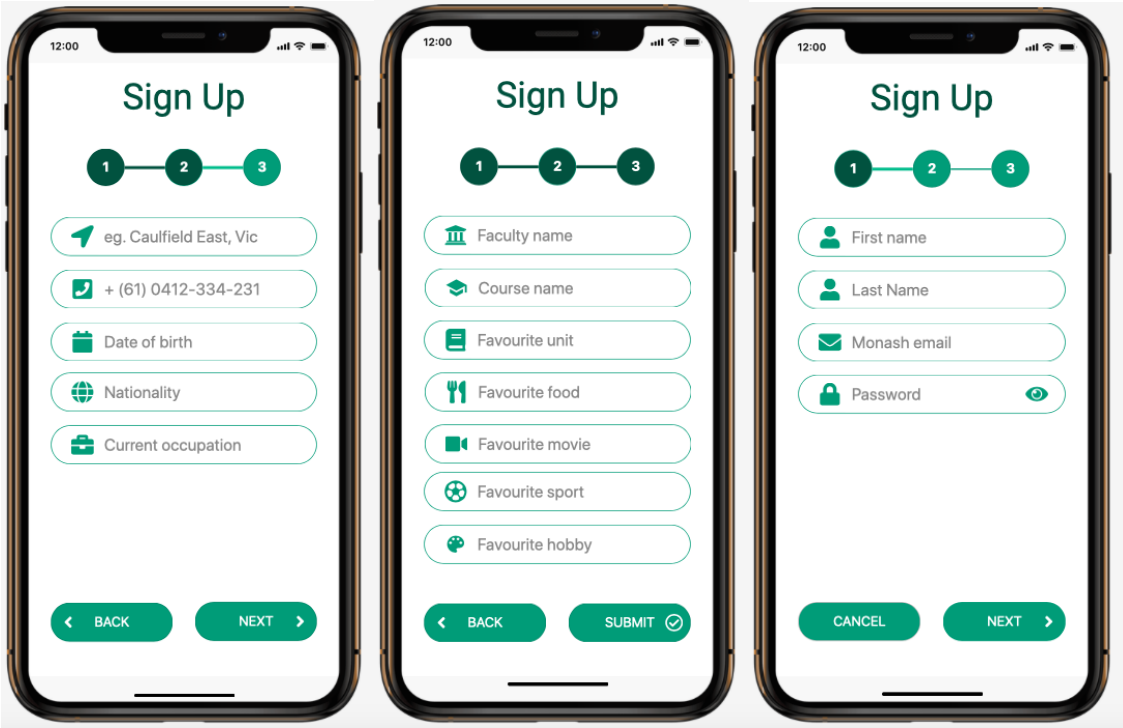


Figure 8. *Grouping related field on sign-up form screen.*

2.2.4. Paper-based prototype improvement

2.2.4.1. Improvement 1: Use of a progress indicator in a complex screen

Keeping the user informed during the process of form completion is achieved by progress bar The progress bar serves as a visual medium for feedback. Current stage is clearly highlighted and the total number of steps is displayed for the user. All three screens are provided with a progress bar which displays the journey on which the user is currently at. The figure 8 and 9 show the progress bar at the top of the screen.

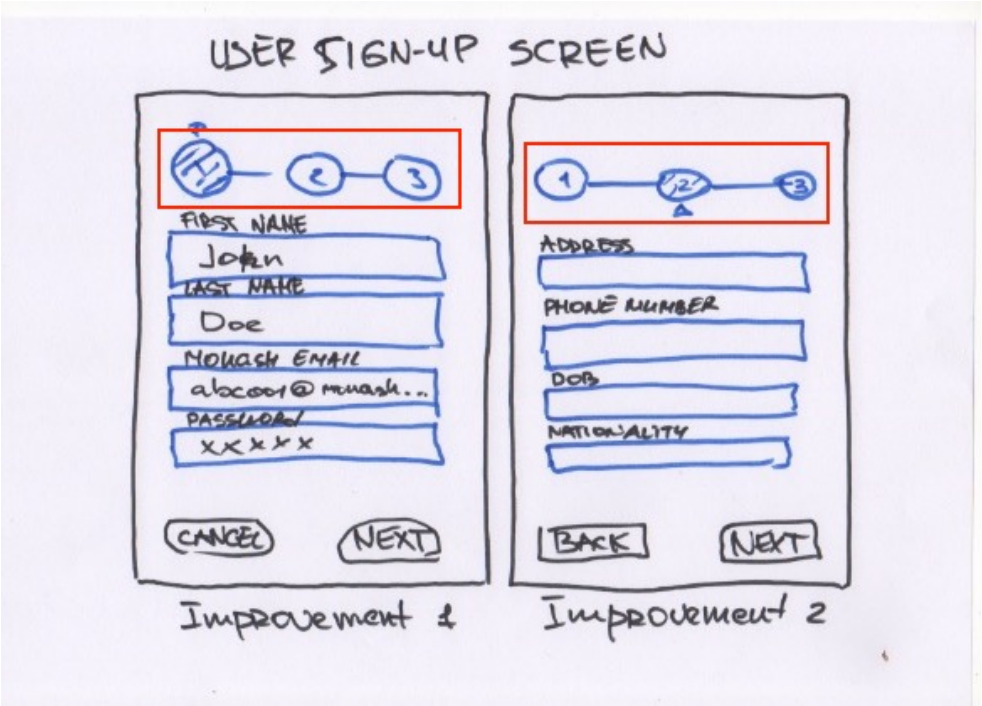


Figure 9. *Progress indication for sign-up screen*.

2.2.4.2. Improvement 2: User control over the signup process

To give the user control over the sign-up process and give the means of redo and undo we include the cancel, back, and next button. The figure 10, show that the first and the second stage of sign up process. During the first stage the user can terminate the process and the system will return him to login screen. During the step two user can go back to the previous step or move to the third step.

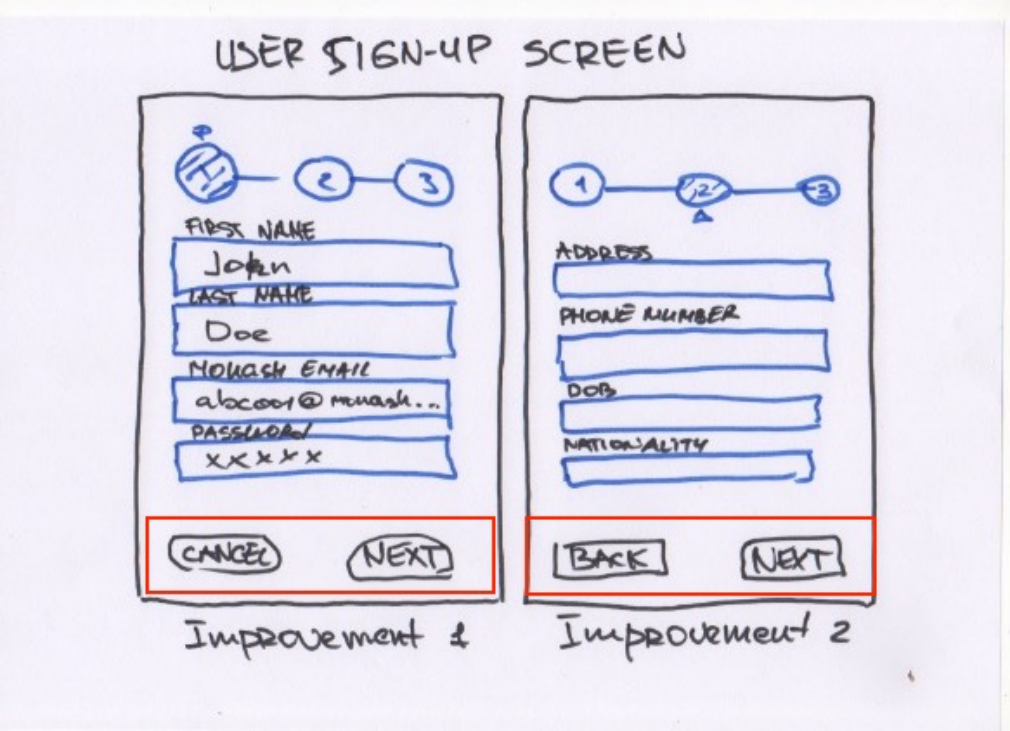


Figure 10. *Provide the user with the means of control over the sign-up process.*

2.3. Home screen

2.3.1. Aesthetic and Minimalist Design

The user can decide whether they like the interface or not within 50 ms and thus it is important to produce visually appealing interface to increase user retention (Lindgaard, Fernandes, Dudek, & Brown, 2006). Interface clutter and irrelevant information on the screen can negatively affects the aesthetics of the screen as a whole. The home screen contains only three main element greeting message, possible friends hear the user, and the current date and temperature (see Figure 11). The date and temperature element is highlighted material design concept of paper and shadows to give the user a clue that this element is important. Also each element on the screen properly spaced to indicate their independence.

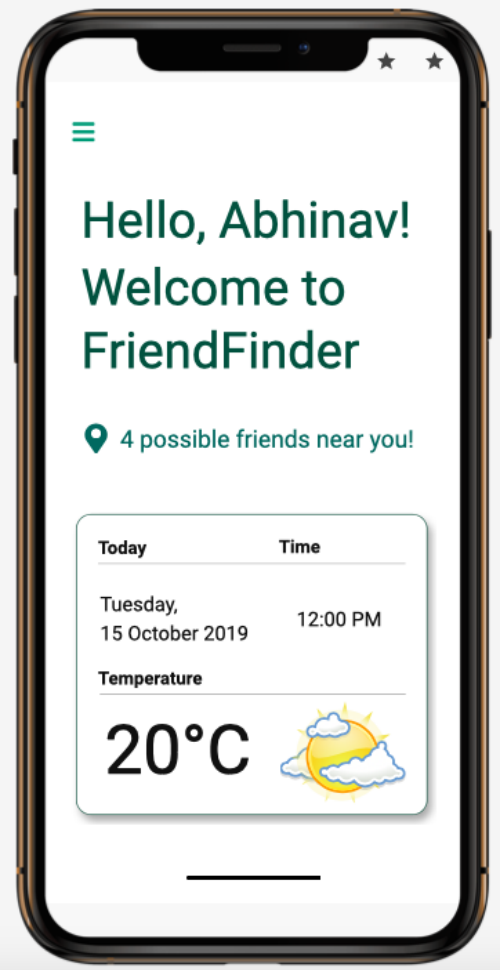


Figure 11. *Minimalistic design of the home screen.*

2.3.2. Hidden menu and screen cluttering avoidance

The primary navigation in our application is done using hidden menu, available on every screen (see Figure 12). In 2003 Bernard conducted a study which showed that most participants expected the "back to home page" link to be located at the top-left and bottom-center of the screen. By pressing the hamburger icon, see Figure 11 top left corner, the user can access the menu of the application. Although it requires the user to know that the hamburger icon represents menu and by clicking on it the menu will appear and limits discoverability, we choose less cluttered screen since on each screen the elements are different and other type of menus required static items, for example fix tab must contain fixed items.

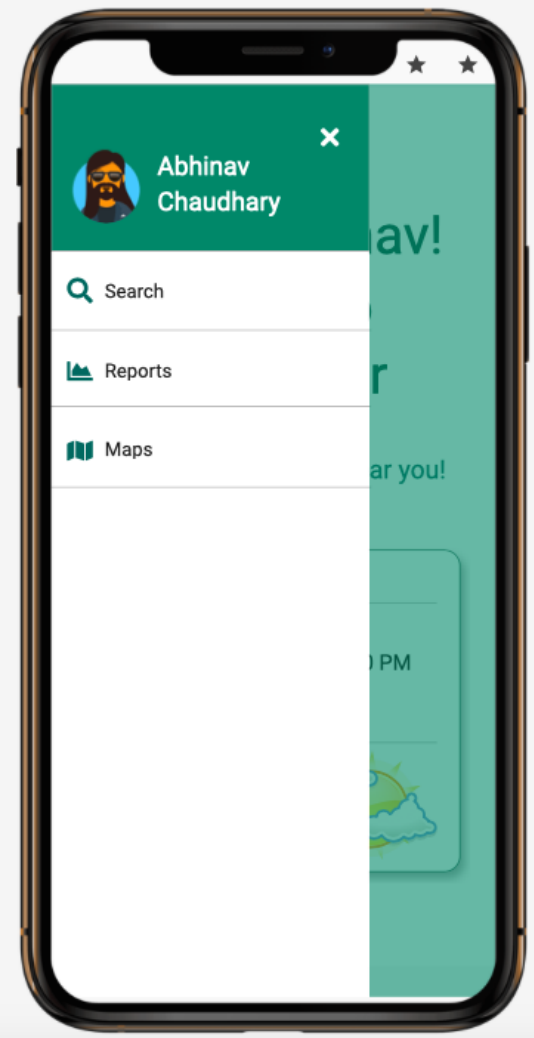


Figure 12. *The primary navigation menu after pressing hamburger icon.*

2.3.3. Structured menu with relative items

The hidden menu itself contains three to four navigation items in it (see Figure 12) depending on the current screen. For example, if the user currently on the report screen that there is no need to show the button that lead to the report screen.

2.4. Multi-criteria search screen

2.4.1. Provide appropriate feedback in a timely manner

Effective use of feedback is crucial in UI design, it allows engage and inform the user that the application is undergoing changes. As an example, when the user adds a person from the search to his friend list, the application informs the user that the request has been sent by showing the notification over the added user (see figure 13). The other aspect of feedback is its timing. In 2010, Djamasbi, Siegel, & Tullis conducted a study which showed that a delay of even a 100 milliseconds is noticeable and annoys the user. In the Figure 13 the notification is shown for two seconds, this timing is enough for the user to perceive it.

Figure 13. *Feedback for sending a friend request.*

2.4.2. Use of contrast in visual design

Contrast on element rich screen provides means to gain user attention, emphasize certain information or object on the screen. The figure 14 show the implementation of contrast to focus users attention on input of the form and prevent clutter of the interface since the other element moved to the background.

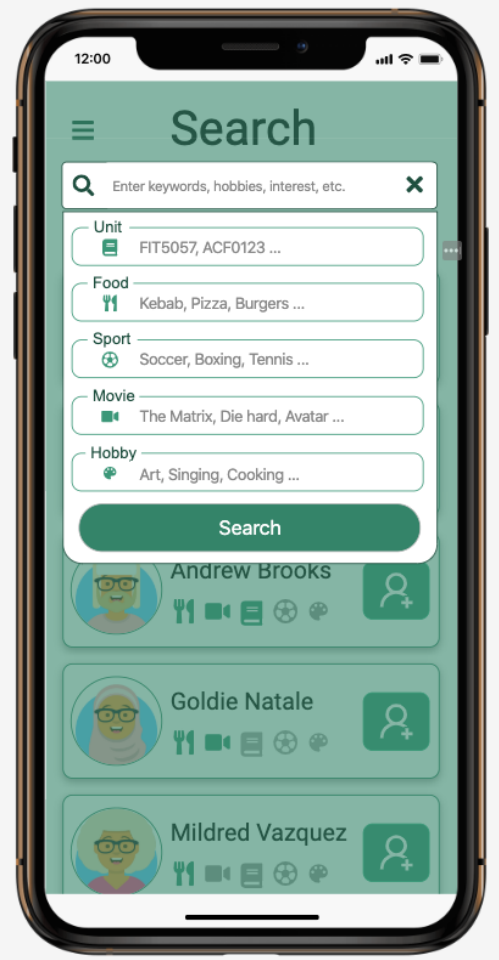


Figure 14. *Hobby icons on the find a friend screen.*

2.4.3. Minimized use of different font sizes

Throughout the application we use on one font size and thee different font sizes for Headings, subheadings, and normal text. The guideline provides consistency in the user interface which prevent confusion and facilitate the transfer of knowledge into the head. Apart from consistency minimize variation in font size and font type is established pattern in the interface and thus increase in speed of reading and recognition (See figure 13 and 14).

2.4.4. Paper-based prototype improvements

2.4.4.1. Improvement 1: Icons to facilitate fast answer retrieval

Icons on the advanced search screen allow to describe the purpose of the input and help the user to find the answer in their head. For instance, food input field contains the “fork and spoon” icon (see Figure 15), when the user sees the icon several cognitive processes happen, first user attention focus on the input, after that user perceives the meaning of it. During the second phase the icon aid easy retrieval of the answer. However, incorrect icon selection can confuse the user, since he can have a different understanding of it.

Figure 15. *Use of icons is improvement 1 for the search for a friend.*

2.4.4.2. Improvement 2: Fitts’s law implementation

Since the target environment of the application is mobile, it is important to ensure that we minimize the amount of motion for the user to complete the task. In order to achieve that we use fitts's law to ensure the size of the element is sufficient surface to press on it. In our case the search button, as well as other inputs have the size and margin between element enough to easily be pressed (see Figure 16).

Figure 16. *Search button size improvement 2 for the search for a friend*.

2.5. Reports screen

2.5.1. Meaningful information

According to this guideline the interface must not contain irrelevant information. Irrelevant information along with important one increase cognitive load, meaning the user has to process all the information on the screen to find the right one. It has been shown a negative correlation between the number of characters on a page and visual appeal. (Djamasbi, Siegel, & Tullis, 2010). The figure 17 show the use of visual aid to provide the user similarity rating for a particular friend.

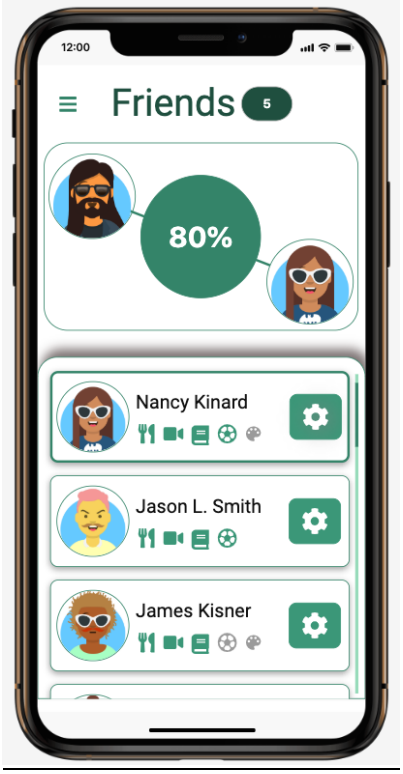


Figure 17. *Report screen with minimal and useful information.*

2.5.2. Repeating and consistency in visual design

Repetition and Consistency helps to reduce the learning time for a product since user gets familiar with the given experience. In the application consistency is implemented through the reuse of user card element, button color, and icon. The figure 17 show the similarity report for the list of user, each user card uses the same layout, color and shadows to ensure that the design is consistent.

2.5.3 Element location on the screen

Effective element location simplify user interaction with the application, since the design is focused on mobile it is crucial to ensure that the user can interact with the application using only one hand. . The figure 18 show lower part of the report sceen which contains user's list of friends. The right side of the screen is easily accessing for the user thumb and thus make it easy for the user to perform task like browsing the list, deleting a friend, and view a similarity report.

Figure 18. *Friend list element on the report screen.*

2.6. Maps screen

2.6.1. Colored cues and improved navigation and scanning speed

Visual cues are the elements for drawing user's attention to an important area or information on the screen. The other aspect of the visual cues is the color, similar element with the same color increases the chances of confusion and errors. The figure 19 depicts the use of visual cues and color schemes to signify the difference between elements. However if the number of elements on the screen exceeds the color scheme, the benefits of using color will be diminished.

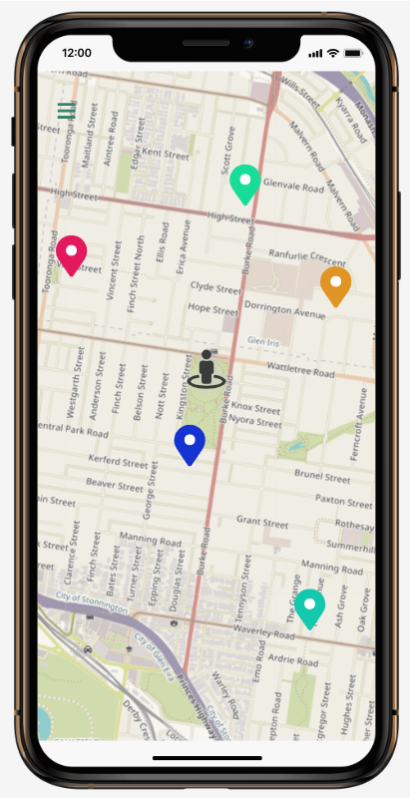


Figure 19. Map screen with different matches utilizing colors.

2.6.2. Material design

The purpose of material design is to unify user experience across all platforms and devices. Material design consists of several principal like material is the metaphor, intention, motions and elevations. In our application we use elevations, the figure 19 depicts location of matched friend using flat icon, the icons are elevated over the map, and thus easily located on the screen.

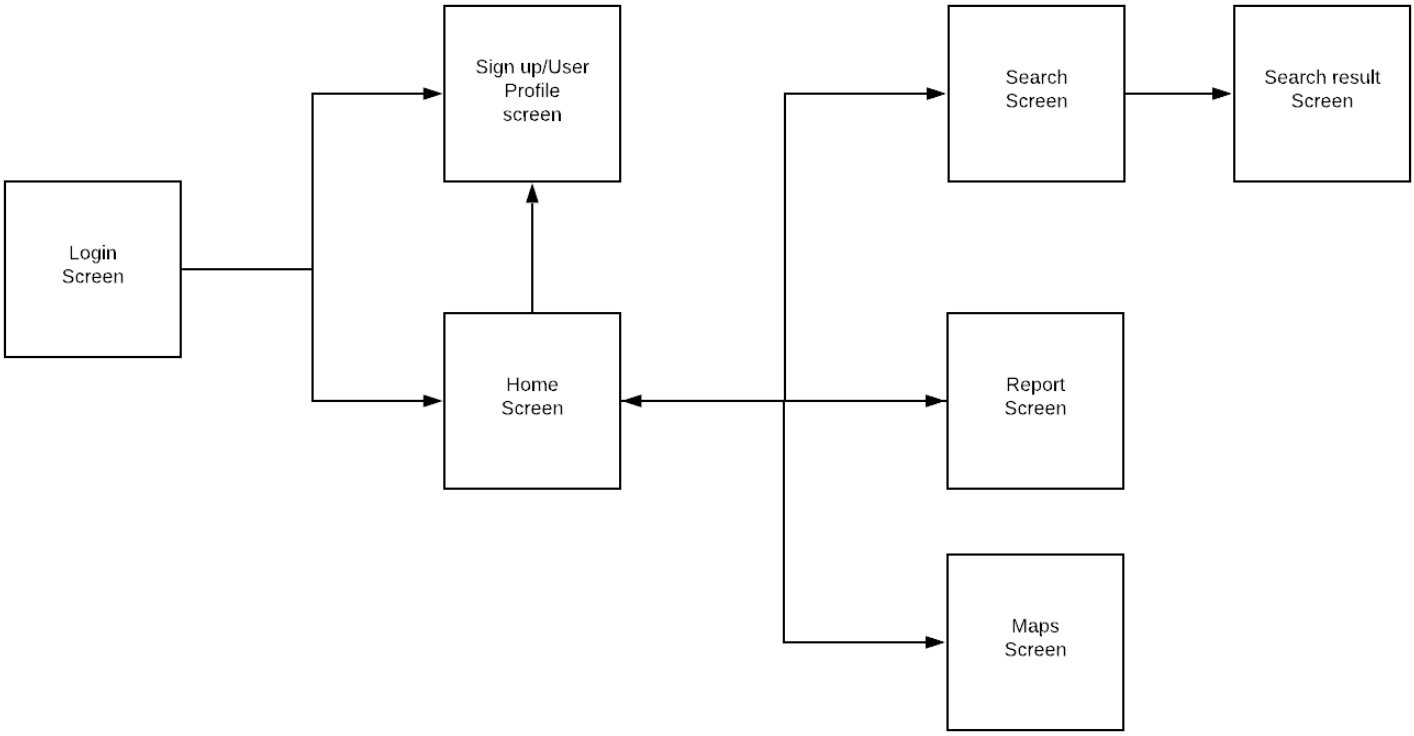
2.6.3 Motion provides meaning

In order to signify that the elements are intractable we use animations, on figure 19 after the screen is loaded the icons that are intractable initiate bouncing animation for 2 second to signify the user oppible actions.

References

1. Bernard, M. (2003). Examining User Expectations for the Location of Common E-Commerce Web Objects. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 47*(11), 1356-1360.
2. Djamasbi, S., Siegel, M., & Tullis, T. (2010). Generation Y, web design, and eye tracking. *International Journal of Human - Computer Studies, 68*(5), 307-323.
3. Kumar, B., & Hussein, S. (2014). Heuristic Based User Interface Evaluation of Mobile Money Application: A Case Study. International Journal of Handheld Computing Research (IJHCR), 5(2), 75-86.
4. Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006). Attention web designers: You have 50 milliseconds to make a good first impression. *Behaviour & Information Technology, 25*(2), 115-126.
5. Nielson, J. (1994). *10 Usability Heuristics for User Interface Design.* Retrieved from https://www.nngroup.com/articles/ten-usability-heuristics/

Appendix


Sign up/User Profile screen
Search Screen
Search result Screen
Login Screen
Home Screen
Report Screen
Maps Screen