

Usense

High-Fidelity Prototype Report

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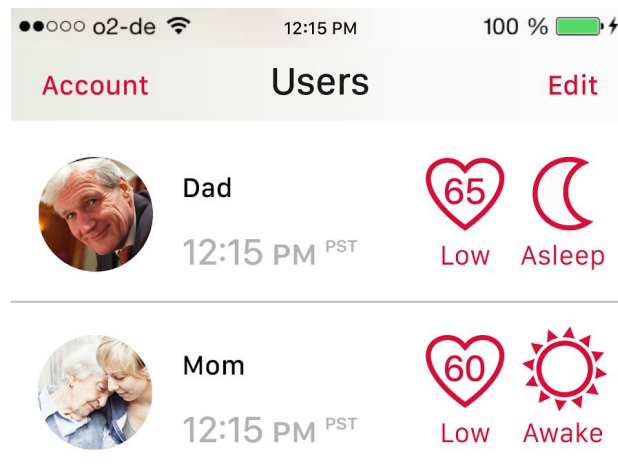
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The Usense system allows you to monitor your loved one's health and safety with a smartwatch and an accompanying smartphone application.

Problem and Solution

Usense aims to give people the ability to care for their loved ones no matter where they are, bridging the barrier of distance for families in our globalized world. Usense solves the problem with a dual-component system: the Usense smartwatch and the accompanying smartphone application. The Usense smartwatch measures health through heart-rate metrics and sleeping patterns, and it sends the information to the smartphone of a family member acting as caretaker. When the system notices a health metric is dangerous, it will automatically warn the caretaker with a smartphone notification. The watch also includes safety features like GPS tracking and two emergency buttons. Pressing one will send a distress signal to the caretaker, who can respond with a call or a text. With both buttons pressed together, the smartwatch will immediately summon local emergency services and notify the smartphone user that emergency services have been called. With these features, both caretakers and loved ones can have the peace of mind knowing that professional help is available at the press of a button.



Tasks and Scenarios

Task 1: Setting an Alarm (Low Complexity)

The smartphone application user can set an alarm for the person wearing the Usense smartwatch. This task is important because it highlights the interactivity between the smartphone user and the watch wearer. Depending on the autonomy and ability of the wearer, the smartphone user can play a less or more active role in caring for their loved one.

Task 2: Responding to a Health Alert (Medium Complexity)

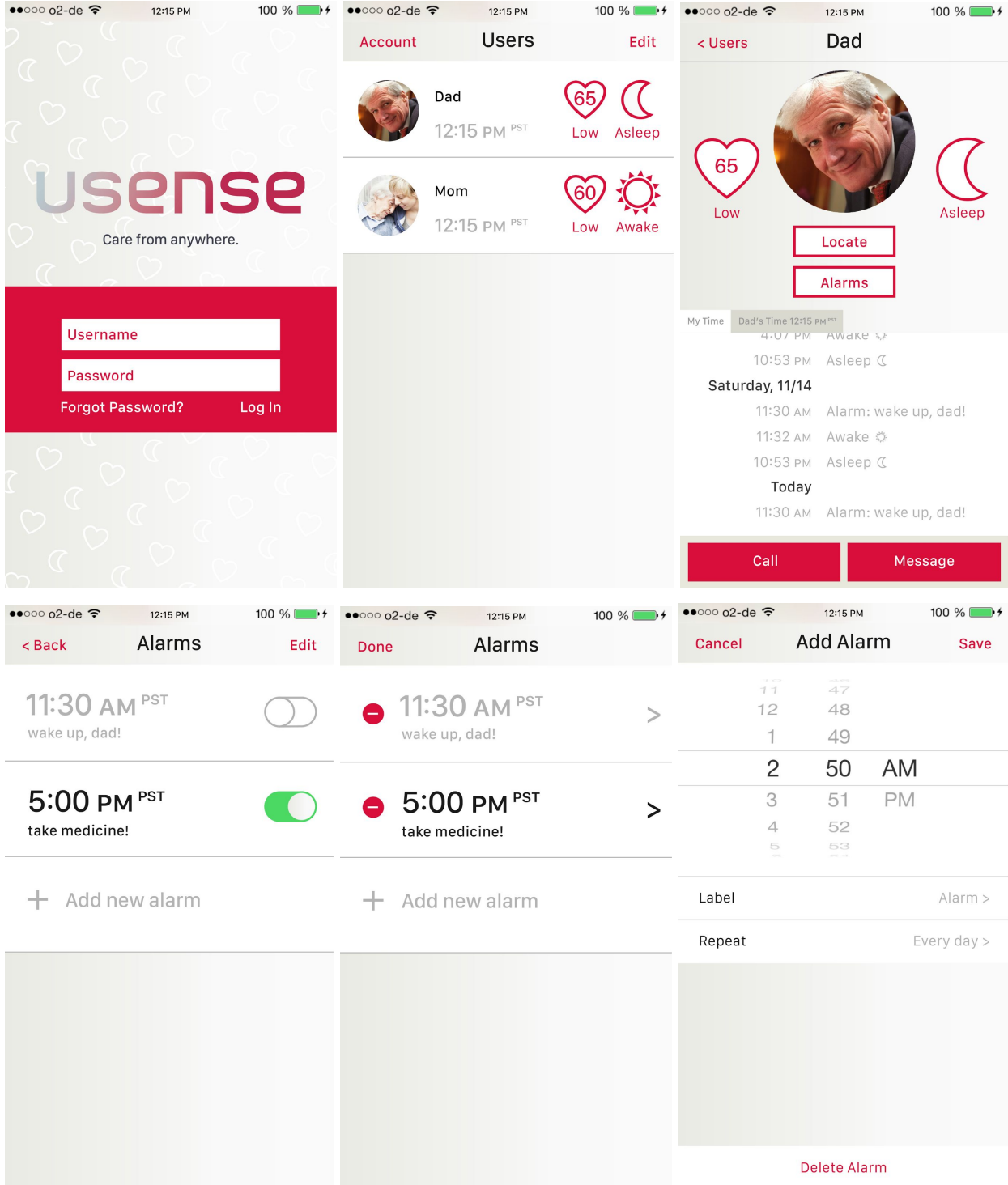
This task delivers a pre-programmed notification that triggers because the system measured that the Usense watch wearer's heart rate is too high. The notification then offers options for the caretaker to respond to their loved one's distress signal, thus giving them direction and guidance. We included this task because it showcases the ease with which the Usense system provides caretaking ability. The Usense system requires little health knowledge on its user's part.

Task 3: Tracking Usense Watch Wearer's Location (Medium-High Complexity)

This task asks the smartphone user to find out where their "Dad" has been during the day. The user gets to interact with the map and see both Dad's current location as well as a log tracing his previous locations. We chose to include this task over the heart rate and sleep logs, because the latter logs were fairly straightforward. We wanted to get the user acquainted with a feature important to many caretakers that is not as prominent on the main profile screen.

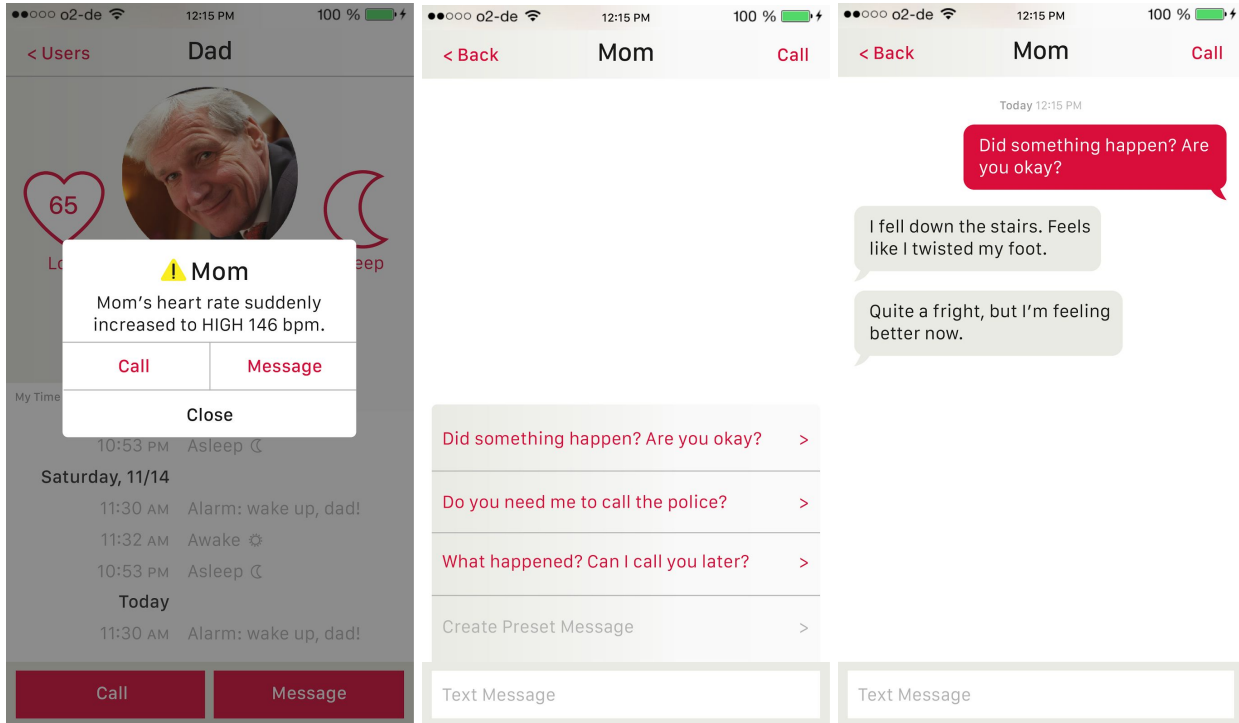
Task 1 Storyboard

The user begins by navigating around the application. They are then informed to set a reminder for their Dad to take his medication at 5:00 PM.



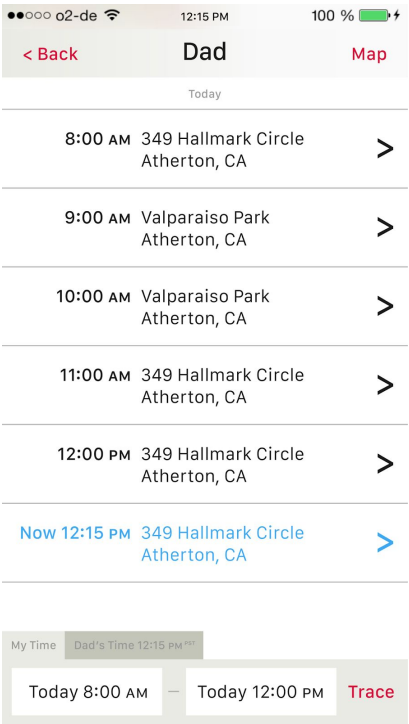
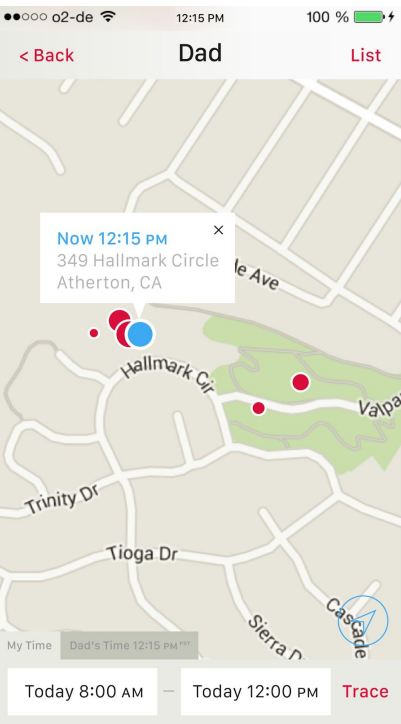
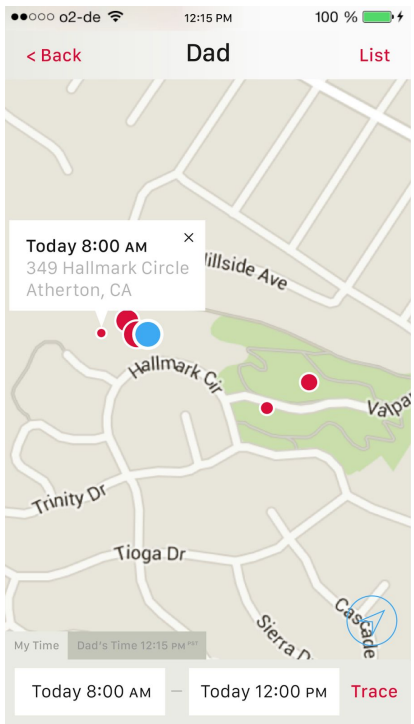
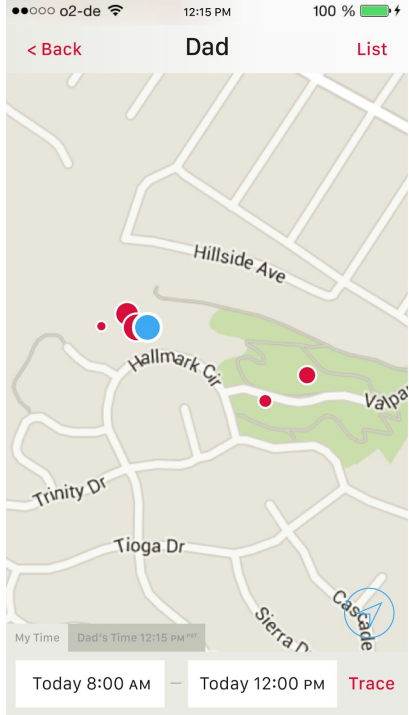
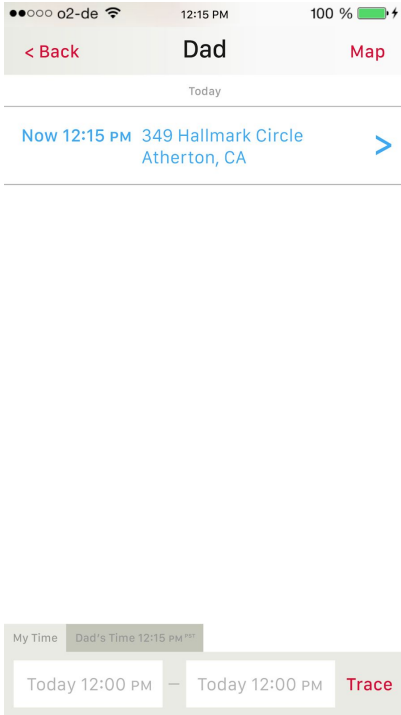
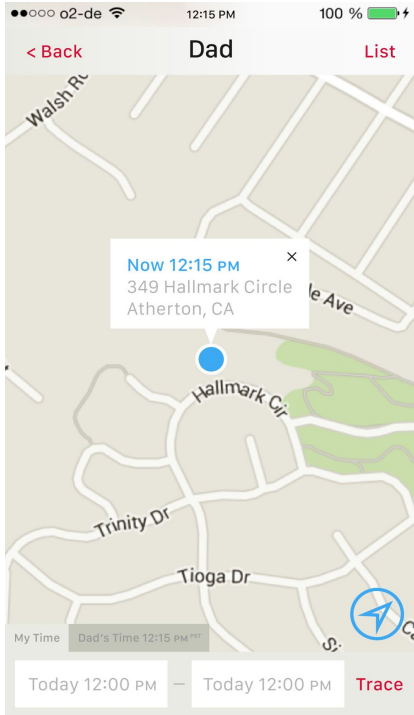
Task 2 Storyboard

The user is browsing the application normally, but then a notification pops up showing that Mom's heart rate has suddenly spiked to a dangerous level. The rest of the task walks the user through testing out the messaging functionality of the application to make sure Mom is okay.



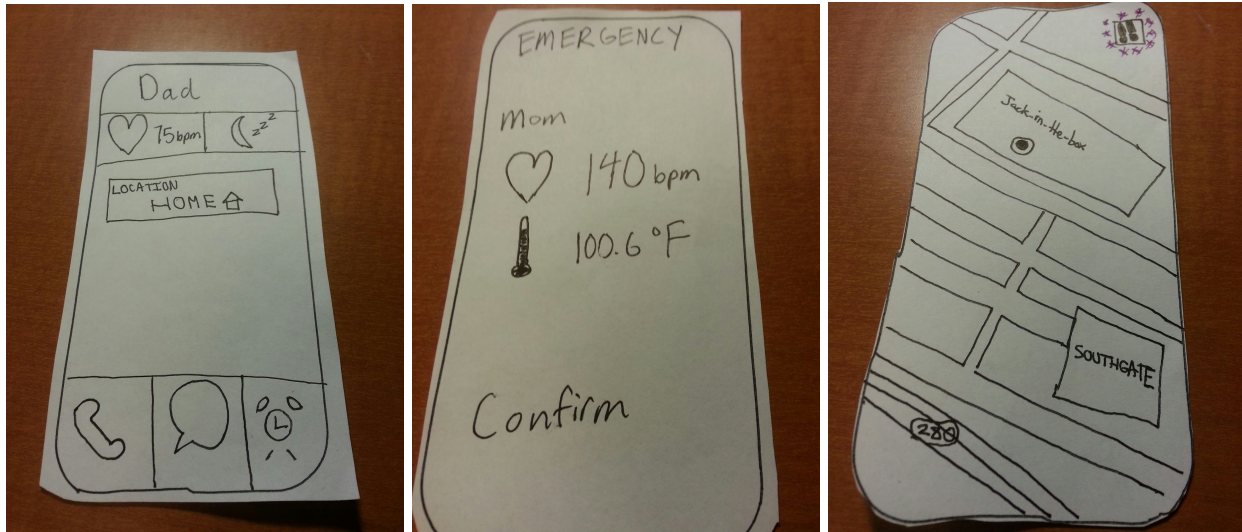
Task 3 Storyboard

The user begins with a map that displays Dad's current location, indicated by the blue marker. The trace functionality allows the user to view a history of locations, but first, the two time fields in the bottom must be selected. After the time range is selected, previous locations will show up as red markers. Size is used as an indicator of time; smaller circles are farther in the past and larger circles indicate more recent times. Finally, the user can tap on the markers to view exact addresses, as well as toggle between Map and List view to read a log of the locations displayed.



Design Evolution

With our Low-Fi prototype, we focused on functionality and feel. We intended for the application to feel intuitive at first glance as we designed each screen. During user testing with the Low-Fi prototype, we found that participants often wanted more clarity in the visuals, such as an explanation for what a 75bpm heart rate might indicate. Users also wanted more guidance and functionalities on the map, which we interpreted as a need for more affordances.



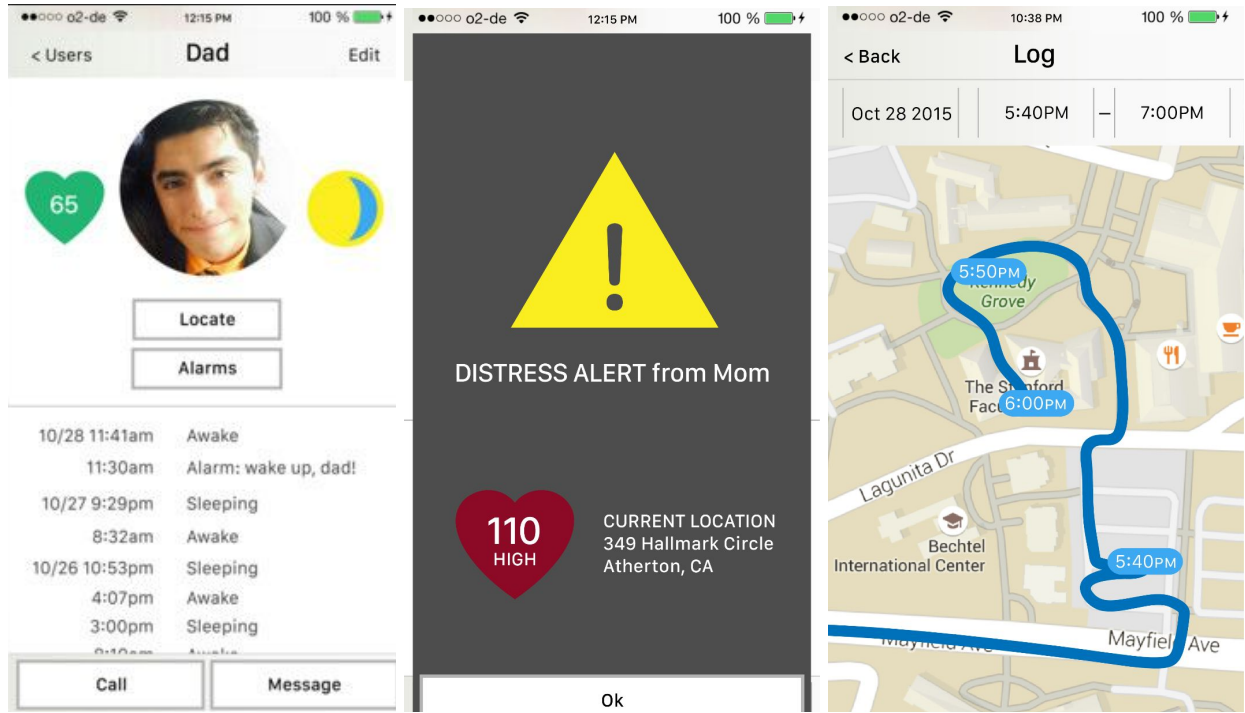
Sample screens from the Low-Fi prototype

Moving forward into the Medium-Fi prototype, we first addressed the design and layout of the application. The drawn out boxes on the profile screen in the Low-Fi prototype felt restrictive, so we created icons that can stand on their own as buttons. Second, the Low-Fi profile screen also had free whitespace in the middle. We took advantage of this screen space by adding a log of important events, allowing the user to assess health in one glance. The last change on the main screen was a rearrangement of the bottom panel; the alarm functionality was moved because it clashed in user frequency with calling and messaging.

The emergency screen used to display temperature in the Low-Fi prototype. We felt that since temperature would be quite consistent, we removed all traces of temperature readings from the application. We also consolidated all the relevant information inside a notification into an easy to read format, so that the user can quickly respond to an emergency notification.

Finally, we reviewed user feedback on the lack of visual guides in the map and location-history screens. We added two notable changes. First, in the location-history screen, the location history would be displayed from a specified timeframe that the user selects on the top of the screen. Second, we added visual guides to mark the path a watch wearer took, using a blue marked path and time markers.

The Medium-Fi prototype marked a big step forward in design, but there were still flaws that would need to be addressed in the High-Fi prototype.



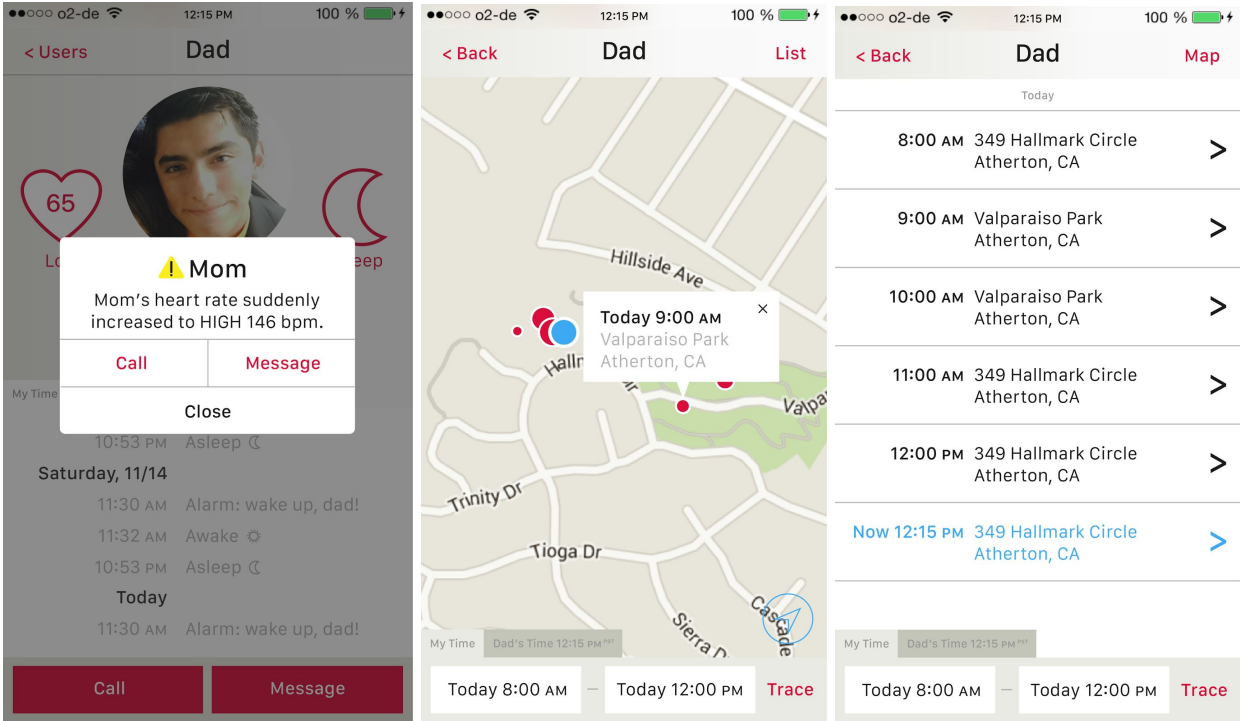
Revised screens in the Medium-Fi prototype

Finally, for the High-Fi prototype, we first sat down to revamp the design brief. We established an expanded brand color palette to help users understand functionality, and we made sure the palette carries our brand’s warm personality. From our heuristic evaluations, we realized using conventional color associations of green for good and red for bad would not work, due to varying cultural associations and clashing associations with health and sickness. The green we used to indicate a good, healthy heart rate can be confused for the green associated with sickness and poison. Instead of using different colors to indicate different heart rates, we switched to using luminance with a brighter shade of our Usense pink. Lighter shades of the Usense pink correspond to lower heart rates while darker shades correspond to higher heart rates, an association which is more intuitive for the user. From here, we established the other colors in the palette, including a neutral beige, varying shades of grey, and white. Pink becomes the action color for our brand, and is reflected in our buttons and icons (e.g. the Call and Message buttons at the bottom of the profile screen).



For the distress alert, we received heuristic feedback that while it displayed all the necessary information, it was inconvenient having to first close the alert and then navigate through the application to contact the right person. We added the ability to Call and Message the person in distress right from the notification.

For the map interface, we realized that the blue line indicating past location is inefficient for the caretaker, and unnecessarily intrusive, so we took it away. We also received feedback that the time markers obscured parts of the map. To address these problems, we removed the time markers and used a dots system. The longer ago a location was logged, the smaller the dot. The current location is displayed with the largest dot. Tapping a dot brings up the time and address of the dot marker. We also added a page where the same information is displayed in text format to give users different ways to visualize the data.



Revised notification and mapping screens in the Hi-Fi Prototype

Major Usability Issues

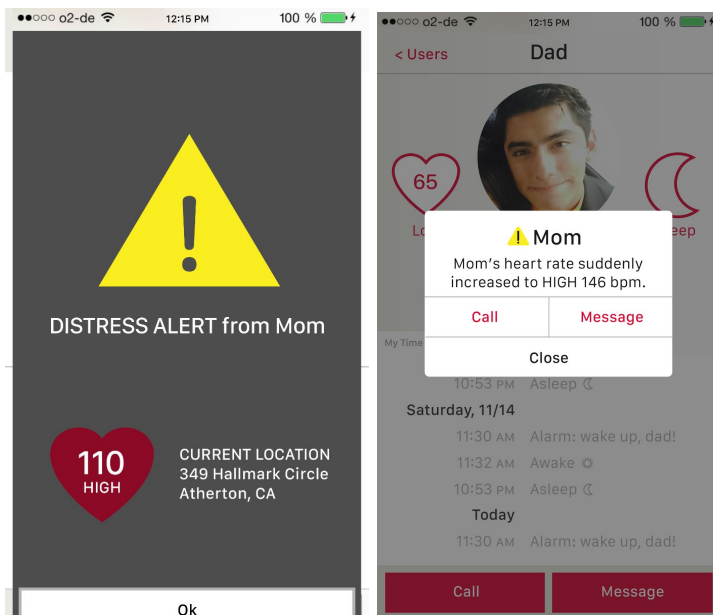
[H2-2 Match between System & Real World] [Sev. 3] The interface has a yellow button with blue lining inside on the “Users” page as well as on the right side of the user’s profile that changes based on if the user is sleeping or awake. The button isn’t clear in its function immediately and looks like a toggle button that I would press.

Changes The icon they are referring to was meant to be the sleep chart icon. We also agreed that the icon was a little ambiguous and decided to change the icon to two separate icons (sun and moon) versus a fluid icon that might be mistaken for a toggle.



[H2-7 Flexibility & Efficiency of Use] [Sev. 3] The interface, after notifying me of the Distress Alert, brings me back to the original screen I was at. I have to navigate all the way back to Dad’s profile page, back to the Users page, and then click on Mom’s page to respond to her Distress Alert when I might immediately want to contact her.

Changes We agreed that this design issue needs to be fixed, so we added the ability to Call and Message directly from the notification. There is also an option to simply Close and ignore the notification. We also took this opportunity to unify the notification format across different alerts.



Minor Usability Issues

[H2-2 Match between System & Real World] [Sev. 3] The interface did not allow me to change the medicine alarm for the user “Dad” from 5:00PM to 8:00PM; instead, when I tried clicking “Edit” to edit the alarm, a new alarm for 8:00PM just appeared on the bottom of the screen. I’m not sure why clicking “Edit” would have caused an alarm to magically appear.

Changes This error was more of a Marvel/Medium-Fi fidelity issue rather than an oversight although this violation was noted during the High-Fi prototype development phase. Editing the alarm works similarly to how a user would expect to work in a native iPhone alarm application.

[H2-7 Flexibility & Efficiency of Use] [Sev. 3] The interface does not have a “New” button that allows me to create a new alarm on the “Alarm” page; it only allows me to edit the existing ones.

Changes Once again, the alarm interface was simplified for the sake of Marvel control flow. The new button has been added in the form of a simple “+ Add new alarm”.

[H2-4 Consistency & Standards] [Sev. 3] Alarm set at 5:00 PM, but task completion page says it’s been set for 8:00 PM. This mismatch creates confusion as to what time the alarm is actually set for.

Changes This violation was an oversight on the Marvel implementation where clicking on the 5 P.M. alarm would make jump to the Task Complete screen. These issues have been addressed in the actual Hi-Fi alarm implementation on the backend.

[H2-3 User Control & Freedom] [Sev. 3] Clicking on different preset messages all result in “Mom, what happened? Are you okay?” being displayed on following screen. This confuses users, and causes them to wonder how to send other messages.

Changes This problem came up in the Marvel screen because we set the default for any click in the preset message panel to jump to a hypothetical text conversation. We’ve added the functionality to actually edit the preset messages (seen below). Second, if a user doesn’t want to use a preset message, the “Text Message” box allows the user to send a customized message.

Coding and Implementation

Tools Used

Xcode and Objective C

Wizard of Oz

Since there is no functional Usense smartwatch yet, we used Wizard of Oz to make the health alert appear in the application. We included a hidden button on Dad's profile page to allow us to manually trigger the automatic health alert. The logs of events present on Dad and Mom's user profile are currently scrollable but static images.

Hard-Coded Data

Both profiles (Mom and Dad) are hard-coded into the application. The heart rate and sleeping logs are not implemented; their icons display a still image. For the map part of the application, the view was generated with hard-coded data. While the map is fully interactive, the annotations are hard-coded to give the user a sense of seeing a history of locations.

Future Steps

Our Hi-Fi prototype currently offers support for only the phone application. We would like to continue and prototype a Usense smartwatch to complete the Usense system. Second, not all of the functionality has been implemented for the system, namely the heart rate and sleep tracking functions. These parts of the application will require more interface and medical research in conjunction with the implementation of the watch software.

Summary

The Usense platform has come a long way from the initial brainstorming in our group. Our iterative process has pushed the platform towards a cleaner and more intuitive design. Usense fills a necessary niche, giving people the ability to care for their loved ones in what is supposedly a more and more connected world.