

COVID-19 Dashboard Research Document

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ARTF-2223

[FINAL PROTOTYPE LINK](#)

ABSTRACT

The goal of this interface is to provide users access to streamlined and cohesive information on COVID-19 risks and statistics. Many of the current dashboards that are being used (notably the CDC, and Northeastern testing dashboard) overwhelm the user with information that is not necessarily applicable, or helpful to calculate their individual risks. The interface will allow users to accurately asses COVID-19 risk on a local and personal scope, rather than on a global, or overly-broad assessment. This is done by designing the interface with a focus on relation of cases to their respective distances to the user, displayed via a populated map, and disruptive notifications via active tracking of confirmed cases.

The information that will be presented to the user is broken up into three main categories: hospitalizations, cases, and quarantined patients. The users will be able to view the current, and historical data for each of these categories, on a weekly, monthly, or yearly scale. This data will include the total quantities, and the age distribution of the respective data points - most efficiently displayed in a scrollable bar graph. Users will also be able to view a geographical layout of this data. For example, they can view a map populated with all the hospitals around them, and can rollover said points to reveal how many cases are located at that hospital. This will be consistent for all 3 categories. The data that will be displayed to the user will be characterized by its relation to the user within a specified mile of a current location, or home address (automatically detected by system, or via manual input). This radius can be changed by the user, and changing this radius will refresh the data to represent the change in area. The last, most important piece of this interface is the disruptive notification that will be sent to the user when a confirmed case comes within a specified distance of the user. Information about the contact, such as location, time and distance, will be available within the app.

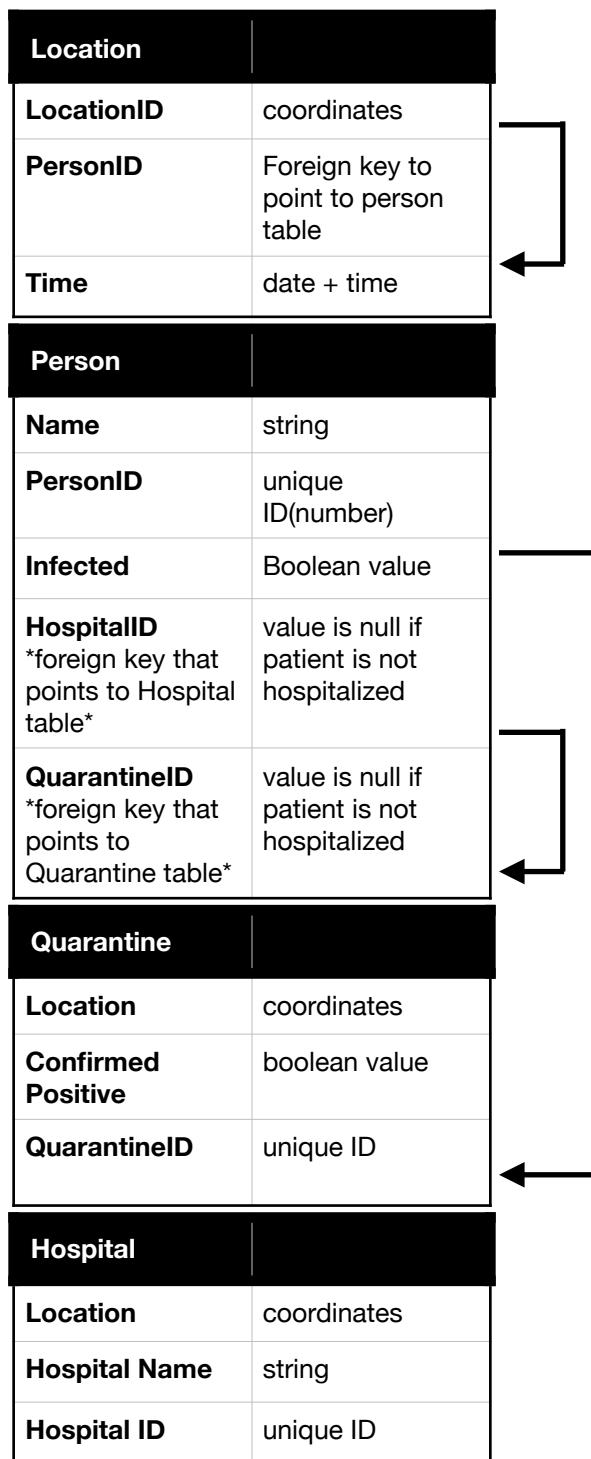
DATA COLLECTION & STRUCTURE

A major aspect of this interface is the retrieval, storage, and display of large amounts of data. This data can be stored in a relational database (*ie. using SQL or another similar language*), so that the relationship between users, other patients, active cases, and hospitalizations, can all be easily linked and retrieved via query. In terms of actually receiving this data, the databases can be populated by accessing public records (at state or national level), and from Hospitals and testing centers. It should also be noted that this interface assumes access to active, anonymized location data from mobile devices.

A sample of how this database will be structured is as followed:

This structure for a Relational database will be particularly helpful in finding out where an infected person was, and who else was there. We could query for all the locations associated with a certain personID, and return all the personIDs from each of those locations to determine who that person had contact with. However, this data should probably be refreshed every 5 days or so, for relevancy and storage concerns.

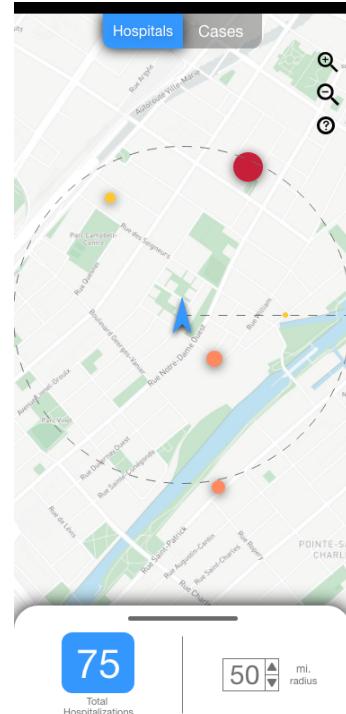
(arrows represent foreign keys that link one tables uniqueID to another)



User Interface

DISCOVERABILITY

When the user opens the app, it starts on the following screen. From here, the sequence that is given to the user is simple and intuitive. There are two options, to select a category from the upper selection tabs, or to pull up the bottom tab, and reveal a more in depth look at the statistics. These options are revealed clearly to the user, as they are the only available surfaces, and utilize signifiers (highlighted selections and hover animations) to communicate to the user that they can be interacted with. If the user pulls the tab up, it comes up in a sliding motion, indicating that it can also be slid back down. Also, all of the other tabs (accessible via upper tabs), follow the same format and action sequence, so the user will be able to interact with the rest of the screens very smoothly, and intuitively.



FEEDBACK

Throughout the interface, there are many signs that communicate to the user about the result of their actions, and how they are affecting/will affect the current state of the app. For example, at the top of the screen, there is a tab that displays what category of data that the user is viewing. When the bottom tab is pulled up, it does not cover this tab, communicating that this screen is still part of the same tab. Throughout all screens of the interface, the user will always be able to know which category they are currently in. Also, hovering over each option will change the background color of that option, indicating the directed path of the action. When clicked, the menu will react, highlighting the choice with a change in color, and the addition of a drop shadow, which clearly displays that the new selection is “active”. This hover, and selection feedback is implemented in the buttons that allow a user to change the active time frame. This interaction with menu items communicates very clearly to the user how their actions will affect the interface state.

CONCEPTUAL MODEL

The way that this interface is built and designed does so in a way that is naturally intuitive to the user, on how to receive the information they want to receive. The screens are broken up into two main categories: Hospitalizations, and cases. Therefore it is clear that in order to receive information in one of these separate categories, the user must navigate to these specific pages. This setup allows for a clear separation of data, instead of a confusing conglomerate of information that would overwhelm the user. The interface displays the bare minimum at first, but reveals everything else within one swipe. This supports a clear conceptual model, as it does not force the user to undergo lots of menu diving and navigation, and provides a clear path to the most important information, with minimal effort from the user.

AFFORDANCES

The main affordances that are available within the interface are the following:

The ability to change what category of data the screen is showing.

The ability to pull upwards on the bottom tab, revealing more extensive data.

The ability to zoom in and out on the map view.

The ability to change the current working radius.

The ability to swipe through the timeline of data displayed in the bar graphs.

The ability to change the displayed time frame (in data view screen).

SIGNIFIERS

The highlighted tab at the top of the screen, as well as its hover animation, are signifiers to the affordance of switching what the screen is showing.

The flat, horizontal line at the top of the bottom tab is a signifier to the affordance of pulling upwards on the tab itself.

The magnifier icon with the plus and minus symbols are a signifier to the affordance of zooming the map in and out.

The question mark icon are a signifier to the affordance of receiving an information key.

The two arrows facing up and down next to the numerical radius value is a signifier to the affordance of changing this number.

The left facing arrow on the side of the bar graph is a signifier to the affordance of scrolling backwards on the timeline.

MAPPING

The placement of the minimized data tab at the bottom of the initial screen, as well as the placement of the pull signifier on the top of this tab, is an effective mapping to the action of pulling this tab up across the screen, and communicates this action well. When this tab is pulled up, the signifier remains at the top of the tab, again mapping this action of pulling down

from the top. This mapping is also consistent throughout Apple's native iOS UI (and other 'flat design' products), so this will be familiar to most users.

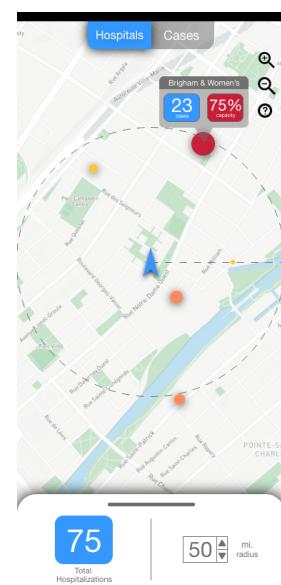
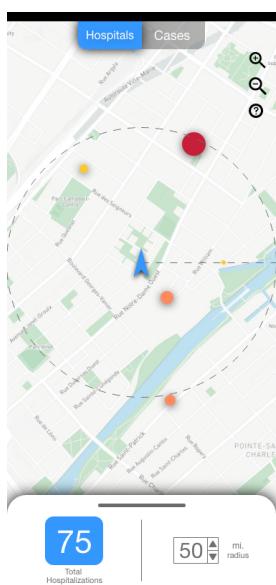
Another instance of effective mapping is the two simple arrows on either side of the bar graph. The placement of these arrows effectively maps these buttons the action of the graph moving in that same direction, and is very intuitive.

CONSTRAINTS

Some constraints of this interface include that the user must access the interface from a mobile device, with active tracking enabled, as much of the interfaces goals are dependent on referencing the users location, and sending disruptive notifications to the users lock screen.

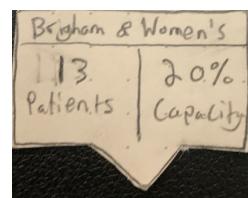
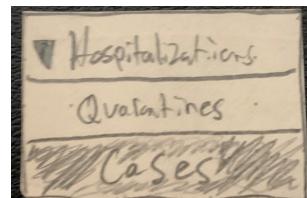
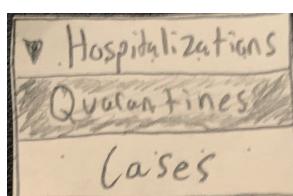
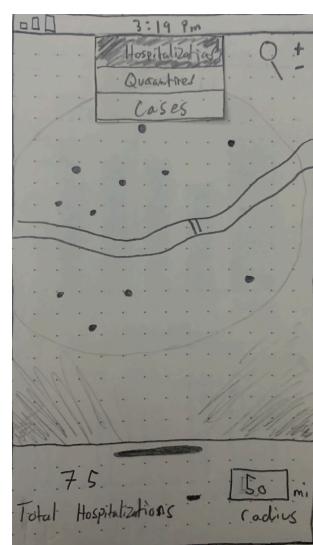
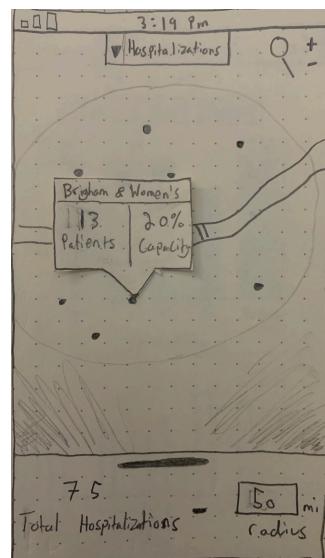
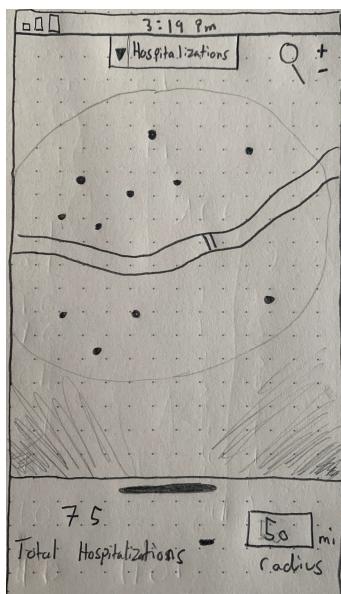
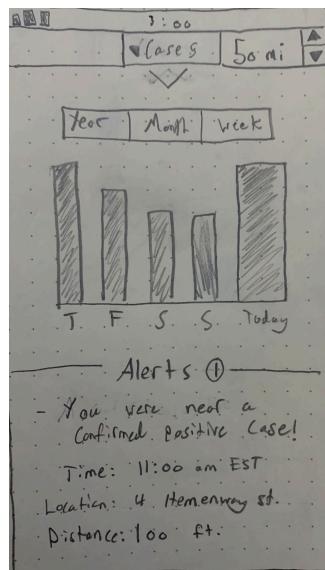
More constraints involve the actual data that is being harvested. Some possible issues that arise with using location based data, and connecting this data to medical records. This might bring up some concerns in terms of user privacy/safety concerns of those who are displayed as positive. However, for the sake of this hypothetical interface, all data will be assumed to be completely anonymized.

FINAL PROTOTYPE SCREENS



Design Process Iteration

1st Iteration: [Marvel Prototype Link](#)



Changes After User Testing:

The main changes that were brought up through user testing, and resolved in the version 2 prototype were the following:

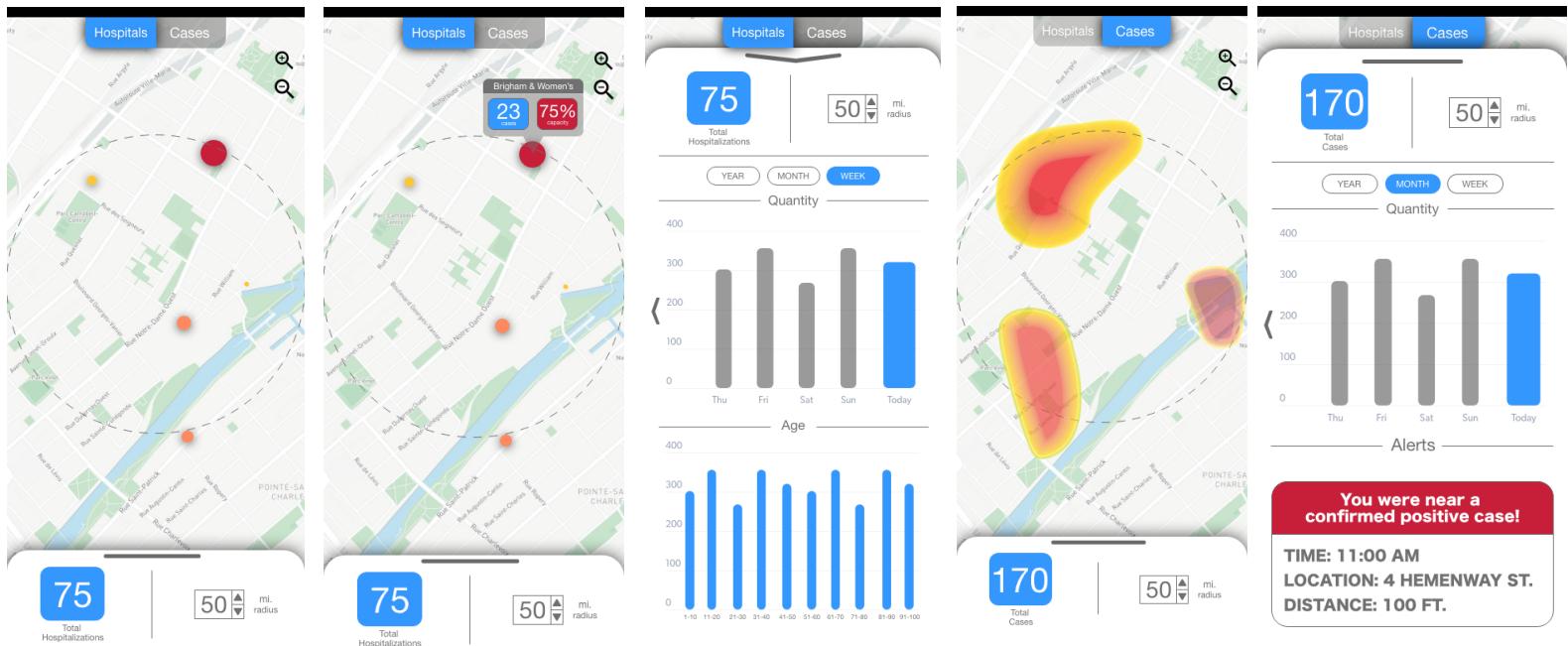
User needed to click on the hospital dots to actually see the extent of the hospitalizations:
This was fixed in the following two ways:

- Addition of color ranking system: red = most danger , yellow = least.
- The dots that represent each hospital are larger/smaller based on how many cases are there.

Both of these changes add an immediate signaling, and communication of desired information to the user.

Another change that was made was the deletion of the “quarantines” tab, as the information was fairly redundant if the user already has the ability to see the cases. Since now there are only two options, i changed the dropped menu design, to a simple switch button.

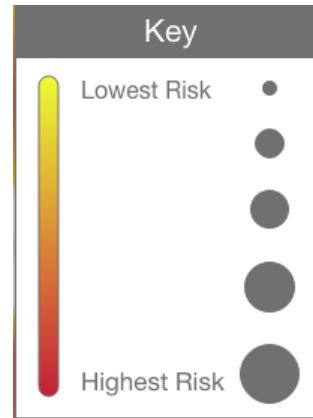
Version 2: [XD LINK](#)



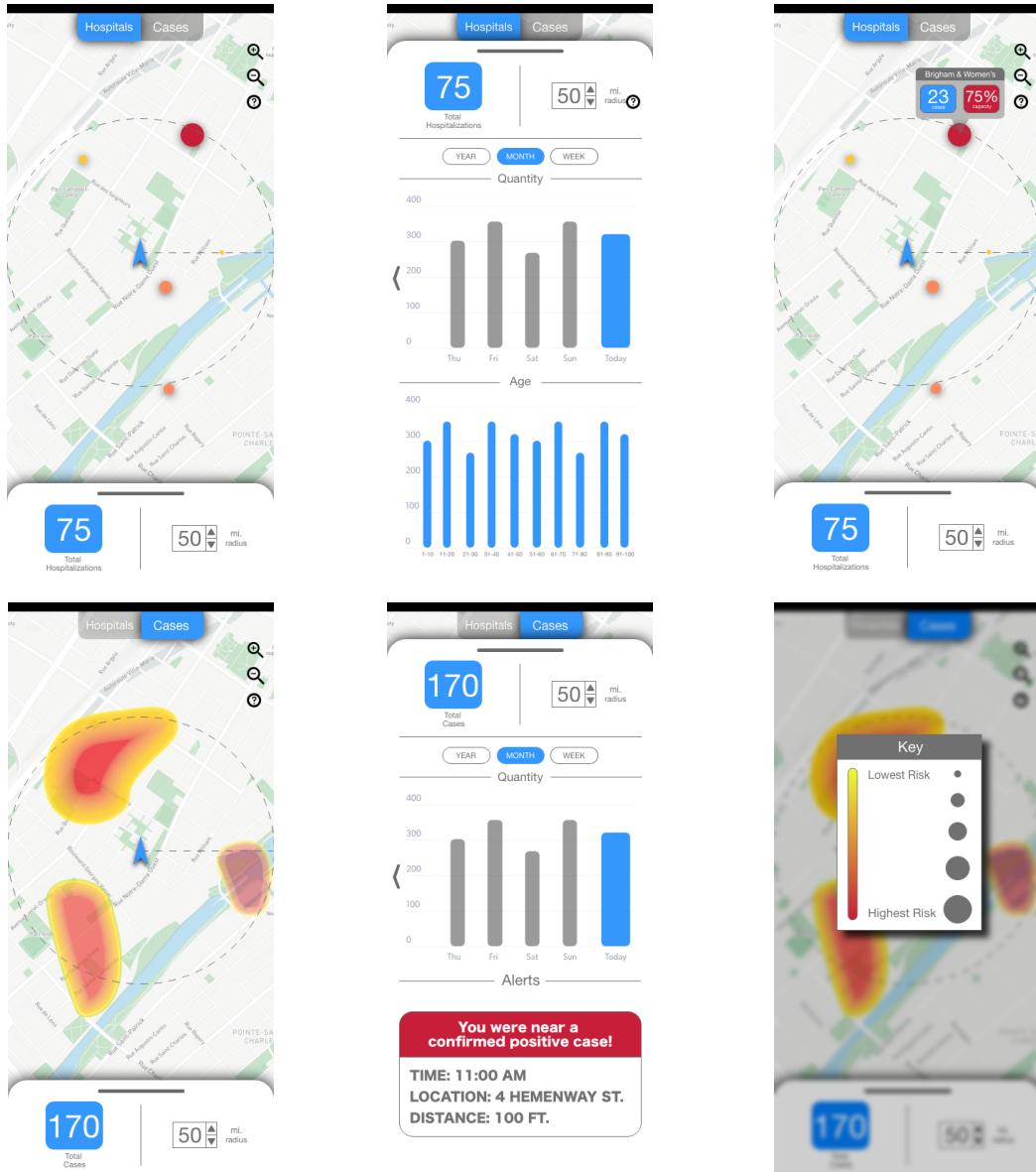
User Testing (2nd iteration)

I received feedback that while scrolling on the map, it would be confusing to understand where the user's current location was (in relation to the specified radius). To clear this up, I added the blue navigation symbol (which is a cultural signifier for location), with a dotted horizontal line to represent the radius. Now, if a user moved the map, it would still be clear where their nearby area is.

Another point of feedback I received was to provide some sort of key to explain the color scales. Although the color red usually represents higher intensity/danger, it would be helpful to have this key as a reinforcement. The key pops up as a context menu, when a user hits the “info” button, and explains the color scale, as well as the size scale for hospitals.



Final Prototype [XD LINK](#)



VERSION OVERVIEW

Version 1:

<https://marvelapp.com/prototype/5ebii97/screen/73151373>

Version 2:

<https://xd.adobe.com/view/25ac67b7-ee7f-4043-ad5b-df0103516650-70ff/?fullscreen>

Version 3:

<https://xd.adobe.com/view/50a056de-c577-4fe1-bb3a-280018595a3f-05f3/?fullscreen>