COVID_19 - Social Distancing App

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Introduction:

COVID_19 app is developed with the aim to increase awareness about social distancing among people and track their social interactions. The device passively collects the data and tracks only under users consent.

Technology used:

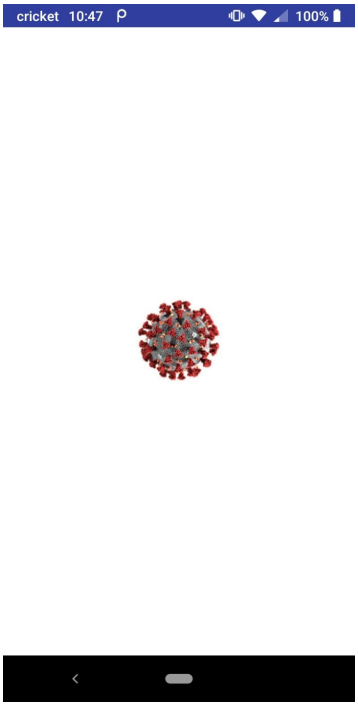
- Android Studio/Java
- Database: Firestore
    - I used firebase because you can sync the data to the server in realtime and computations/analysis can be made in realtime.
    - Offers user authentication, ML and cloud functionalities that can be used while extending the project idea.
- No places API
    - I didn't use the Places API, instead I obtained the address from the lat/long information. If we want to have more insights about the places a user visits, then places API will be handy.

Ideas:

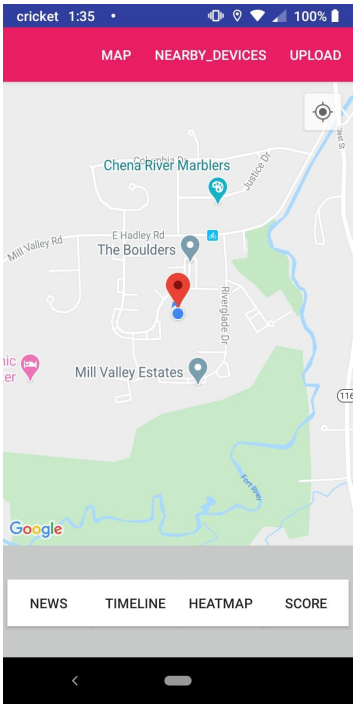
- A good app should provide maximum information with minimum content(less cognitive load). Therefore, I used a heatmap to highlight the data on the geographical map.
- Awareness about the ongoing pandemic should be increased and people should take necessary preventive steps to protect themselves. Hence, I incorporated a NEWS feature that redirects to a website that provides updates on COVID.
- User authentication should be done and firebase makes this task easy. I did not set up the authentication for this project, however it can easily be set up.
- In my code, the bluetooth passively scans for nearby devices, but the control to update information on the server is given to the user. I feel this is important because of the associated privacy concerns. Sometimes the user might not be comfortable to mark a few places in their timeline. Though, I understand that it will be cumbersome to manually update the data, it gives the user a sense of responsibility and control over the app.
- We can ensure that the user constantly updates, by pushing notifications at regular intervals. Making the app more user friendly and attaching some perks based on the score can attract the user to use the app.

UI/UX Design:

- Kept the design simple and included minimal widget to reduce cognitive load.
- Consistent theme
- Provided feedback through toast messages.
- Allows the user to make mistakes and explore the app without cascading effects.

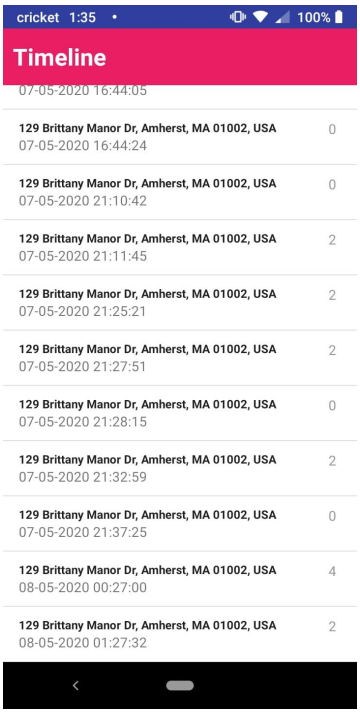


Splash Screen

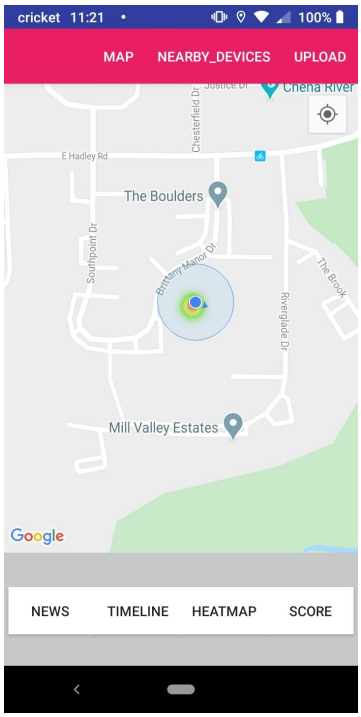


Main Activity

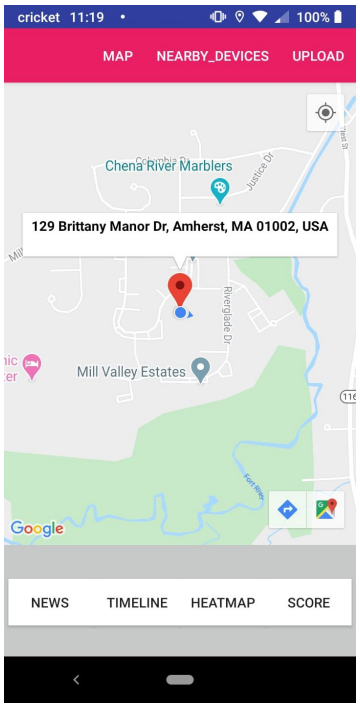
News



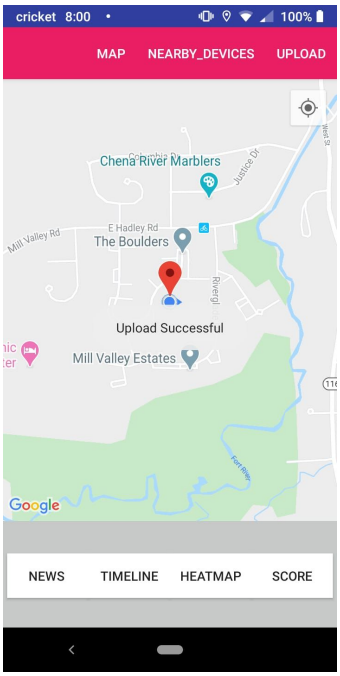
Places History along with time and number of people



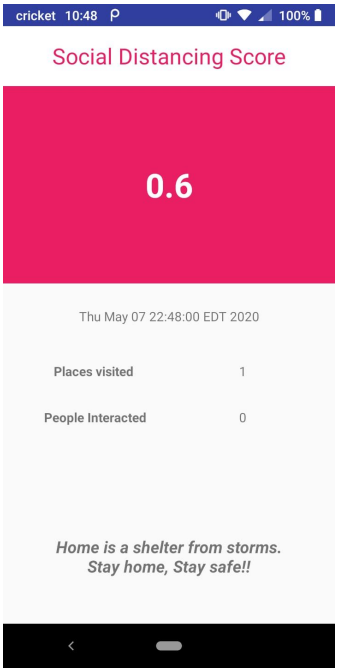
HeatMap of the place distribution



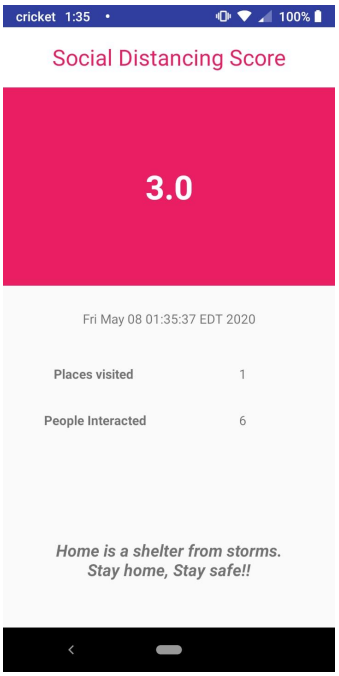
MAP: Displays the location



Update Toast



Score before update



Score after update

Functionalities of the app:

Splash Screen:

- Displays the app logo.

BUTTONS AT THE TOP OF THE MAIN SCREEN

News:

- Redirects to the website "https://www.worldometers.info/coronavirus/". This website provides the latest news about the Coronavirus. This helps the user stay informed and take sufficient measures.

Timeline:

- Displays the history of places visited along with their corresponding time and the estimate of the crowd in that place.

Heat Map:

- Displays the heatmap of the places visited and the map is weighted by the crowd at the given location.
- This visualization helps the user understand their moving patterns and the places that they commonly visit.

Score:

- Displays the computed social distancing score of the user. It is the weighted average of the number of places visited and the number of the people interacted till a given time of the day. Lower the score benefits the user. So the aim is to maintain low scores.
- Inspiring quotes are displayed at the bottom of the page.
- Score = 0.6*Place count + 0.4*device count.

    - The score displayed for the current day and it's a cumulative score.
    - This penalizes travelling to places. My intuition behind this is that the user can restrict going to places but the crowd in those areas is out of users control and hence we penalize heavily with place count.

BUTTONS AT THE TOP OF THE MAIN SCREEN

Map:

- Displays the current location of the user.
- Using the latitude and longitude information, the address of the location is obtained and a marker highlights the location.
- On clicking the marker, the user can see the exact address of the place.

Nearby Devices:

- This functionality activates the bluetooth to discover nearby bluetooth devices and displays the paired devices.
- Estimated number of people around the user is obtained from the device count.
- Only phone devices are filtered out among other bluetooth classes and it is assumed that each phone represents one person in the vicinity. The device details are not stored for privacy concerns.

Upload :

- The recorded information(Latitude,Longitude, Address, number of devices and the timestamp) are uploaded to Firebase in realtime.
- Though this functionality requires the user to perform the action, it saves a lot of battery and in a way can protect the users privacy. If we collect the information from the app, in the background, then the user does not have much control over his/her privacy.
- A toast message is displayed on successful updation.

Code Contribution:

- The starter code provided was very helpful.
- Used the starters code. Implemented Splash,Upload, Timeline, News, Heatmap and Score over the basic code.
- Set up a Google Firebase realtime database to record the location details.