**System Requirements Specification**

**COVID Tracking Ego Network App**

**CS491 Spring 2021**

**Team Name: COVID Tracking**

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# 1 Introduction

## **1.1 System to be Produced**

The overall system will be an improved version of a mobile app that calculates friendship levels to determine how close the user is to each of their friends using an ego network algorithm. The ego network algorithm is able to calculate these friendship levels using Instagram, Facebook, Snapchat data that is downloaded from the user’s account and then stored on their device. The results of the algorithm are then able to be used to track COVID-19 spread along with who you are most at risk of spreading COVID-19 to or getting COVID-19 from. The overall purpose of this product was to implement the idea of contact tracing to reduce the spread of COVID. This project will have further additions such as location (GPS) tracker and COVID 19 precautions page. The ego network algorithm will use the levels of closeness that it calculates to group the user’s friends into these different groups.

## 1.2 Applicable Standards

* The system will contain a user interface with a quick access toolbar to allow for easy navigation and use of the app regardless of the user’s technological skill. This will be accomplished by having a comprehensive help page within the app that will walk the user through all major parts of the app’s functionality. This will also be accomplished by having information and tabs being clearly labeled with descriptive names or titles.
* The system will identify the user’s contacts with high closeness numbers as determined by the ego network calculation. The user can then analyze the contacts and their related closeness numbers to understand who may be at most risk of potential COVID-19 spread.

## 1.3 Definitions

* CDC - The Centers for Disease Control and Prevention (CDC) serves as the national focus for developing and applying disease prevention and control.
* Closeness - This term refers to the closeness score that the ego network algorithm calculates that defines how close it perceives that specific person to be to the user. This calculation is based on the quantity and frequency of interactions between the person and the user. The higher the closeness number, the closer the algorithm perceives these two individuals to be.
* Contact Tracing - The term contact tracing is used to describe the process of identifying potential people who have been exposed to the virus due to a close contact with another person.
* COVID-19 - A respiratory disease caused by SARS-CoV-2, a new coronavirus discovered in 2019. The virus is thought to spread mainly from person to person through respiratory droplets produced when an infected person coughs, sneezes, or talks.
* Ego - A shorter way of saying “Ego Network”.
* Ego Network - An ego network is a list of the user’s friends and family that is ranked by their closeness to the user. This network is a result of an ego network algorithm which calculates the closeness values.
* Friendship Level - This term refers to the different groups that the ego network groups people into (Serious Friends, Good Friends, Friends, Distant Friends). The level that a person is placed into by the algorithm is based on their closeness score.

# 2 Product Overview

## 2.1 Assumptions

The ego network app will work purely as a standalone app, with no cloud or separate components. This means that all computation will be done on the local device as well as all data being stored to the local device due to security and privacy reasons. The user is expected to have either an Android or iOS device that meets the operating system requirements outlined in the Physical Environment Requirements section.

To enable this app to create an ego network it needs to be uploaded data about the user from Instagram, Snapchat, or Facebook. Any or all of these data sources may be used. It is expected that the user frequently uses the apps associated with the data sources they upload and understands that the more frequently they use the app(s) the more accurate the ego network becomes.

Once the user decides which data source(s) they will use, they must download their account data for each data source and upload the unzipped folders to the local device the app will be running on.

## 

## 2.2 Stakeholders

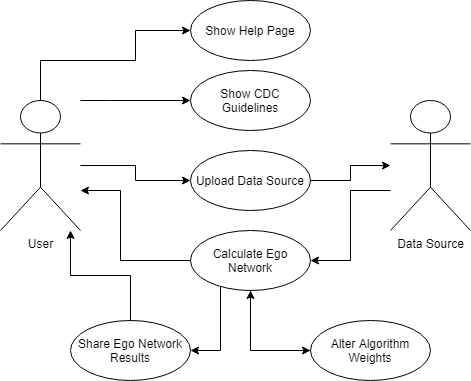
* Customer:
  + The user is the person the app is being designed for based on their idea for the project.
* Product Owner:
  + The product owner is the person who works with the developers to insure that the project is progressing and satisfies the wants and needs of the user.
* Developer:
  + The developer is the person/people who design and create the product.
* Researcher:
  + The researcher is a type of user that uses this app to research ego networks by adjusting the weights of the algorithm to see how it affects the output.
* Ego Network User:
  + The ego network user is a type of customer that would use this app out of interest in finding out how close they are to their friends according to the ego network algorithm.
* COVID-19 Tracking User:
  + The COVID-19 tracking user is a type of user that would use this app to help determine the people they are closest to so that they may help protect themself and others from spreading COVID-19.

## 

## 2.3 Event Table

|  |  |  |  |
| --- | --- | --- | --- |
| Event Name | External Stimuli | External Responses | Internal Data and State |
| Upload Data Source | The user navigates to the Upload Data tab and clicks the Upload Data button. | The app displays the file picker UI to allow the user to select the correct folders containing the data. | The user must be on the Upload Data tab of the app. The user must have data downloaded to be uploaded. |
| Calculate Ego Network | The user navigates to the Ego Network tab and clicks the Calculate Ego Network button. | The app calculates the user’s ego network and displays it to the user. | The user must be on the Ego Network tab of the app. The user must have data uploaded to be analyzed. |
| Show Help Page | The user navigates to the Help tab. | An interactive help page is displayed where the user can click the appropriate tile to get more information about that topic. | The user must be on the Help tab. |
| Show CDC Guidelines | The user navigates to the CDC Guidelines tab. | A page displaying the CDC’s guidelines about COVID-19 is shown. | The user must be on the CDC Guidelines tab. |
| Share Ego Network Results | The user navigates to the Ego Network tab and clicks the Share button. | A shareable version of the user’s ego network is created and saved to the user’s device. | The user must have previously calculated an ego network. The user must be on the Ego Network tab. |
| Alter Algorithm Weights | The user navigates to the Weights tab, selects a weight, alters the value, then saves the new value. | The app saves the new weight value and is now displayed on the weights tab as the new weight for that type of data. When the user calculates a new ego network this change should be reflected in the calculated friendship scores. | The user must be on the weights tab. |
| Create Shareable Algorithm Snapshot | The user navigates to the Ego Network tab and selects the Share button. | The app shall take a screenshot of their ego network overview and save it to the device. This screenshot can then be used to easily share with friends. | The user must be on the Ego Network tab and have calculated their Ego Network before. |

## 2.4 Use Case Diagram



## 2.5 Use Case Descriptions

* Show Help Page:
  + The user navigates to the Help tab.
* Show CDC Guidelines:
  + The user navigates to the CDC Guidelines tab.
* Upload Data Source:
  + The user navigates to the Upload Data tab and uses the file picker to select the folder containing their data which links that folder to the app. This establishes a data source for the app.
* Calculate Ego Network:
  + First, the user navigates to the Ego Network tab and chooses the button to calculate their ego network. This causes the app to communicate with the data source so that the algorithm can analyze the social media data. After the ego network has been calculated it is then displayed to the user in an interactive form.
* Share Ego Network Results:
  + If an ego network has already been calculated using the app then the user can navigate to the Ego Network tab and click the Share button. This will save an image that gives an overview of the ego network to the device. This image can then be shared by the user.
* Alter Algorithm Weights:
  + The user must navigate to the Weights tab and select the weight they wish to alter. After the weight has been selected a slider will appear which the user can move to alter the value of the weight. After the desired value has been selected the user can save this value using the Save button. Next time the user calculates a new ego network the algorithm will use this new weight value when calculating the friendship scores.

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# 3 Specific Requirements

## 3.1 Functional Requirements

|  |
| --- |
| No: 1.1 |
| Statement: The app shall ask the user to upload their data to the app to be parsed. |
| Source: User |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: User uploads unzipped folder of their social media app data. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.2 |
| Statement: The app shall utilize Instagram,Facebook, Snapchat data including likes, group messages, direct messages, received images, received videos, data categorized as received other, sent images, sent videos, and data categorized as sent other. |
| Source: User, Internal Design Team |
| Dependency: 1.1 |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: User data is saved onto the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.3 |
| Statement: The app shall differentiate Instagram,Facebook, Snapchat data including likes, group messages, direct messages, received images, received videos, data categorized as received other, sent images, sent videos, and data categorized as sent other. |
| Source: Internal Design Team |
| Dependency: 1.2 |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: User data is saved onto the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.4 |
| Statement: The app shall analyze the user’s uploaded data to create the ego network. |
| Source: Internal Design Team |
| Dependency: 1.1, 1.2 |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: User data is processed. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.5 |
| Statement: The app shall produce an ego network based on the user’s social media communication data. |
| Source: Internal Design Team |
| Dependency: 1.3, 1.4 |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: The app can utilize and differentiate between Instagram,Facebook, Snapchat data (1.2, 1.3) |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.6 |
| Statement: The app shall calculate the ego network using a custom ego network algorithm created for the app. |
| Source: System Design - Implemented algorithm in source code |
| Dependency: 1.5 |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: The apply produces an ego network for the user (1.5) |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.7 |
| Statement: The app shall allow the user to adjust the weights of the ego network algorithm. |
| Source: System Design - Implemented algorithm in source code |
| Dependency: 1.6 |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: The size of the ego network changes. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.8 |
| Statement: The app shall sort friends into four defined levels. |
| Source: System Design - Implemented algorithm in source code |
| Dependency: 1.1 |
| Conflicts: None |
| Supporting Materials: Use Case Diagram |
| Evaluation Method: The system displays the friends’ of the user. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 1.9 |
| Statement: The app shall use geo-tagging from Instagram posts to determine where the user has been to evaluate COVID-19 risk. |
| Source: System Design - Implemented algorithm in source code, User, Database |
| Dependency: 1.6 |
| Conflicts: None |
| Supporting Materials: Vision Statement |
| Evaluation Method: The user is able to select a specific image from the set and the system returns calculations of the required changes. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

## 3.2 Interface Requirements

|  |
| --- |
| No: 2.1 |
| Statement: The app shall display the general locations of the where the user has been based on geo-tagging of their Instagram posts and the COVID-19 statistics from that general area. |
| Source: System Design, Data Source |
| Dependency: 1.9 |
| Conflicts: None |
| Supporting Materials: Vision Statement |
| Evaluation Method: User’s location data is stored onto the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 2.2 |
| Statement: The app shall display the time and day the user was at a location. |
| Source: Data Source |
| Dependency: 2.1 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SDS |
| Evaluation Method: User’s location data is stored onto the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 2.3 |
| Statement: The app shall display to the user who is in each friendship level in their ego network. |
| Source: System Design |
| Dependency: 1.8 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SDS |
| Evaluation Method: The app sorted the user’s close contacts into four levels (1.8) |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 2.4 |
| Statement: The app shall display a COVID-19 precautions page from CDC. |
| Source: CDC, Data Source |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SDS |
| Evaluation Method: CDC guidelines tab is displayed |
| Revision History: Original requirement by the Internal Design Team (Feb. 2021); Add beginning test page for CDC tab (Feb. 25-End of Sprint 1) |

## 3.3 Physical Environment Requirements

|  |
| --- |
| No: 3.1 |
| Statement: The app shall be able to run on either an ARM Android device or iOS device that is an iPhone 4S or newer [1]. |
| Source: Internal Design Team, User |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The app does not become unresponsive |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 3.2 |
| Statement: This app shall only run on an Android with operating system Jelly Bean v16 4.1.x or newer or on an iOS device with iOS 8 or newer [1]. |
| Source: Internal Design Team |
| Dependency: 3.1 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The app does not become unresponsive. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 3.3 |
| Statement: The app shall require up to 50 megabytes of available storage on the device. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The app downloads on the user’s device. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 3.3.4 |
| Statement: The app shall require the user to have at least 5 megabytes of available storage for the data of each social media account. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The app downloads on the user’s device. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

## 3.4 User and Human Factors Requirements

|  |
| --- |
| No: 4.1 |
| Statement: The app shall be usable for users with a recommended age of 13 years or older. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: User confirms they are 13 years of age or older |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 4.2 |
| Statement: The app shall contain a detailed Help page. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: Help tab is displayed in the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 4.3 |
| Statement: The Help page shall explain to the user how to download their communication data from Instagram, Snapchat, or Facebook. |
| Source: Internal Design Team |
| Dependency: 4.2 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The "Downloading Your Data" page is displayed in the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 4.4 |
| Statement: The Help page shall explain to the user how to upload their communication data to the app. |
| Source: Internal Design Team |
| Dependency: 4.2 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The "Uploading Your Data" page is displayed in the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 4.5 |
| Statement: The Help page shall explain to the user how to adjust the algorithm weights within the app. |
| Source: Internal Design Team |
| Dependency: 4.2 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The "Adjusting Your Algorithm Weights" page is displayed in the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 4.6 |
| Statement: The Help page shall explain to the user how to calculate their ego network. |
| Source: Internal Design Team |
| Dependency: 4.2 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The "Calculating Your Ego Network" page is displayed in the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 4.7 |
| Statement: The Help page shall explain to the user how to interpret their ego network. |
| Source: Internal Design Team |
| Dependency: 4.2 |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: The "Understanding Your Ego Network" page is displayed in the app. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

## 3.5 Documentation Requirements

|  |
| --- |
| No: 5.1 |
| Statement: The app shall have all of its associated documentation stored in the GitHub repository for the app. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: GitHub Repository |
| Evaluation Method: Documentation can be found in the GitHub Repository |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 5.2 |
| Statement: The app shall have an associated SRS document. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: Documentation can be found in the GitHub Repository |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 5.3 |
| Statement: The app shall have an associated SDS document. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: Documentation can be found in the GitHub Repository |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 5.4 |
| Statement: The app shall have an associated Test Plan document |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: Documentation can be found in the GitHub Repository |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 5.5 |
| Statement: The app shall have a detailed README.md file. |
| Source: Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: COVID Tracking Team SRS |
| Evaluation Method: Documentation can be found in the GitHub Repository |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

## 3.6 Data Requirements

|  |
| --- |
| No: 6.1 |
| Statement: The app shall only accept data in the JSON format. |
| Source: System Design - implemented source code, Internal Design Team |
| Dependency: None |
| Conflicts: None |
| Supporting Materials: None |
| Evaluation Method: Data files are of file extension .JSON |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 6.2 |
| Statement: The app shall convert the inputted JSON data from the user's Instagram and Snapchat accounts into a custom JSON format specified in the GitHub repository in the file "data\_standard.md". |
| Source: System Design - implemented source code, Internal Design Team |
| Dependency: 6.1 |
| Conflicts: None |
| Supporting Materials: GitHub Repository |
| Evaluation Method: .JSON data files match the GitHub repository defined naming convention. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

## 3.7 Resource Requirements

No additional resources shall be required by the app.

## 3.8 Security Requirements

|  |
| --- |
| No: 8.1 |
| Statement: The app shall not store any communication data that the user imports for usage in creating their ego network. |
| Source: System Design - implemented source code, Internal Design Team |
| Dependency: 1.1 |
| Conflicts: None |
| Supporting Materials: None |
| Evaluation Method: User uploads data. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 8.2 |
| Statement: The app shall only store the names, friendship levels, and friendship scores of the user's friends. |
| Source: System Design - implemented source code, Internal Design Team |
| Dependency: 1.1 |
| Conflicts: None |
| Supporting Materials: None |
| Evaluation Method: User uploads data. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

|  |
| --- |
| No: 8.3 |
| Statement: The app shall only store data locally on the user's device. |
| Source: System Design - implemented source code, Internal Design Team, Data Source |
| Dependency: 1.1 |
| Conflicts: None |
| Supporting Materials: None |
| Evaluation Method: App data is visible on the local device. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

## 3.9 Quality Assurance Requirements

|  |
| --- |
| No: 9.1 |
| Statement: The app shall be required to be secure enough that a user can trust the app with their communication data. |
| Source: User |
| Dependency: 1.1 |
| Conflicts: None |
| Supporting Materials: None |
| Evaluation Method: User uploads data. |
| Revision History: None - Original requirement by the Internal Design Team, Feb. 2021 |

# 4 Supporting Material

See GitHub repository at[*https://github.com/TrackSpike/COVID-Tracking*](https://github.com/TrackSpike/COVID-Tracking)to view the supporting materials listed in Section 3 Specific Requirements.