**System Requirements Specification**

**COVID Tracking Ego Network App**

**CS-490 Fall 2020**

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# Section 1: Introduction

## System to be Produced:

The product that will be produced from this project is 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 can calculate these friendship levels using Instagram and 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. This product was inspired by Robin Dunbar’s research on the social brain hypothesis based on his study of apes [2]. His hypothesis states that humans are evolved to live in social groups and have well defined levels of closeness [2]. This product defines those levels of closeness as Serious Friends, Good Friends, Friends, and Distant Friends. The ego network algorithm will use the levels of closeness that it calculates to group the user’s friends into these different groups.

## Applicable Standards:

None

## Definitions:

* 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. It bases this calculation 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.
* 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.

# Section 2: Product Overview

## Assumptions:

The mobile app should work mainly as a standalone application. Due to the privacy issues surrounding using lots of user data, all computation will be done locally on device. The user is expected to have a phone running either Android or iOS and meets the requirements specified in Physical Environment Requirements PE-1 through PE:4. In order to make a good evaluation the application needs data about the user. It will be assumed that the user has an Instagram and Snapchat accounts that are used to communicate on a semi-frequent basis. The amount communicated is up to the user, but it should be noted that the more communication the user has communicated using those accounts, the more accurate the algorithms predictions will be. The user must then download their communication data from Instagram and Snapchat then save that data on their mobile device.

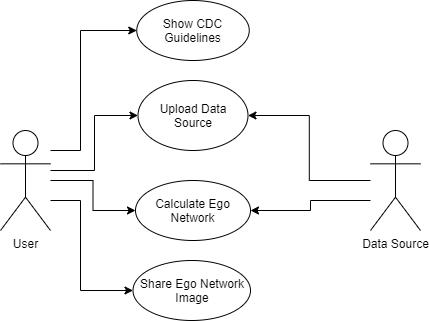
## Stakeholders:

* Customer:
  + The customer is a major stakeholder because the app is being designed as their product.
* Product Owner:
  + The product owner is a stakeholder that works closely with the developers to ensure that the project is progressing successfully and that the customer’s needs are being met.
* Developer:
  + The developer is the stakeholder that designs and creates the application.
* Researcher:
  + A researcher is a type of user that would use this app to research ego networks and be able to test different algorithm weights and how that affects the algorithm.
* Ego Network User:
  + This type of user would simply use the app out of curiosity and interest, giving them insight into how close they might be to each of their friends.
* COVID-19 Tracking User:
  + This type of user would use the app to help protect themselves from catching COVID-19 by understanding who they interact with the most.

## Event Table:

|  |  |  |  |
| --- | --- | --- | --- |
| Event Name | External Stimuli | External Responses | Internal data and state |
| Link Data Source | User navigates to the Upload Data tab and clicks the Upload Data button. | The app provides a UI to select files from the device’s file system | The user must navigate to and be on the Upload Data tab of the app. |
| Calculate Ego Network | User navigates to the Ego Network tab and clicks the Calculate Ego Network button. | The app calculates the user’s ego network based on the uploaded communication data. | The user must navigate to and be on the Ego Network tab of the app. |
| Show CDC Guidelines | User navigates to the COVID Info tab. | A page is displayed with verified information about COVID-19. | The user must navigate to and be on the COVID Info tab of the app. |
| Share Ego Network Image | User clicks the share button. | An image is generated of the ego networked and is then shared using Android/iOS’s built in share feature. | An ego network must be calculated. |

## Use Case Diagram:



## Use Case Descriptions:

* Show CDC Guidelines:
  + The user navigates to the COVID Info tab that gives general information regarding COVID-19.
* Upload Data Source:
  + The user navigates to the Upload Data tab and clicks the button to upload their communication data. If the user successfully selects their communication data using the file picker with no errors this will give the app the path to find the data which will be needed to calculate the ego network.
* Calculate Ego Network:
  + The user navigates to the Ego Network tab and clicks the button to calculate their ego network. Upon this event the ego network algorithm will then be called and use the path to the communication data that was given to calculate then display the user’s friends based on friendship level.
* Share Ego Network Image:
  + The user calculates their Ego Network and then clicks the Share Ego Network button. This will save their ego network as on their device as an image that can be shared.

# Section 3: Specific Requirements

## 3.1 Functional Requirements

* F-1: The app shall produce an ego network based on the user’s social media communication data.
* F-2: The app shall calculate the ego network using a custom ego network algorithm created for the app.
* F-3: The app shall utilize and differentiate Instagram data including likes, group messages and direct messages.
* F-4: The app shall utilize and differentiate Snapchat data including received images, received videos, data categorized as received other, sent images, sent videos, and data categorized as sent other.
* F-5: The app shall allow the user to unlink their social media data from the app.
* F-6: The app shall display to the user who is in each friendship level in their ego network.
* F-7: The app shall ask the user to upload their data to the app to be parsed.
* F-8: The app shall analyze the user’s uploaded data to create the ego network.
* F-9: The app shall allow the user to adjust the weights of the ego network algorithm.
* F-10: The app shall sort friends into four defined levels.

## 3.3 Physical Environment Requirements

* PE-1: The app shall be able to run on either an ARM Android device or iOS device that is an iPhone 4S or newer [1].
* PE-2: 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].
* PE-3: The app shall require up to 50 megabytes of available storage on the device.
* PE-4: The app shall require the user to have at least 5 megabytes of available storage for the data of each social media account.

## 3.4 User and Human Factors Requirements

* UH-1: The app shall be usable by a normal mobile app user with a recommended age of 13 years old or older.
* UH-2: The app shall have a detailed Help tab within the app.

## 3.5 Documentation Requirements

* DOC-1: The app shall have all its associated documentation stored in the GitHub repository for the app.
* DOC-2: The app shall have an associated SRS document.
* DOC-3: The app shall have an associated SDS document.
* DOC-4: The app shall have an associated Test Plan document.
* DOC-5: The app shall have a detailed README.md file.

## 3.6 Data Requirements

* D-1: The app shall only accept data that is in the JSON format.
* D-2: 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”.

## 3.7 Resource Requirements

* No resources shall be required by the app.

## 3.8 Security Requirements

* S-1: The app shall not store any communication data that the user imports for usage in creating their ego network.
* S-2: The app shall only store the names, friendship levels, and friendship scores of the user’s friends.
* S-3: The app shall only store data locally on the user’s device.

## 3.9 Quality Assurance Requirements

* QA-1: The app shall be required to be secure enough that a user can trust this app with their communication data.

# References

[1] “FAQ,” *Flutter*. [Online]. Available: https://flutter.dev/docs/resources/faq. [Accessed: 30-Nov-2020].

[2] S. G. B. Roberts and A. I. Roberts, “Social Brain Hypothesis: Vocal and Gesture Networks of Wild Chimpanzees,” *Frontiers in Psychology*, 25-Oct-2016. [Online]. Available: https://www.frontiersin.org/articles/10.3389/fpsyg.2016.01756/full. [Accessed: 30-Nov-2020].