Final Project Design Document

Team No: 27

Members:

Abdoul Aziz Diallo
Michael Collins
Tanishka Shah
Priyal Chauhan
Kevin Carlson
Chloe Thornton

Project Name: Incognito

Project Synopsis:

Web app that provides supplementary resources for people living with a mental illness. It includes a chatbot, a social network, and an emergency alert device.

Project Description:

There is a shortage of volunteers at the local and state offices for the national suicide prevention hotline. The volunteers receive training for incoming calls and texts from people looking for help. While there is group for many people to work at a time, the emotional weight of the work discourages people from signing up and sometimes even drives people away. The goal of our project is to assist leaders and make their workload more manageable. We believe that a well built and trained AI chatbot can do approximately the same job as a human volunteer participating in the texting program. This involves some advanced natural language processing and extensive training of AI. This will be hosted on the same platform as the rest of the project.

The second part of our project is a social network. Many studies show that social media usage can amplify stress and disordered thinking for many people. This network is specially designed for people affected in this way and provides them a platform to connect, relate, and share resources, their stories, and advice without fear of being judged or "trolled". This network will be protected by rules and regulations that prevent trolling or harmful messages. The result of the project will be an app containing these two elements, hosted on a cloud platform.

The third part of the project is an emergency alert device that will send a pre-specified number of people the location of the person when a button is pressed in a specific sequence.

Project Milestones:

Semester 1:

1. Research algorithms and requirements for all parts – 10/1/21
2. Plan interfaces and UI/UX - 10/18/21
3. Initial coding, have shell of Social Network functioning - 10/29/21
4. Initial stories, have a basic bot functioning – 10/29/2021
5. Implement restrictions, alter themes, specialize network - 11/26/21
6. Have video and final proposal complete – 10/31/2021 & 12/6/2021

Semester 2:

1. Deploy site for social network– 1/24/2022
2. Complete Final Project Design Document – 1/31/2022
2. Connect chatbot to site - 3/1/2022
3. Device connected to app, basic functionality – 3/14/2022

4. Complete signals for device – 4/1/2022
5. Record final video – 4/6/2022
6. Complete Quad Chart - 5/4/2022

Project Budget:

Website Hosting:

- Education Host – $10

Social Network Source:

- Elgg – Free

Alert Device:

- Unsure of Exact Device - ~$15
    - From Amazon
    - Required by Late February

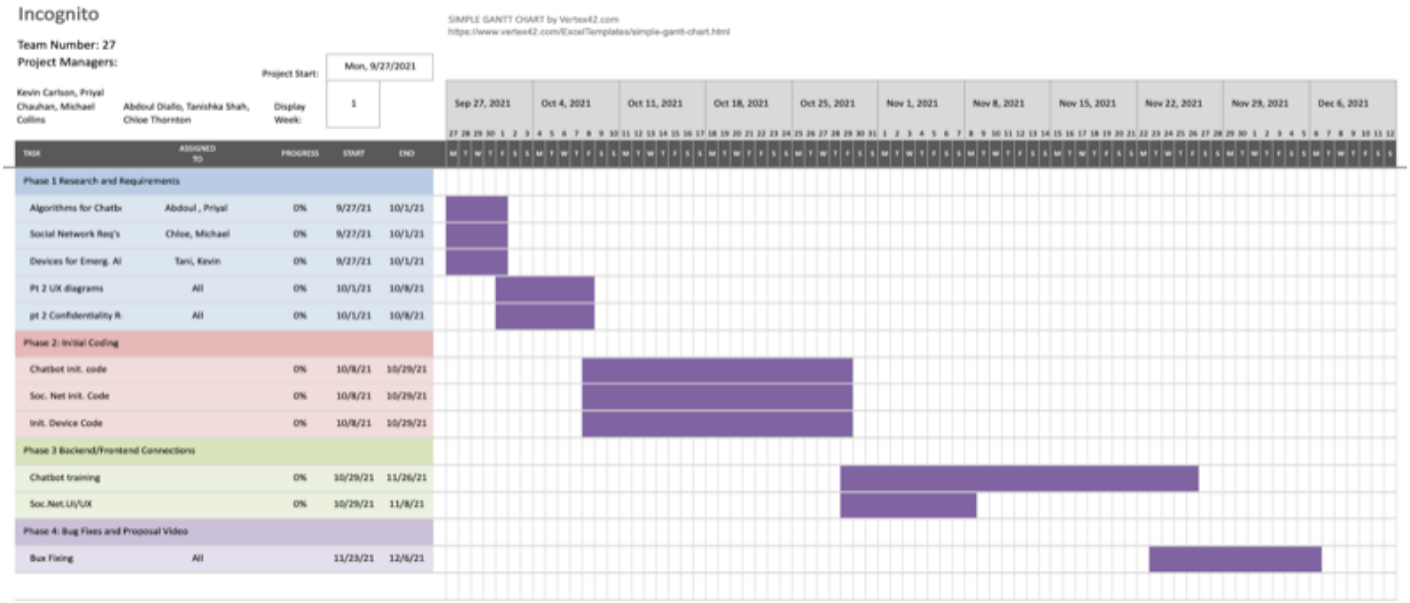
Rasa Open Source:

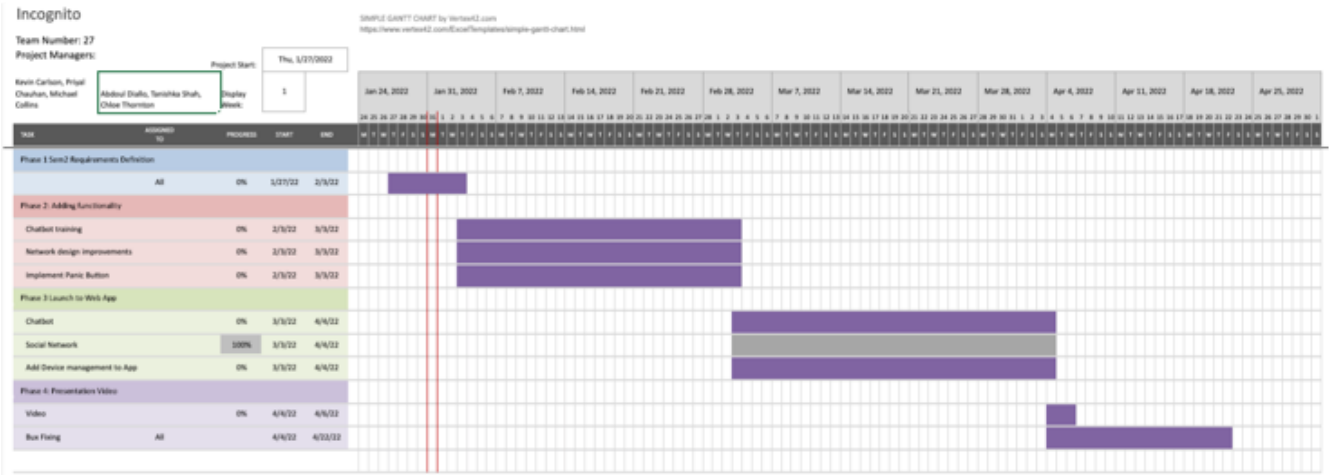
- Free

Rasa X:

- Free

Project development schedule:





Preliminary Project Design:

The project consists of 3 parts: a chatbot, a social network and an emergency alert device.

Chatbot [CATA]:

We used RASA open-source and RASA X to build the chatbot. RASA is "an open-source machine learning framework for automated text and voice-based conversations" (rasa.com). The ability to connect to messaging channels and APIs gives the option to integrate Rasa to apps like Facebook Messenger. As our project requires, we use Rasa X which is a tool installed on top of Rasa Open-Source that serves a great purpose for Conversation-Driven Development (CDD). Rasa configuration files are written in YAML. There are 3 main parts in building and training a rasa bot in the data folder, which are:

- nlu.yml for listing intent examples and labeling keywords among those examples
- stories.yml for conversation examples that the bot can use to communicate.
- rules.yml for specifying what the chatbot should do for each intent.

There are two other important parts of the configuration. The config.yml where we determine the "pipeline" that is followed by the chatbot to take input from the user and analyze it. We use the pre-loaded model Spacy for our language model. That is because it has pre-trained English word vectors and doesn't require us to have a lot more training data. The "Domain" (domain.yml) is "The domain defines the universe in which your assistant operates. It specifies the intents, entities, slots, responses, forms, and actions your bot should know about".

Social Network [Incognito]:

The social network is built using Elgg. Elgg is “an award-winning open-source social networking engine that provides a robust framework on which to build all kinds of social environments” (Elgg.org). Written in PHP, the open source gives us access to the source code to edit themes (HTML, CSS, and JavaScript) to fit our needs.

Elgg requires and uses the following tools:

- MySQL 5.7+
- PHP 7.4+
- Apache server or Nginx

Social Network setup:

The social network has a dashboard that will be the main page for the user. From the dashboard, users will see a list of groups they are part of, a list posts from those groups (the wire), their flow of activity, their blog posts, and a list of pages they created. Every mental illness has its own group. Each group will have certain terms and conditions that the user will have to agree to before they can access it. Groups can only be created by those with an administrator role. Users can join as many groups as they want. A user can request the admins for a group to be created using a poll or a personal message. Depending on potential uses, the group will be created. Because this was a social network based on mental health illnesses, we decided not to allow users to send friend requests to each other. All a user can do on the social network is post, like posts, comment, reply, report, and bookmark posts. They can participate in tasks and polls. We installed a variety of plugins to make our social network possible and to bring ease of experience for the users. We were able to add features that add more to our users' experience.

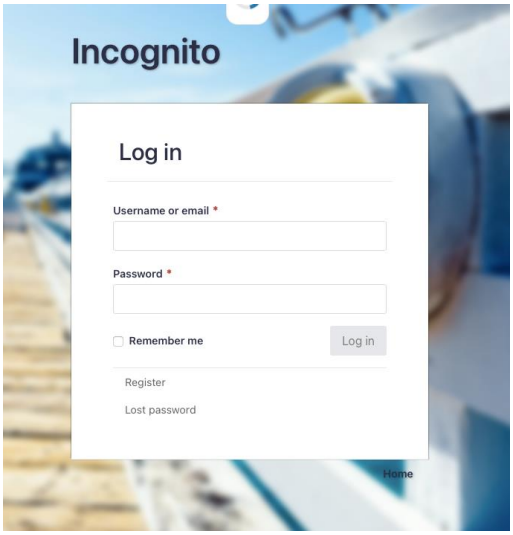
Some plugins and widgets we added are:

- Polls:
    - For users to have statistics over different tools, resources, methods other people use that help them in their daily lives and in times of crisis.
- Blogs:
    - For users to create large posts on things they want others to know about.
- Report
    - For users to report other users that are breaking rules and not following the terms and conditions.
- Content bookmarking
    - Allows users to bookmark content and access it from their profile.
- The Wire
    - Allows users to make short 250-character posts. Meant to be used as a quick check-in or to share a thought/quote they found interesting.

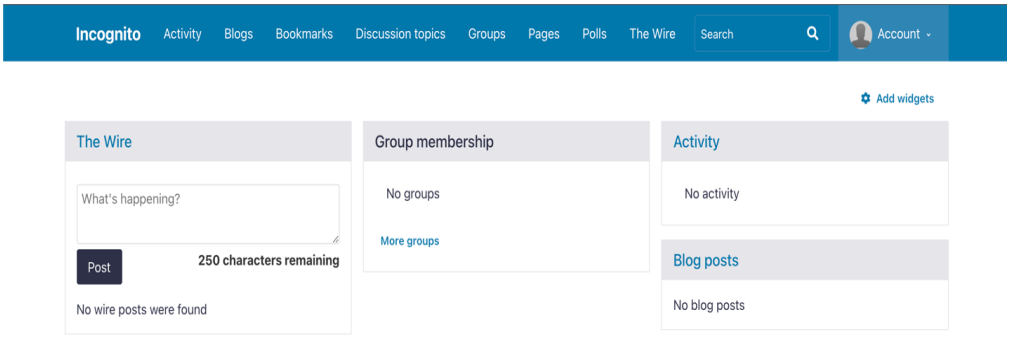
There are other plugins as well. You can see the site at http://incognitoworld.tech/

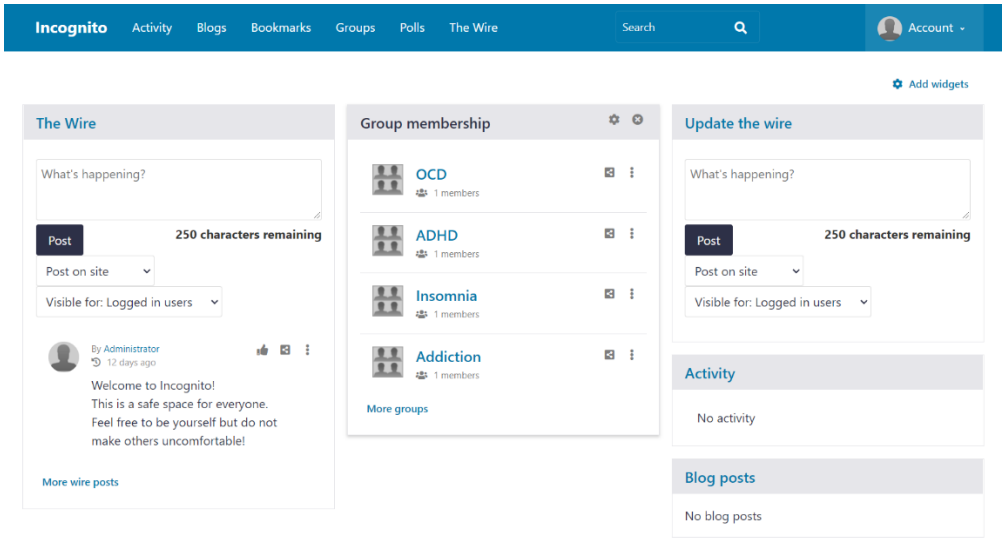
Below are pictures of the user interface looks like. The dashboard will vary from user to user.

Login:

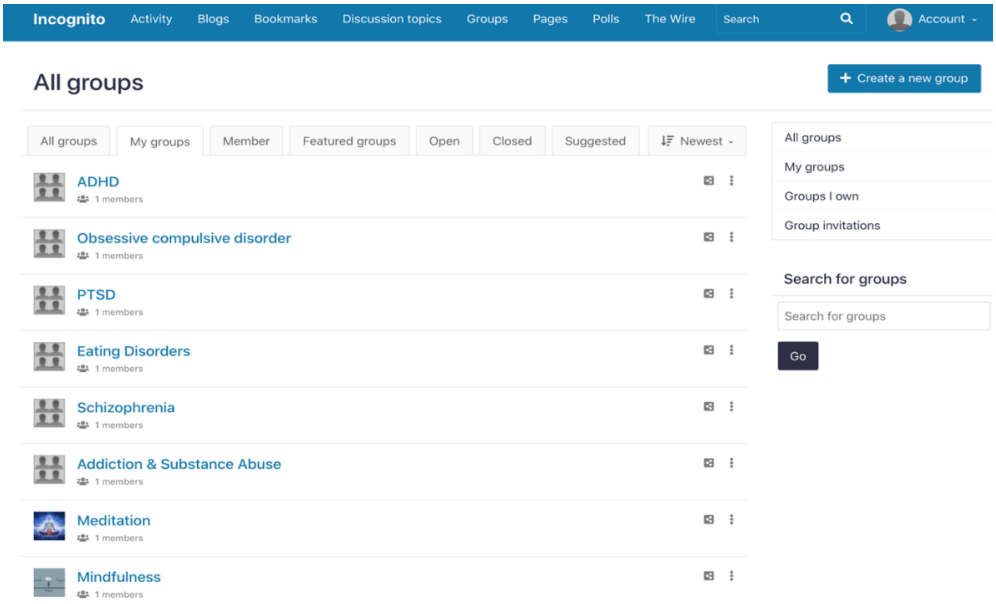


User Dashboards:





Groups:



Flert (Friend Alert):

The emergency alert device is going to consist of a device and a mobile app created via React Native. The user will be able to configure a series of emergency phone numbers to be notified in case the button is pressed. The button itself will be placed in an object that the user can wear such as a bracelet or necklace. Users will be able to configure the sequence of button presses which triggers the app, which will be monitoring the Bluetooth signal, to send out the notifications. Once the button is pressed in that sequence it will trigger the app which in turn will get the location of the button and send the coordinates to the listed emergency contact contacts.

Design Constraints:

Our project has design constraints in a few ways. Firstly, the platform we used to build our social network Elgg, needs a webserver with PHP and SQL integration to function properly. The platform used to build the chatbot, RASA requires python versions 3.6, 3.7 or 3.8. It also requires the python module Groupy. Rasa runs on docker containers which can require a lot of resources and may impact portability. A business constraint that applies to our project is the deadline by which we need to have the project completed. We should be done with the project by early April.

Ethical Issues:

Qualifications:

One possible issue with the project is the ethics concerns of an AI bot counseling an individual during one of the most vulnerable times of their life. If we were to launch this to the public, we would have to have people from one of the national suicide prevention centers monitoring the actions of the bot and constantly making updates for better

performance. We would also need to run multiple studies comparing the abilities of the chatbot with the abilities of a human volunteer to evaluate its capabilities to register emotions. This is possibly the biggest issue with the project and would require the highest levels of approval from different organizations and the most frequent updates and re-evaluation over time.

Trolling:

Another issue we could face is trying to deal with people who would join the social network just to troll the members. If we don't handle this correctly, it could render our network pointless. Our main goal is to protect people who are at their most vulnerable. It will likely be difficult to monitor the network efficiently and effectively when the number of users becomes large enough. While this might not be the case right away, we would still probably need a large team of moderators to read between the lines of people's comments and posts and find out if they're being honest or just trying to mess with people.

Testing:

We received a few queries about whether our testing protocols are ethical given that we cannot verify the functionality and efficacy of the chat bot without training and testing it on multiple situations with real people. Our plan for this issue is to train it using only professionals who have volunteered to work with us. Then we will open it up to a small group of external volunteers following its extensive training and update it based on those interactions, expanding the number of users gradually until we feel comfortable sharing it with the world. This would help us manage the changes the bot faces as well as implement feedback from our testers. We believe that leaving the testing to workers and volunteers at the suicide prevention centers is the best way to go about this matter.

Intellectual Property Issues:

Using Open-Source Hosts:

A possible issue that could come up with this project is the fact that we used the open-source platforms Elgg, Rasa Open Source and Rasa X to implement our project. While this is completely ethical and acceptable for the constraints of this project, if we ever decided to try to profit off the app or launch it publicly this could cause some issues. We anticipate having to buy the source code from Elgg or sign a lease-like contract that says we can use it for a given amount of time. This also goes hand in hand with the ethical issues we might be facing, as the company may not want to be associated with our project.

Social Network Similarities

While we don't expect much attention from big-name social media tycoons, we do acknowledge that it is easy to find similarities between our social network, Incognito, and many others that have dominated the market for years now. The "groups" feature especially is an easily recognizable component of Facebook and the 250-character limit for posts on The Wire is very similar to one that Twitter used to have in place for its users. We strongly believe that the specialized nature of our social network helps distinguish it enough from these others that we will not face this issue, and it is difficult to claim intellectual property in a situation such as this since so many companies set up similar websites every day.

Change Log:

We originally planned to design and code the social network ourselves but thought that using an open-source platform would be easier as it would still accomplish our goals but would take less time and we wouldn't run into may issues.

We also decided to change the platform we're using to build the social network from HumHub to Elgg at the end of November 2021. We did this because Elgg installation and modification is much simpler and the source code easier to manipulate as a software developer to meet our specifications.

We made changes to our original plan for training the AI bot as we became more knowledgeable about the topic and got feedback from others. It became much more extensive.

With regards to the design document, we updated the project milestones and the Gantt chart according to our progress as we moved further.