dharmaraj@nyotahealth.com
https://www.youtube.com/watch?v=2SrOgVtYnWs
chat.nyotahealth.com

Nyota Health

Research Idea

Addiction recovery is cumbersome. Nyota Health is an iOS application that aims to make the recovery process easier. The main feature of Nyota Health is our bot named Nyota. A user is able to use Nyota to access tools such as information about addiction treatment options, manage their prescription drugs, and locate nearby events that can help the user socialize in safe situations.

The second feature to Nyota Health is our Virtual Visit platform. A user is able to video chat with a licensed therapist without the need of leaving the comfort of their home. This is incredibly useful for those people who would like to see a therapist but cannot reach a treatment center for regular meetings. Expanding on our Virtual Visit platform is video chat group therapy option with a licensed therapist running the group. Initially this will likely be just for those would benefit from group therapy and also lack the ability to reach a group therapy session. Therapists could use their existing office and sign up on our platform to deliver care. This is not an on-demand solution for both the user or the therapist but rather allows the user to sign up in advanced for sessions the therapist has designated for our platform. Users will be required to pay a fee to access this feature with the majority of the fee going to the therapist while we take a small percentage for the infrastructure and marketing help we provide. Initially we will have users pay directly but our long-term goal is to let insurance companies pay for this benefit. Not all users will benefit from our Virtual Visit platform and will need in-person care. This is why the Nyota bot will have an addiction treatment locator so they can explore their options.

Researchers can benefit from more diverse groups of people in their experiments which can sometimes be difficult due to the location differences of potential participants and the researchers. Our final feature is a Study platform that allows researchers and software developers to create their own HIPAA complaint chat bots. Researchers will be able to use a web application to create a bot that the research participant will access in the Nyota Health app. This solution requires no-coding whatsoever by the researcher. Users of Nyota Health will have an option to allow researchers to reach out to them to take part in a study. If they choose to do so, they might be sent a survey to determine if they are a good fit. If they are deemed a good fit by the researcher, then the researcher has the opportunity to include them in their study. At this point, the researcher will be required to pay a flat monthly fee per month per participant. Another option for researchers is to use one of our software development kits (SDKs) to create their own bots using our secure backend. In this scenario, the research participant would access the study through a custom-built app developed by the researcher. For this option, researchers who use our backend will be charged a “compute” fee which is correlated to how many computing resources they need. This “compute” fee will be similar to how Google App Engine costs are calculated (https://cloud.google.com/appengine/pricing). These tools will be fully complaint with Apple’s ResearchKit and CareKit frameworks. Eventually we will integrate our Virtual Visit platform into the Study platform so that researchers can conduct video conferencing with study participants.

Team

1. Jonathan Dharmaraj
    a. Currently a full-stack developer

b. Undergraduate Biophysics at Benedictine University
    i. Research in cellulosic ethanol production
c. Master of Engineering in Bioinformatics at University of Illinois at Chicago

Minimal Viable Product (Approximately 6 to 9 months)
The Minimal Viable Product (MVP) will be a chat application with a bot for iOS devices. Our bot's name is Nyota. When the user opens our app for the very first time they will be presented with our terms of service. They will then be asked to sign up with an email address, create a password, and give us a first name. The MVP for Nyota will have seven areas of focus:

1. Information about addiction treatment options and locator for treatment centers. (Data comes from https://www.samhsa.gov/treatment/substance-use-disorders and https://www.samhsa.gov/data/sites/default/files/2017%20SA%20Directory.pdf.)
2. What to do if an overdose occurs. (Data comes from https://store.samhsa.gov/shin/content/SMA13-4742/Overdose_Toolkit_2014_Jan.pdf.)
3. Further educational material that could be useful for a person receiving Medication-assisted Treatment (MAT). (Data comes from https://challenges.s3.amazonaws.com/ABT/Challenge%20Assets%20_FINAL%20APPROVED.xlsx.)
4. Find nearby social activities such as meeting locations (AA, NA, etc.), nearby yoga studios, etc. (Meeting location data comes from https://www.smartrecovery.org/local/full-meeting-list-download/ that is confirmed with crowdsourcing from our users and https://developers.google.com/places/web-service/search to locate other suggestions such as yoga studios.)
5. Help managing any prescription drugs they are taking (such as Methadone). This includes the ability to find drug information, side effects, track any side effects, drug interaction information, and reminders to track any prescriptions. (Data for drug information, drug interaction, and side effects comes from https://challenges.s3.amazonaws.com/ABT/Challenge%20Assets%20_FINAL%20APPROVED.xlsx. Reminders and tracking are custom built.)
6. Track how long they have stayed clean and to encourage them in the future. (This feature is completely custom built.)
7. Suggestions on ways to stay healthy such as delicious yet healthy recipes, work-out ideas, and a meditation timer. (Recipes come from https://www.nutrition.gov/subject/shopping-cooking-meal-planning/recipes, hand-curation of exercise videos found on YouTube, and meditation timer is custom built.)

Users primarily send Nyota text messages as if they were talking with a friend. However, there will also be other elements within the chat interface such as buttons for suggestions on what the user might want to do next. The design for these elements will be borrowed from Facebook Messenger (https://messenger.fb.com/blog/messenger-platform-1-1-ratings-quick-replies-account-linking-and-more/). Nyota will also be sending more than just texts and images but will also send different templates. Initially the design for these templates will be borrowed from Facebook Messenger (https://developers.facebook.com/docs/messenger-platform/send-messages/templates), however they will likely be amended based on our user feedback.

Our initial app will launch on iOS only as we figure out what works best for our initial users. The backend will utilize Google Cloud Kubernetes Engine, Bigtable, Natural Language API, and Vision API for the MVP. The entire platform has been designed to be HIPAA complaint including the choices in third-party technologies used

(https://cloud.google.com/security/compliance/hipaa/#covered-products). Initially we will be using a Google Cloud grant (https://cloud.google.com/developers/startups/) to pay for the Google Cloud services we use for the MVP.

The user will have an option to create a more robust profile such as filling out a last name, location information, age, gender, etc. None of this information will be vital for the MVP but could prove very useful to our future Study platform.

Usage of MVP

Chris is a recovering opioid addict. OxyContin was his drug of choice, but he dabbled a bit in other drugs such as marijuana, heroin, and Demerol. He is currently undergoing Medication Assisted Treatment (MAT) at a local recovery center. One of the other patients at the center recommended Nyota Health to help with his recovery process and he is hoping it will help aid in his recovery too. Chris starts with downloading Nyota Health from the Apple App Store to his iPhone, signs up with an email address and creates a password. The only other information he needs to input is his first name.

Nyota welcomes Chris to the app and gives Chris some options on what he can do next. Chris chooses to input how long he has been sobriety anniversary and Nyota gives Chris some encouragement.

Now Chris decides he wants to track his Methadone. Nyota begins by asking Chris a list of all the prescriptions he is currently taking. Chris says Methadone and Metformin. Nyota now asks how often Chris takes his medication or gives Chris an option to take a picture of his prescription bottles. Chris takes a picture of his bottles, Nyota returns the dosage and instructions she interpreted, and Chris confirms these are correct. Nyota asks the last time he took each of his medications and then determines that next time she needs to remind Chris about his medication is tomorrow.

The next morning Chris sees a notification on his phone that just says he has a new message from Nyota. Chris taps that notification, uses his fingerprint to unlock the app, and sees that Nyota is just reminding him to take his medicine. Chris confirms that he has taken it and then goes on with the rest of his day.

Later that afternoon Chris gets another notification from Nyota. Chris tries to unlock the app with his fingerprint, but the sensor is not working this time, probably because he is sweaty from working out. So he instead inputs his password into the app. Nyota asks how he is doing. Chris says that he is doing well, just tired from working out. Nyota tells Chris that he has so far been sober for 1 week. Chris confirms that this is true and Nyota reminds him that certain social interactions can reinforce good behavior. Nyota asks Chris if he would like to explore some local activities such as a Narcotics Anonymous meeting. Chris finds a meeting that seems good but it is tomorrow. He asks Nyota to remind him about the meeting, Nyota says sure, and Chris goes on with the rest of his day.

That night, Chris is hungry and wonders if Nyota can help with a recipe. Chris unlocks Nyota Health and asks for help with what he should eat. Nyota recommends 5 recipes and also asks if Chris would like to see some more options, narrow down recipes by cuisine, or narrow things down by the estimated time it will take to cook. Chris just selects the first recipe because it seems good and the estimated time to make is just 15 minutes. Chris enjoys his dinner, watches some television, and goes to bed.

Analysis of Pilot (Approximately 3 to 4 months)
After our MVP is built, our initial users will be collected from an advertising campaign conducted through Google AdWords. The advertising campaign will last 30 days or 100 downloads of the app, whichever occurs first. We will then look at a 90-day period for how many users we have, how often do users use our app, what features are most popular, what features do users want the most, and can we determine why users stop using our app.

To better understand our initial users, three tools will be used:

1. Anonymous surveys will be offered periodically to users through Nyota. The user fills out the survey completely inside the Nyota chat interface. This will include things such as if they like different tools we have created within Nyota, what would they like to see in the future from us, would they participate as a research participant in the future, and would they be willing to pay for a virtual meeting with a therapist.
2. Anonymous data is collected using Piwik as the user uses the app. This Piwik installation will be self-hosted using Google Cloud Kubernetes Engine.
3. Email will be sent to users who have chosen to uninstall our app to understand what we did wrong and where we can improve. This email will be sent 48 hours after the user uninstalls the app.

This data is analyzed using Google Cloud Machine Learning Engine to draw our conclusions on our pilot and what improvements should be made to our app. We will also be using this data to determine if we should build our Study or Virtual Visit platform first. Selected parts of this data may also be used in the selling aspect to either researchers or therapists.

Future Development
1. Integrate various wearable data into the app so that relevant tools can be smarter and to be better serve our future Study platform. This will likely involve using a trusted third-party such as Validic.
2. Create a web platform for researchers to create basic survey bots, analyze the results of surveys, and include text reminders for the user to do certain tasks. Our iOS app will need to be amended to include an option along the bottom tab bar to discover these studies, a way for the user to input a code that dictates they are a part of this particular study, informed consent for the study, and ask for permission to access any relevant data.
3. A way for researchers to find participants for a research study through our platform without the need for the end user to input a code. This means we need to verify eligibility, give researchers an ability to send invitations to relevant users that fit their goals (gender, location, age etc.), and handle any relevant payments to the user. This might not be possible for all studies but should increase the applicant pool.
4. Launch our Virtual Visit platform with just a few licensed therapists and a select few Nyota Health users. This will just be for one on one sessions with the user paying not insurance companies or employers.
5. Group therapy using video chat with just a few licensed therapists and a select few Nyota Health users who also would benefit from a group setting. The users would pay for this feature not insurance companies or employers.
6. An Android app that has the same features as our iOS app.