AURA

AI powered solution to Eating Disorders

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Mission

Our mission is to provide free, specialized, and on-demand mental health support for people with eating disorders by digitizing both the content and the process of therapy.

Members

The team behind Aura consists of five 11th grade high school students who have a passion for computer science and business. As teenagers born in the mid-2000s, we have lived our entire lives with instant access to the lifestyles of thousands of people all over the world through social media and observed its destructive effects firsthand. While this level of connectivity is incredible in some ways, it provides a constant fuel for toxic comparison, overthinking, and extreme pressure to fit in with the societal definition of "beauty." All five of us have experienced this pressure, and several of our team members have had close connections with people suffering through eating disorders due to a variety of factors, often including this pressure that millions of teenagers fall prey to. We have observed firsthand how inaccessible support is to all people with eating disorders, whether because of financial reasons or social stigma associated with seeking help.

Thus, we created the concept of Aura as a possible solution and as a way for millions of people to seek counseling without fearing the judgment of a human being, without depending on others to access help, and without having to worry about financial implications.

Service Description

The overall idea of Aura is to provide an AI counseling service that uses machine learning and facial/vocal analysis to provide interactive, face-to-face support sessions for people struggling with eating disorders. Whenever a user wants support, they will be able to log into their account, where they will see an option to receive personalized support from Aura, our AI counselor.

If it is their first time using this feature, they will be asked to complete a short quiz about their eating disorder behaviors, such as how often they binge, purge, or restrict. However, they can always opt-out of the quiz if they do not feel comfortable responding.

It's important to note that Aura does not work to diagnose anyone of any disorder; rather, the results of the quiz will be used to provide nuanced support for people with varying levels of bulimic, anorexic, or binge-eating behaviors. Thus, after the users complete this quiz, Aura's algorithm will point towards what they want to work on. If the user chose not to respond, our algorithm will still provide them with nuanced care, but it will be slightly less specialized towards their specific symptoms.

After this, the user will be able to jump right into the counseling process. Here, they can select the option to interact face-to-face with an expressive Aura model of their choice or to use the chatbox feature if they prefer not to use a webcam. Then, they will be able to talk about whatever they please (whether it's related to their daily life or their struggles with disordered eating), and Aura will guide them through the discussion to contribute to a healthy, open, and supportive space. The primary purpose of Aura is to provide users with a smart, yet attentive, listening ear when they may be isolated in their daily lives.

Aura is not meant to be a replacement for therapists, but it does employ a multitude of therapeutic techniques, such as enhanced cognitive behavioral therapy, in order to walk users through various coping mechanisms that will help discourage them from partaking in self-destructive behaviors as well as aid

them in their recovery process. Everything is determined by what works best for the person themselves, and the benefit of using AI is that the algorithm will automatically self-learn how to tailor its responses to each individual user.

Technical Description

On the technical side, Aura will function based on three distinct algorithms. First and foremost, a natural language processing neural network (NLP) will be used to generate conversations between Aura and our clients. This model will be trained by thousands of eating disorder therapy transcripts that will be provided by professionals. The NLP core model will be a preventative algorithm designed to support those with body dysmorphia and beginner symptoms for disordered eating. Submodels will be created to provide specialized care for people struggling with different types of eating disorders, since, for example, someone with anorexia should not be provided with the same support as someone with bulimia. The following four models will exist: Anorexia, Bulimia, Binge Eating Disorder, and Parental Support. Each of the first three submodels will have an age attribute to increase the level of personalization.

Secondly, a convolutional neural network (CNN) will be used to carry out sentiment analysis, which invokes facial recognition technology and vocal analysis to determine a user's intent, emotional state, and responsiveness. The output from this network will be fed and used in conjunction with the NLP to direct the application of the sentiment analysis to best determine the AI response. Aura's responses will consequently be tailored to suit each individual user, accounting not just for their spoken language, but also their facial expressions and vocal inflections. This is revolutionary within the intersection of AI and psychology, as it combines unprecedented aspects of in-person therapy with the precision and accessibility of the digital world. However, sentiment analysis is not a mandatory feature for the entire model to function, as the NLP alone is sufficient to generate a conversation. This option to exclude the sentiment analysis is included in case clients do not have access to a functioning camera and microphone or are not willing to turn them on.

Furthermore, to create a therapeutic bond with users, the model will keep track of the conversations and progress of individuals through a long short-term memory artificial recurrent neural network (LSTM) that analyzes their responses. This aspect will allow the model to personalize its conversations and establish a bond with users.

Lastly, a reinforcement model will be used as human input for the improvement of Aura. Anonymous conversations between our clients and Aura will become the input for the reinforcement model, for which professional psychologists will review and redirect Aura for enhancement purposes. This allows for the system to be kept in check by professionals, and it opens the gate for constant improvements in future conversations between Aura and its clients.

Please click on this link to see our works cited: **Bibliography**

Flowchart to Visualize Our Proposed Architecture of Aura
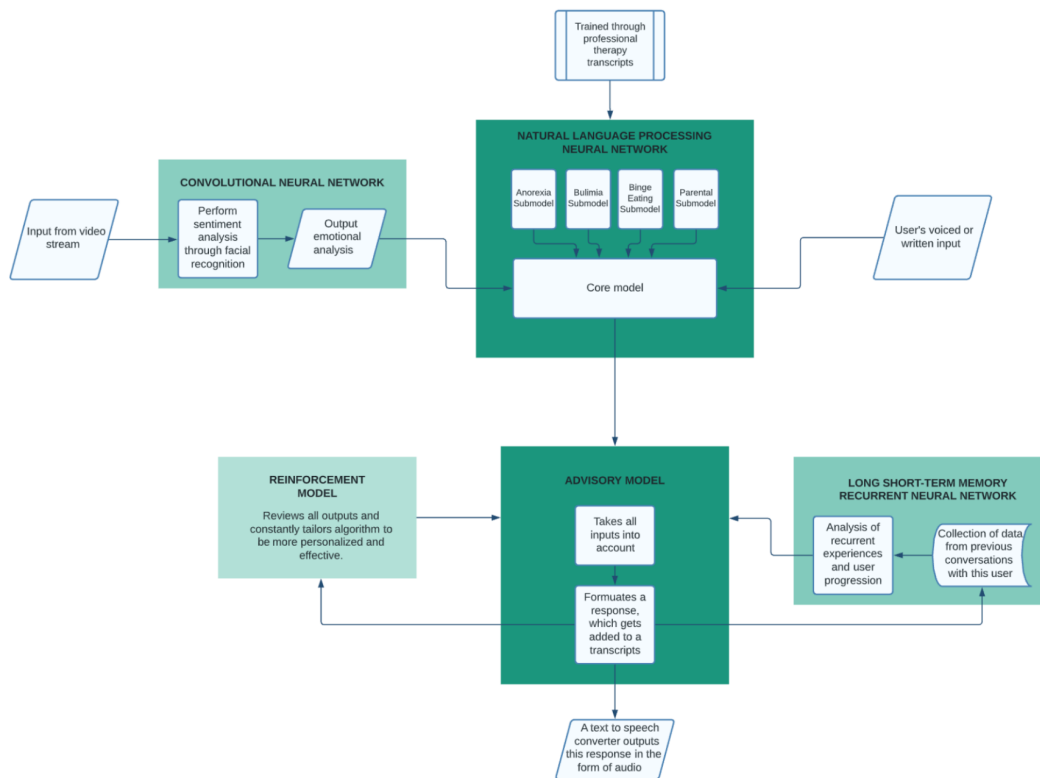
Needs Statement

Recent studies have revealed that only twenty percent[1] of teenagers with eating disorders seek treatment and that only one in ten people ever receive it. This can be largely attributed to social stigmatization, such as the belief that eating disorders are simply a lifestyle choice or that they only appear in thin, young women. Thus, millions of Americans abstain from seeking help in fear of being judged, shamed, or treated as a burden.

Thus, in order to combat this disparity, we offer an accessible, affordable, and on-demand solution that is available to patients 24/7. We guarantee reliable support for everyone who needs it, and we offer specialized support for specific eating disorder types (anorexia nervosa, bulimia nervosa, and binge eating disorder). This allows us to ensure that our clients get the best possible care through counseling and support that is tailored to them.

Our project will be an effective use of a million dollars for several reasons. First, we provide our resources at no cost, which reduces the financial barriers people face when trying to find support for eating disorders. According to the Harvard T.H. Chan School of Public Health[2], the average annual cost per person for anorexia nervosa and bulimia nervosa is $27,400 and $18,300, respectively. Providing a free support system that guides users through their unique problems will be crucial for people who do not have the means to access in-person counseling or therapy. Moreover, Aura's accessibility provides users with a private, on-demand way to express themselves or receive advice about their struggles. Often, people with eating disorders feel uncomfortable asking for help, so Aura's simplicity and accessibility of interface makes it so that users can log in and start receiving help at any time, and from anywhere. Unlike

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many helplines or call centers that have human volunteers and close in the afternoon, Aura is able to operate at all hours of the day because it is technology-based. Users will also not have to take transportation, book appointments, or wait to receive support, which will help alleviate the aversions to seeking help that some people may have.

Additionally, the structure of our algorithm allows Aura to exponentially improve upon itself, since the Neural Networks will learn from each interaction and psychologists will be consistently reviewing the model's outputs to ensure maximum efficacy.

Unique Value Proposition

The organizations that have produced the most similar Artificial Intelligence Models are X2 Foundation, with their creation of "Tess," and Woebot Foundation, with their creation of "Woebot." Both AI-powered mental health chatbots have been tremendously successful. A large-scale study with over 35,000 users found that Woebot creates lasting therapeutic bonds that are non-inferior to the bond created between human therapists and patients[3]. Research studies have additionally found that chatting with Tess led to significantly reduced symptoms, on average by -28% for depression, and -18% for anxiety[4]. Both these examples demonstrate the success that such a resource will have. However, Aura offers more specialized solutions for two reasons: first, our focus on eating disorder support, and second, the option for face-to-face communications that allows for the analysis of users' emotions.

The current AI models of "Tess" and "Woebot" provide no support that is specific to eating disorders. For example, Woebot's algorithm is only able to provide general stress management and breathing exercises for people who report eating disorder symptoms, which is not nearly as effective as specialized support would be. Therefore, Aura is a solution that is not on the market and would impact millions, since we specifically target eating disorders and have more specialized care than any other digital mental health platform. Aura offers care that is far more specific to eating disorders as a whole, with unique models for both preventative care and specific disorders (Anorexia, Bulimia, Binge Eating Disorder, and Parents).

Additionally, no other organizations offer a face-to-face digital mental health support option that actively integrates sentiment analysis within user conversations. Our incorporation of both emotional and vocal inflection analysis allows for an added degree of personalization, which better mimics a real-life counseling environment.

Personnel

Two methodologies can be used for the initial implementation of Aura.
1. Preferably, we can partner with an overseas Artificial Intelligence development company to reduce costs and management. We will obtain consultations from various companies to evaluate different prices and the projected time required to create the model. For this scenario, we will need the following personnel to manage the project:
   a. A Chief Technology Officer (a Senior Artificial Intelligence Psychologist) who will serve as a Project Manager and oversee the work of the engineers, as well as help wherever their expertise is needed.

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b. A highly experienced and renowned <u>Psychologist</u> who will act as Chief Psychologist and will work to aid in the design process and ensure that the care we provide is as effective as possible.
   i. After the first year of implementation, two part-time psychologists will be hired to consistently review and guide the model. The psychology team will continue to expand as the project advances.
c. A <u>Fundraising Consultant</u> to work on marketing, communications, and finding partnerships. This consultant will be crucial in generating income to keep the non-profit running.
d. We will also need <u>engineers trained in cyber security</u> for the design phase at the beginning and for review before release.

2. However, another method is for us to hire personnel without outsourcing. For this, we will need the following **additional** personnel to create Aura:
   a. A <u>Consultant specializing in Data Architecture</u> to create the infrastructure of the model.
   b. A <u>Data Scientist</u> to build the bulk of the models.
   c. A <u>Full Stack Engineer</u> to work on both the frontend and backend of the model.
   d. A part-time <u>Front End Engineer</u> to build the Aura model that users will interact with, as well as the website Aura will be hosted on.

Budget

Please click **this link** for the budget and projected financials.

Marketing Plan

The main objective of our marketing plan is to reach those nine out of ten people[5] who would otherwise have no access to support. By establishing a strong brand identity, we will increase our user base and attract more investors and partners. Throughout the marketing process, we will place a significant emphasis on building partnerships with insurance providers, as this will allow Aura to address the quarter-billion-dollar loss that eating disorders cost insurance companies and health care providers every year.

First, our initial marketing strategy will clearly communicate the benefits of our services to our target audience of South Floridians from ages 15-30. Here, we will mostly utilize push marketing tactics (such as event promotions and advertisements on social media platforms like Instagram, Youtube, and Tik Tok). This will allow us to establish the importance of Aura to potential users and investors. To further promote Aura, we will employ pull tactics, such as Search Engine Optimization and content marketing. Throughout the initial stages of the marketing campaign, we will focus on building an extensive first-party database, which will later allow us to focus on more direct marketing tactics, including email and SMS marketing, helping us to build stronger relationships with donors. Overall, we will combine different aspects of Positioning and Emotional Messaging to highlight the value Aura will bring to users.

Once we reach 500 active users, we will begin pitching to large insurance companies to build long-term partnerships and secure valuable sponsorships. Furthermore, forming an expansive first-party database consisting of at least 50,000 contacts would increase our marketing spending and establish a high-quality direct marketing campaign. We have dedicated $50,000 in the first year of operations, but we

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will later increase it to $75,000 in year 3 and to $90,000 in year 4 to work with a marketing firm to effectively carry out our plan in coherence with our goals and values and satisfy the increasing demand for our services.

Evaluation

Overall, we will measure and evaluate our program's success through a 3-fold approach that takes into account total users, recurrent users, and clinical efficiency.

1. We will intermittently measure the total amount of users on our platform, which is essential in allowing our team to understand the scale at which the program is operating.
   a. If the user total is lower than expected, then we will heighten advertisement efforts so as to maximize the impact of the program.
   b. If the user total is higher than expected—therein raising the risk of lagging or server failure—then we will work to improve the scalability of the infrastructure.
2. Measuring the total number of recurrent users over a given period of time provides our team with the ability to accurately measure user satisfaction.
   a. If the user satisfaction is lower than intended, then we will work closely to address the underperforming medical and technical aspects of the program.
3. Measuring users' progress and the algorithm's clinical efficiency is vital in providing tangible evidence of its impact.
   a. Once the algorithm is commercialized for several years, large-scale studies can be conducted by labs, such as ones that will sponsor us and that we will partner with. Such studies would present concrete clinical results of Aura's impact, including the percentage of clients with reduced symptoms for each eating disorder.
   b. On a smaller scale, the LTSM model that keeps track of recurrent users' progress will give us a good indication of long-term progression.

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