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Brains and Bots

Using Ai to Aid Mental Health

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Types of Therapy Offered	Increase of Patients
Substance	72%
Trauma	64%
Anxiety	60%
Depression	46%

Figure 1.1 - Washington's Treatment [7]

I. INTRODUCTION

Rising demand for mental health services has prompted psychologists to explore other resources that can complement their treatment. For example, Washington has stated that the demand for mental health resources has increased, and psychologists no longer have openings for new patients [8]. To the right, you can see *figure 1.1,* which is a table displaying the types of therapy offered in Washington and the percentage increase in patients seeking help for each topic. A primary option being explored is the use of AI, as many forms of AI can be applied to various mental health options. Can AI tools effectively support psychological therapy, particularly in diagnosing and treating common mental health conditions like anxiety and depression?

1. STATEMENT OF RESEARCH PROBLEM

This research proposal will examine how AI applications (like chatbots, virtual therapists, and sentiment analysis tools) can assist psychologists and patients. The goal is to determine whether AI can accurately assess mental health conditions and complement human therapists without sacrificing empathy and personalization. Further, articles will be examined to estimate how comfortable people are with AI contributing to their mental health journey.

2. BACKGROUND

The global mental health crisis has stretched healthcare resources thin, with long wait times for therapy and limited access for many individuals. AI-based mental health tools have

gained attention as potential solutions. Known technologies include AI chatbots like Woebot and Wysa, which use cognitive-based therapy (CBT) techniques to assist users [9].

Woebot is a behavioral health co-pilot, aiming to increase access to mental health support. In general, Woebot is designed to solve problems in behavioral support [9]. WYSA is an anonymous website intended to help with mental health. It offers personalized care that is always available - since people have to wait on average 2–3 months to meet with a new therapist [10]. These are just two of the many AI chatbots designed specifically for mental health out of the many.

3. SCOPE

This report will focus on the capabilities and limitations of AI in psychological assessment and therapy, particularly in treating depression and anxiety. There will be examples of how AI has already served the world of mental health, as well as current projects to further combine the two. The technological advances required from AI will be noted, as well as the window AI opens to people who remotely prefer therapy. This report will also cover the challenges of utilizing AI. Challenges include Limitation of Emotion, Diminishing Empathy, and Ethics Considerations To assess the positive impact AI has on mental health services, the negative impact has to be studied as well. It will not cover AI's use in severe psychiatric conditions, medication management, or crisis intervention.

II. METHODS/APPROACH

This project will involve research on existing AI-powered mental health tools, scientific literature on AI's role in psychology and case studies of real-world applications: noting chatbots, therapy platforms, and LLMs. It will also explore the ethical concerns related to patient data privacy and AI's potential impact on patient-therapist relationships. The specific technological

advancements will be covered, drawing on the benefits of such. Lastly, there will be some focus on the previous ways that AI has already assisted psychologists with their patients.

III. PROPOSED SOLUTION

AI can enhance mental health treatment by providing continuous support, early diagnosis through data analysis, and personalized treatment suggestions based on patient responses. This will cut down the wait time patients have to experience drastically, helping more people in a more optimized time frame. Further, it can aid the psychologists in helping their patients. For example, AI can take notes for the psychologist during their appointments, so the therapist can see things they have possibly missed. However, the solution will make it clear that AI should be used as a tool to assist, not replace, human therapists, focusing on combining AI's analytical strengths with human empathy.

1. PERSONALIZED TREATMENT

A breakthrough has been made that is relevant for mental health around the world. JAMA Network has developed LLMs (Autoregressive Large Language Models) [5]. LLM models use deep learning algorithms from data sets that predict the next word, or sequence of words, based on a prompt or question. These algorithms help AI generate coherent and convincing text that closely resembles human dialogue. This makes it possible that LLM-based agents could offer a tool that can help deliver different, complex, therapeutic models that can engage with thousands of clients simultaneously while offering personalized care to each client [5].

2. MAKING SPECIALISTS AVAILABLE

Currently, there is a rapid decrease in the availability of specialists for clients. This has also affected the expansion of mental health services in more low-income countries in multiple ways. Community health workers are unable to deliver psychological services, and primary care

physicians have to take on the diagnosis and pharmacological treatment of mental health conditions [5]. However, the use of LLMs could increase availability by supporting non-specialists. AI can act as clients so non-specialists can practice their skills, be provided with learning materials customized to them, and review session transcripts. With this assistance, specialists will have more time and flexibility to focus on complicated healthcare, expanding the services of mental health.

One way AI is helpful in supporting non specialists is through medical training. AI has been used for medical training in many ways, including virtual reality simulations. VR simulation can provide immersive experiences for healthcare professionals [7]. These experiences help healthcare workers adapt to different scenarios in the real world, so they can give advice to a variety of people.

3. PROVIDING HEALTH TO A VARIETY

As stated in the *Background* section of the proposal, there are two examples of telehealth. Telehealth platforms utilize AI to improve user experience and health outcomes. To the right is *figure 1.2,* which is a table that includes two telehealth services, WoeBot and Wysa, and their several users. Telehealth services are important for a variety of reasons, the primary one being open to a variety of people to use. For example, an AI system aided a doctor in India with managing his telepath patient load [7]. AI proposes new ways to utilize telehealth. If one is unable to meet with an in-person therapist due to a number of reasons, they will now have options of virtual

Type of Telehealth	**Amount of Users**
WoeBot	1.5 Million
Wysa	4.5 Million

Figure 1.2 - Telehealth and its users [9][10].

healthcare. This includes, but is not limited to, the familiar telehealth, virtual assistants, or health apps for mental health issues [7]. The different varieties of resources make it easier for those who cannot go to in-person healthcare. Further, they provide 24/7 healthcare, so it can fit in the schedule of any person. Mental Health platforms are designed to be accessible to the user and to be used anytime, anywhere. Further, online resources such as Woebot Health or Wysa are not used independently by AI, but rather used as a tool for wellness support [10].

4. TECHNOLOGICAL ADVANCES

Resources like Telehealth and LLM models use machine learning algorithms to analyze patient data. These machine algorithms analyze large amounts of data and identify patterns that are used to provide appropriate treatment [7]. Further, it can be used for predicting data analytics. Predicting analytics is helpful for serval reasons, including predicting health risks, analyzing patient symptoms, evaluating needs from a variety of sources, and assisting physicians [7]. This provides a huge advancement in healthcare from many different technological aspects.

Further, natural language processing is being used when delivering healthcare services. As stated in *Personalized Treatment,* LLMs are constantly using learning algorithms. This makes them far more capable of various tasks while seeming human [5]. Learning algorithms also make AI more equipped to provide therapy in many different cultural situations. This is important, as people from different countries have a more difficult time receiving help than people from other countries based on culture.

5. WHAT WILL NOT HAPPEN

The use of LLMs has its risks, such as outputting incorrect information to patients. Therefore, it will not be used as a replacement for psychology specialists, but rather as an aid. Its primary focus will be on combining the analytical strengths of AI and the empathy of

a human. Telehealth services are not to be used independently of human therapists, either, as they will be supervised and utilized by professionals.

IV. CHALLENGES

Using AI in therapy presents several challenges. First, there are limitations of AI in understanding emotions and maintaining patient trust. There is also a risk that using AI could diminish the empathy and personalization that human therapists offer. Lastly, there are ethical considerations when using AI for mental health.

1. LIMITATIONS IN UNDERSTANDING EMPATHY

ChatGpt and other AI platforms are trained using web-based information and utilize reinforcement learning techniques with human feedback. If AI is not prepared with authentic sites, they can provide the wrong advice that could be harmful to patients [3]. The universality of AI applications is both a positive and a negative, as it might lead to misdiagnosis, inappropriate advice, and the inability to handle crises due to the lack of emotion[3].

AI does not have a difficult time reading all emotion, as it can measure heartbeat and blood pressure. However, such measurements are not related to certain emotions. AI can misinterpret these measurements for specific emotions, and that can lead to misdiagnosis and other negative results. Further, AI can misinterpret facial expressions or voice tone, leading to the same negative results [2].

2. RISK OF DIMINISHING EMPATHY AND PERSONALIZATION

One of the biggest concerns when using AI is the lack of empathy. While there are many different learning/machine algorithms to better replicate human emotion, it cannot notice the “subtleties” of human emotion [3]. Empathy is so important in therapy due to the connection it creates. With that connection, a patient will have an easier time sharing and healing the things

they struggle with. Further, the empathetic connection a therapist makes with a patient makes their relationship more personal. A professional is trained in navigating the different emotions of their client, and as of right now AI cannot replicate such a thing [2].

3. ETHICAL CONSIDERATIONS

Confidentiality is a significant concern, along with privacy and data safety. Someone who utilizes therapy shares very personal details about themselves, as they know the law of confidentiality regarding therapy. Using AI could make a patient vulnerable in situations of confidentiality breaching [3]. Further, AI has previously been asked to draw "schizophrenia", and it resulted in drawings of harmful stereotypes and extreme bias [4]. To the left is *figure 1.3*, a drawing which shows how AI drew faces of horror, with grotesque features to describe schizophrenia [6]. However, Morgan King states that "the Midjourney artificial intellegence's was entirely unlike the mental health disorder I had encountered in the hospital wards" [6]. These drawings show an ethical flaw in utilizing AI, with concern of how to overcome it.

Figure 1.3 - AIs view on schizophrenia [6]

Further, there are data privacy, mistrust, and relevance of therapy materials that need to be considered as well. People are much more willing to trust humans than they are to trust robots. In order to be utilized, collaborated with, and trusted globally, these concerns need to be addressed. Where professionals legally cannot share the information of their patients, the same cannot be said about AI. The idea that information shared can be breached makes people less willing to trust them. AI can be drawn upon in almost any aspect of therapy, and used by most

anyone. Therefore, human oversight will be necessary to be sure that the platforms are being used appropriately [5].

V. CONCLUSION

AI has the power to transform psychological therapy by making mental health support more accessible, affordable, and personalized. Already, AI is being used in many different aspects of health care, including mental health interventions. It offers tools such as chatbots, mood trackers, and a variety of analytics. These applications provide immediate support and can identify a number of patterns that can be helpful for professionals to see. However, the utilization of AI must be approached with caution to ensure that it does not replace the humanity of therapy, but rather complements it.

The success in using AI lies in understanding how to use it responsibly, and by balancing technological advancements with both ethical considerations and empathy. It is crucial to address all the challenges that come with integrating AI into mental health, such as data privacy, algorithmic bias, and the necessity of professional-patient trust. With proper research and care, the impact of AI has many benefits for individuals from all across the globe by making therapy inclusive and available.

1. FUTURE DIRECTIONS

There will be further discussion on the use of AI and developing guidelines. These discussions will take into consideration the population being served, ethical implications, and the availability of existing mental health resources [5]. AI will also be used to diversify the way mental health care is provided, so provide positive care to everyone, no matter the race, gender, or sexual preferences. Lastly, the development of AI is ongoing, making consistent, positive,

changes to machine algorithms and language models to further its ability to be used in mental health settings.

AI is going to be seen as a tool to aid in Mental Health services. The idea of AI taking over mental health is not in discussion, as it currently cannot completely replicate care from another human. Given the pandemic, different situations patients might be in, and lack of professional availability, the further use and discussion of AI opens many doors for the expansion of mental health resources.

VI. QUALIFICATIONS

As a student who is studying Computer Science and Psychology, I have a strong academic background that will help aid me in researching the combinations of AI and Psychology. I have researched AI development and have a strong interest in mental health/mental health technologies. This positions me well to research the cross-over of both fields. I have previous experience with machine learning algorithms and am knowledgeable about the challenges AI faces in emotionally focused domains such as Psychology. Additionally, having personally struggled to find a therapist with availability, I am motivated to find solutions that could improve access for myself and others.

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