Applications of AI in Psychotherapy: An Innovative Tool

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Abstract: This paper explores the application and potential of artificial intelligence (AI) in psychological therapy as well as its implications for Chinese psychotherapy firm "JianDanXinLi" or otherwise known as SimpleTherapy. Through an analysis of several AI psychological therapy service platforms, it reveals the principles of integrating AI into modern psychotherapy and demonstrates that AI technology can serve as a flexible alternative and supplementary means for optimizing data in the therapeutic process. Although AI technology cannot fully replace human services, it can significantly expand and enhance the scope and effectiveness of therapy. Additionally, this paper discusses the challenges faced by AI technology in integrating psychological therapy, especially regarding issues of empathy.

Keywords: artificial intelligence, psychotherapy, empathy

1. Intake Interviews

For psychotherapy, intake interviews are absolutely crucial in assessing and evaluating the mental state of patients. This is demonstrated through the intake process at JianDanXinLi where participants are assessed on their mental state prior to therapy treatment. However in named "SimpleForest", the counselling center subsidary of the firm, conducts manual intakes at its front desk. This prompts suggestions for its digitisation in achieving greater operational efficiency. The full intake and self-harm agreement process can be digitized through artificial intelligence on the JianDanXinLi App where the patients can have the form filled out before they come to the center. This saves time for the front desk and allows the patients to fill out sensitive information in the comfort of their home.

2. Chatbot AI

For simple health concerns such as distress or lack of sleep, training a therapeutic chatbot can fill the work of the counselors. Chatbots allow for more affordable and accessible therapy. Patients with social anxiety may use chatbots to solve their problems instead of in-person counselors. In the JianDanXinLi headquarters, the labels made to segment and denote patient concerns can work in synchronization with a chatbot AI where less serious and more resolvable problems (e.g. lack of sleep) can recommend patients to be assigned a chatbot instead of a psychotherapist.

3. EMA and Big Data

EMA (Ecological Momentary Assessments) can be paired with big data to better understand, monitor, and generate personalized interventions for patients. AI can be used to monitor social media activity, credit card spending, GPS tracking, etc. If user responses about their feelings and everyday activities are combined with monitored, real time activity, it would allow for a personalized and big picture understanding of patient emotions and tendencies. Psychologists at the University of Notre Dame are testing an algorithm which monitors users' online activity to determine whether they are at risk of suicide through the flagging of terms related to self-harm. JianDanXinLi can also potentially research related technology to allow counselors to be notified of the worsening or bettering of patient conditions after each session, improving the effectiveness of its service.

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4. Case Study

4.1. Case: Wysa

Wysa is a private company which operates a Bangalore-based mental health AI chatbot. To date it has gained $30.5M in funding and is at a valuation of $83.4M (as of May 1, 2023). Wysa claimed to have held over half a billion AI conversations with over five million people about mental health. It claims that AI-led support has been proven to improve symptoms while taking 80% of the support load, to free up human support for where it's needed.

Wysa's AI-led support provides anonymous conditions to work in to prevent worsening of mental illness. Wysa's AI is clinically proven to create a therapeutic alliance equivalent to a human therapist within the first week. A study of 1,205 people evaluated users of mental health app Wysa who were experiencing measured symptoms of anxiety or depression. The results were comparable or better than scores found in traditional in-person CBT, in-person group therapy and internet-based tools. Furthermore, Wysa AI assigns patients curated programs and on-demand support, and checks in every morning routinely supplemented by human support. It also offers 1-on-1 sessions and takes on 80% of leads by supporting people with sub-clinical symptom levels while providing a hotline support guide.

4.2. Case: Lyssn

Lyssn is a private company based in Seattle, Washington. It is a US-based platform providing AI for training and assurance. To date it has gained a grant of $2.1M from the National Institute of Mental Health.

Lyssn AI integrates with organizations to improve services, support staff, and provide insight. Their AI works with CCBHC & other behavioral health providers. Furthermore, Their service enables providers to demonstrate evidence-based practices, establish and maintain accreditation, improve patient engagement, and provide training. Lyssn delivers, monitors, and reports on training in evidence-based practices. They also assess the quality and effectiveness of each session and support staff with auto-generated reports, clinical documentation, and transcripts.

4.3. Case: Ieso

Ieso Is a private company based in Cambridge. It is an UK-based online mental health therapy provider. It has raised funding of $77.9M (Series B) at a valuation of $130M as of November 2021. Ieso claims to have treated a wide variety of psychological disorders such as anxiety, depression, OCD, PTSD, Phobias, sleep problems, social anxiety, and stress. It claimed to have helped thousands through their therapy sessions while bringing precision to mental healthcare through 650,000 hours of de-identified therapy data, deep analysis, and science.

In Ieso, participants first check their eligibility and register for the program. Then, they will be able to chat with therapists while Ieso creates personalized treatment programs to break down problems and change behavioral patterns. It tracks progress with questionnaires and target the most persistent and troubling data after data analysis. Finally, change in behavior is monitored.

4.4. Analysis of AI Integration in Psychotherapy

Through the analysis of various established AI-integrated psychotherapy firms, it seems like AI is most commonly integrated in the modern-day therapy as flexible substitutes and means of supplementary data optimization. Although it cannot fully replace human services, it can maximize therapy reach and effectiveness significantly.

5. AI and The Role of Empathy

The most integral aspect of psychotherapy that AI technology needs to integrate into their system if it aims to achieve effective conversational therapy is empathy. If empathy can be digitized and understood by the machine, it can tailor personalized responses to improve the mental health of a consumer by reflecting their comprehension of how the consumer feels.

While some experts like Minerva and Giubilini (2023) are suspicious of the possibility that AI technology can exhibit empathy at all, even stating that it "is an eminently human dimension that it would

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be difficult, or perhaps conceptually impossible, to encode into an algorithm" and that AI even in its usefulness can neglect empathy and substitute it with the analysis of big data instead. However, recent technology like ChatGPT has demonstrated a complex understanding of conversational empathy which even surpasses those of human nature.

Despite this, an article by Paolo Raile called The Usefulness of ChatGPT For Psychotherapists and Patients suggests that ChatGPT provides users with "empathy" but not at a level complex enough to replace psychotherapists.

In the case of empathy-driven conversational AI, a team of researchers at the Behavioral Data Science Group in the Allen School is working with clinical psychologists from the UW and Stanford Medical Schools to create computational methods for peer supporters to express empathy more effectively in conversations. They are developing tools which can identify and improve empathy in conversations, giving users intelligent and actionable feedback.

Furthermore, companies like Wysa have been conducting psychological studies through their own empathy integrated conversational AI models. In a study published in 2018, the researchers aimed to present preliminary real-world data evaluation of the effectiveness and engagement of their empathy driven AI on those who suffer depression. Anonymous global users who voluntarily installed Wysa self-reported symptoms of depression through a questionnaire. Based on the extent of app usage on and between 2 consecutive screening time points, 2 distinct groups of users (high users and low users) emerged. The quantitative analysis measured the app impact by comparing the average improvement in symptoms of depression between high and low users. It found that high users had significantly higher improvement than low user groups. More than half of users' feedback also report improvement in depression symptoms.

This study finds that at least some form of empathy integrated AI is beneficial and effective on mental health patients. Although this study requires larger sample sizes across a more prolonged time period as well as the confirmation from a similar app to eliminate any potential room for misinformation due to self-advertisement.

6. AI and ChatGPT as a Psychotherapist Substitute

ChatGPT, a recent and new form of AI technology has recently been introduced to the world. Still with many questions regarding the intellectual extent of this technology, its free and accessible nature could allow it to be a potential psychotherapist substitute.

Wysa's annual report states that interest in using the power of conversational AI has increased since the announcement of ChatGPT. It has also broken the notion that humans are always better than AI at interacting with other humans. Its research also shows that AI-guided health coaching and mental health support can create a bond and have efficacy similar to that of human therapists.

Wysa claims that their AI services were able to provide safe spaces, making them even more suitable than human therapists in many areas.

However, it claimed that chatbots like ChatGPT have been reported to respond to users with hostility. GPT 1-3 has generated 1 in 100 responses containing toxic language, making them potentially unfit for psychotherapist substitution as there is low tolerance for mistakes made by AI.

Researchers looking into natural language processing models like ChatGPT have found its practicality in psychiatric situations. Notably, a team at Drexel University in Philadelphia has shown that GPT-3 can predict dementia by analyzing speech patterns (Agbavor, F., & Liang, H., PLOS Digital Health, Vol. 1, No. 12, 2022). Other cognitive psychologists are attempting to learn more about how its reasoning abilities compare to that of humans. This has wider implications for the psychotherapy industry and firms like JianDanXinLi as successful translations between human reasoning and AI reasoning can lead to the development of tools which can effectively interpret psychological abnormalities and respond to human therapeutic requests.

Minerva and Giubilini (2023) found that current AI has been used in healthcare for mainly digital phenotyping (use of personal data to monitor mental health), chatbots, and natural language processing (processing of digital speech footprint to monitor mental health).

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Alternatively, Paolo Raile (2024) aimed to account for the usefulness of ChatGPT for psychotherapists and patients. It found that although ChatGPT was able to successfully diagnose patients with a profound understanding of theory, its diagnoses are brief and unhelpful. Furthermore, ChatGPT also shows a lack of diversity in psychotherapeutic approaches and is heavily biased towards CBT treatment. Additionally, ethical restrictions stop it from making further analysis of the patients' condition. This intrinsic and consistent bias limits the AI to suggesting only one type of further treatment without the ability to account for potentially more effective ways of dealing with a patient's condition. Interestingly, it was found that ChatGPT is excellent at interpreting dreams and coming up with alternative meanings, a crucial process in psychotherapy. However, this also comes with downsides which makes it unsuitable for a psychotherapist substitute as it may give interpretations which induce negative emotions in patients. Raile stresses that despite ChatGPT's vast catalog of information and intelligent interpretation of information, it is suitable only as a supplementary tool and not a substitute for psychotherapists.

Similarly, Minerva and Giubilini also found that despite ChatGPT's ability to easily interpret statements and provide free and accessible mental healthcare to patients, its brief answers were limiting.

Despite so, their research found several ways in which AI can successfully substitute the role of psychotherapist and identified factors which appeal to some patients. The use of digital phenotyping in AI allows users to be self-aware of when they need to seek professional help. Despite the possibilities of false positives, if AI evolves to avoid this issue, it can successfully evaluate any population at risk of mental health issues. Furthermore, many today are discouraged to seek mental support due to social stigmas surrounding the severity of mental illness. This allows chatbots like ChatGPT and other AI to be suitable substitutes which patients feel more comfortable interacting with. Those with depression, PTSD, and autism may also choose to avoid human interaction like therapists due to difficulties surrounding communication or the sharing of experiences. This increases the importance of chatbots and AI, opening up opportunities for it to act as a substitute for psychotherapists. Alternatively, AI can also help identify the genetic or physiological conditions of a patient to facilitate diagnosis. Lastly, practitioners are prone to schematic biases where factors such as age, race, social status, gender, etc. can lead to the misdiagnosis of patients. AI could potentially be more accurate at diagnosing patients as it is not influenced by cognitive biases. Hence, allowing mental illnesses to be accurately identified while promoting the swift recovery of patients.

As technology matures, AI in the realm of psychotherapy could put into question old methods and blur the boundaries of responsibilities. According to Minerva and Giubilini, whether rectifying algorithm biases and mistakes made by AI are the responsibility of therapists or not is a subject to be further debated.

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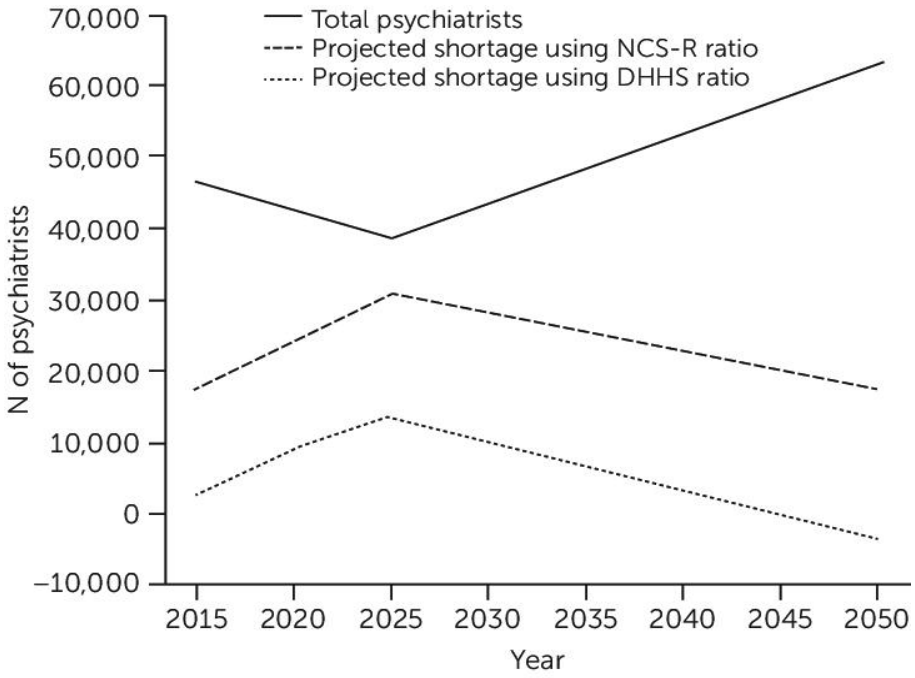

Figure 1. Projected workforce of psychiatrists in the United States through 2050

Chatbots and AI are important for society and the psychotherapy industry as a substitute or complement to its service due to the fast-rising demand for therapy unable to be kept up by the supply of mental health workers. It is estimated that there is a global shortage of 4.3 million mental health workers and could reach 10 million in 2030 for low/middle - income nations. If AI is not used efficiently to fill the gaps, it could lead to the decrease in productivity of an economy or even worse, a generation plagued by depression.

7. Risks and Benefits of Conversational AI and ChatGPT

With an idea of how conversational AI and ChatGPT can be integrated into psychotherapy services, we can look into the potential risks and benefits of this technology, especially when compared to human solutions.

Wysa's annual mental health report summarizes a few key points regarding this area. It is difficult to test for the clinical safety and validity of auto-generated AI texts. This signifies that psychotherapist firms incorporating AI and ChatGPT in their services must set boundaries and systems in place to ensure clinical appropriateness.

Furthermore, user anonymity is compromised as data is sent to third parties, leading to security, privacy, and regulatory risks. It is possible that this risk may limit the extent to which AI can be integrated into psychotherapy. However, it is possible to mitigate this risk through separating data from personally identifiable information.

Lastly, AI is not developed enough to ensure complete accuracy and reliability. This needs to be addressed by the psychotherapy firm itself. If what is generated deviates from the identified clinical prescription, the deviation must be corrected. AI must be constantly managed and monitored by the firm to ensure issues are solved. Moreover, artificial intelligence is prone to bias and errors like humans, but the organizational liability of AI errors can be significantly higher.

In another research finding by Minerva and Giublini (2023), the risks and benefits of AI in psychotherapy were evaluated, proposing four main outcomes of AI development.

The best outcome is that AI will greatly improve outcomes for patients, leading to greater provision of mental health care for a lower cost. Another outcome could be that AI improves healthcare but with significant downsides not worth its utility; therefore, is used sparingly. Alternatively, it may be that the

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best results of AI can be obtained through the collaboration of healthcare practitioners and AI technology. AI is able to comprehend and respond empathetically; hence, alleviating burden from practitioners. The healthcare system could become more efficient. Lastly, AI may not be cost effective and that humans are better than AI for this industry. Human psychotherapy requires the building of relationships between two humans and AI simply cannot replace this vital factor. AI could also gather sensitive information about one's health, posing risks. In this case AI should not be used in mental healthcare at all.

When specifically discussing the weaknesses of ChatGPT, the most accessible and advanced form of AI yet, Paolo Raile (2024) identified some potential weaknesses and strengths. ChatGPT can consider the whole conversation in context and is very effective in coming up with interpretations and diagnoses. It is free, accessible, and an interesting complement to psychotherapists; therefore, making it a vital tool in psychotherapy. However, its broadness, one-sided suggestions, ethical restrictions, inability to assess subjective factors, and bias favoring specific treatment methods limits it from being a true replacement for psychotherapists. If the tool develops the ability to consider all possible methods of treatment for patients while adopting a genuinely empathetic attitude, it may be able to replace psychotherapists entirely. At the moment, it would be wise for psychotherapy firms to integrate it as a tool given its clear benefits.

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