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Research Paper

AI-Based Emotion Recognition in Tele-Therapy: Improving Client Engagement and Emotional Insight

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ABSTRACT

Tele-therapy has expanded rapidly, especially during the COVID-19 pandemic, offering mental health services via digital platforms. However, it faces challenges like the loss of non-verbal cues, crucial for emotional understanding. This review explores how AI-based emotion recognition, through facial expression and speech analysis, enhances emotional insight and client engagement in tele-therapy. A thematic analysis of peer-reviewed studies and expert conversations was conducted, highlighting the role of AI in improving therapy outcomes and the need for psychologists' involvement in developing these technologies to ensure their clinical relevance.

Keywords: *AI in Psychotherapy, Emotion Recognition, Human-AI Collaboration, Real-time Emotional Insight, Mental Health Technology*

Tele-therapy, also known as “telehealth” or “online therapy”, refers to the delivery of mental health care through the medium of digital devices such as video conferences, phone calls, text messaging, or therapy apps that are dedicated for providing mental health services. This allows the therapists and counsellors to render treatment and support services remotely, thereby increasing accessibility of such services, especially for those who face barriers such as distance, mobility, time constraints (Boiangiu et al., 2022) The rise of the usage of tele-therapy can mainly be attributed to the advancements in technological means of providing mental health care. Another influencing factor that has probably accelerated the demand for mental health services is the COVID-19 pandemic, particularly during the need for social isolation. On days like these, tele-therapy has come to the rescue.

However, like with any other newly developed treatment, tele-therapy also has challenges. One such challenge is the loss of assessing non-verbal cues and emotional context which are crucial for holistic diagnosis and detection. This is a major benefit of traditional in-person therapy sessions. With the growing advancements in technology, AI has now been used as an option to address this issue. AI-based emotion recognition software and technologies have emerged in recent times to improve the therapist-client engagement and give proper emotional insight in tele-therapy settings (Singh & Srivastava., 2023; Franzoni & Milani, 2019; Comas, Aspandi, & Binefa, 2020). The use of AI in this context leverages various modalities such as facial expression analysis, and speech and tone recognition, and also

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helps in detecting physiological signs that make it easier for the therapist to interpret emotional states in real-time (Shehu, Haidar & Sahin., 2020; Khare et al., 2023).

AI-based emotion detection can improve therapy results by allowing the therapist to monitor the emotional progress of the client. As a result, it allows the therapist to understand the client better during remote sessions. They can further modify the treatment interventions based on the characteristics of the clients (Younis et al., 2024). This form of therapy has proven to keep clients in therapy longer because of the sense of warmth which is provided by the therapist. In addition, theory can also predict emotion by emotion detection based on different real-time analysis of deep learning models of emotional tracking (Abbaschian, Sierra-Sosa & Elmaghraby., 2021), which thus creates not just an immersive experience but an interactive one as well (Sinha., 2021).

With systematic integration of such AI-based emotion recognition, therapists will be equipped with the skill of providing emotional insight within virtual-tele-therapy platforms. This review paper will seek to establish how these technologies can help in increasing client engagement and even the emotional comprehension in services such as tele-therapy for the purpose of improving emotional health.

Theoretical Perspectives - Affective Computing by Rosalind Picard

Affecting Computing is a theory presented by Rosalind Picard in 2000. This field of study is today regarded as important because it states that systems and devices can recognize, interpret, process, and simulate human emotions if they were built properly. This theory is important in the context of tele-therapy because it can lead to the creation of AI systems that detect emotional states through a variety of data inputs, like facial expression recognition and vocal tones interpretation, and also understanding of physiological signs, such as heart rate variability ((Khanna et al., 2022; Steppan et al., 2020). These technologies will also help in the development of systems that can address the challenges associated with virtual therapy sessions, where non-verbal cues, being a big part of a client's emotional state, often slip out of sight because of the physical distance (Sinha., 2021; Rukavina et al., 2016).

Current Usage in Tele-Therapy

Presently, there are advanced algorithms that help in the recognition of facial expressions. These algorithms analyse micro-expressions of clients during virtual therapy sessions. This data is processed in real-time, allowing the therapist to respond to the shifts in the non-verbal cues (Zhang., 2018).

METHODOLOGY

Research Aim

The aim of this review paper is to explore the role of AI-based emotion regulation in enhancing client engagement and emotional insight during virtual therapy sessions. The paper looks at how emerging technologies can help in improving therapy outcomes within the context of virtual mental health care.

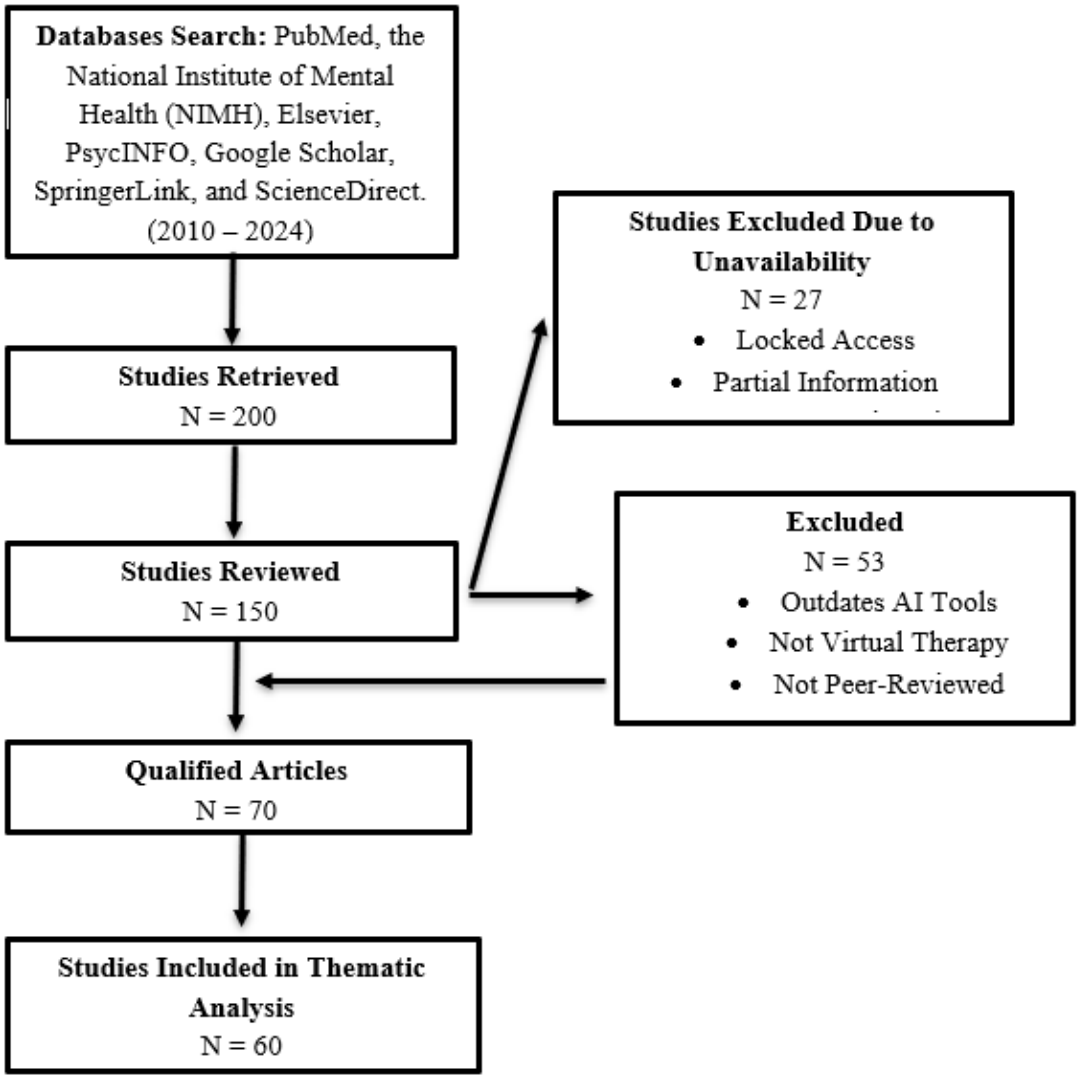
Research Objectives

- To examine the effect of AI-based emotion recognition on client engagement.
- To evaluate the effectiveness of AI-driven emotion recognition in real-time tele-therapy sessions.
- Investigate how AI systems enhance emotional insight for therapists and clients.

Research Design

This paper adopts a thematic analysis approach. The study involves a collection of peer-reviewed studies, reports, and articles of experts from the field focused on AI tools that analyse facial expressions, voice modulation, and text to enhance emotional insight and client engagement in tele-therapy.

Literature Review Flowchart



Thematic Analysis of the Database Search Results

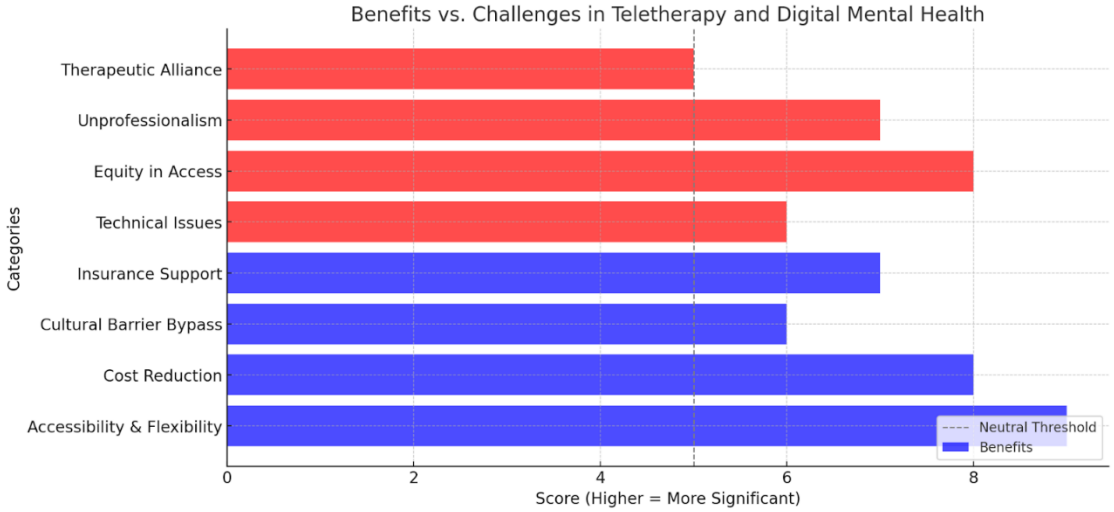
Theme 1: Technological Advancements in Teletherapy and Digital Mental Health

The COVID-19 global outbreak hastened the introduction of digital health technologies in the area of mental health services, and their uptake has endured after the pandemic (Kane et al., 2022; Sagui-Henson et al., 2022; Li, 2023). The necessity for therapy has led to the development of these healing technological methods, making the practices more flexible, accessible, private, and more comfortable to address delicate issues (Jo et al., 2023; Chakraborty, 2022; Taylor, Fitzsimmons-Craft, & Graham, 2020; Odugbose, Adegoke, & Adeyemi, 2024; Wu et al., 2024). On the contrary, they also bring an ethical dilemma

mainly cheating, technology failure and unfair subscription policy (Van Daele et al., 2020; Ogugua et al., 2024)

According to Kister et al. (2023), highlighting the positive impact of telepsychiatry in areas where associated costs are very low shows that, apart from overcoming cultural barriers, there are also reduced costs involved. Nevertheless, they indicated that doing so is often difficult with the patient hence the difficulty in establishing the attachment that is critical in therapy. Such study findings suggested adopting telepsychiatry interventions as adjuncts rather than supports to in-person therapies (Philippe et al., 2022; Singh et al., 2024; Tal & Torous, 2017)

Likewise, Gangamma et al. (2022) reported that, with the onset of the pandemic, teletherapy was more beneficial for clients with insurance and of marginalised identity groups whereas lower socioeconomic groups were unable to access such services. This issue raised by Gangamma et al. (2022) resonates with Chakraborty's (2022) argument advocating for measures to curb the ill effects of technology concerning access equitability.



- **Blue Bars**: Indicate benefits like accessibility, cost reduction, cultural barrier bypass, and insurance support.
- **Red Bars**: Represent challenges, such as technical issues, equity in access, unprofessionalism, and therapeutic alliance difficulties.
- **Neutral Threshold Line**: Helps distinguish more significant factors (scores above 5) from less significant ones.

Theme 2: Ethical and Practical Considerations in Digital Health Interventions

While the booming digital mental health services have advantages, they come with some concerns regarding their quality. Tremain et al. (2019) & Gomes, Murray, & Raftery (2022) stated that electronic platforms can hinder the therapeutic alliance in comparison to physical interaction, which makes it difficult for therapists to reach their client. In the same vein, Horn and Weisz (2020) warned that there is a risk of care being less personalised when AI is used excessively, with the reduction of emotional effort in favour of efficiency that may compromise treatment.

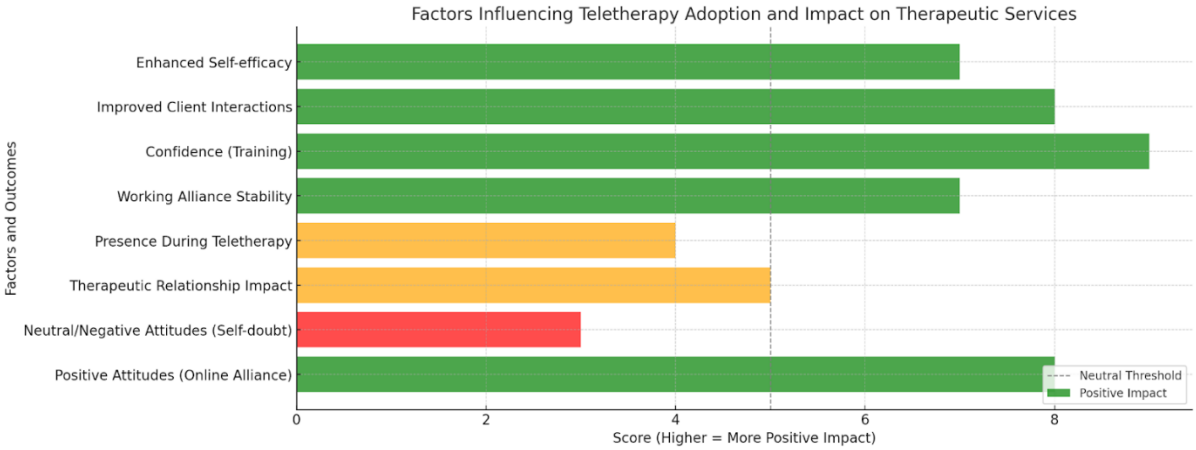
Fiske, Henningsen, and Buyx (2019) explored the application of artificial intelligence in the area of mental healthcare delivery and its advantages such as introducing novel therapies, increasing clients' participation, and decreasing the burden of therapists' work. Still, these scholars expressed concerns about ethical issues such as potential misuse of personal data, over-reliance on technologies, and lack of adequate clinical integration, thus stressing the importance of progress without loss of key therapeutic principles (Jumelle & Ispas, 2014; Hall, Gómez Bergin, & Rennick-Egglestone, 2024; Maeckelberghe et al., 2023)

- **Green Bars**: Indicate benefits such as innovative treatments, improved patient engagement, and reduced workload.
- **Red Bars**: Represent challenges, including reduced therapeutic alliance, risk of depersonalization, data misuse, algorithm over-reliance, and lack of clinical integration.
- **Neutral Threshold Line**: Helps distinguish more significant considerations (scores above 5).

Theme 3: AI Integration and its Impact on Psychotherapy

There's a growing trend of using AI in psychotherapy which has led to advancement in research and practice. According to a study by (Békés et al. 2021 & Miner et al., 2019) therapists who were aged below 40, experienced low self-doubt and had a robust teletherapy relationship had more favourable views towards tele psychotherapy. On the other hand, therapists with high self-doubt tended to show more negative attitudes.

In research conducted later by Békés et al. it was discovered that the use of teletherapy did not affect the therapeutic bond much as the therapists described themselves present in the sessions less than face to face one (Gual-Montolio et al., 2022; Ping, 2024). However, over time, this deleterious effect was almost wholly removed, and there were no differences in the working alliance if therapists were willing to conduct therapy over the phone. Antebi-Lerman (2014) explained that such training – termed 'tele-facilitative' – increased clinical therapists' competence and effectiveness in working with clients. Likewise, Tabaei (2022) claimed high levels of acceptance and involvement in digital art therapy after training, and clients were more able to express themselves (Holohan & Fiske, 2021)



- **Green Bars**: Indicate positive impacts, such as acceptance with a strong online alliance, confidence through training, and improved client interactions.
- **Red Bars**: Reflect concerns, particularly related to professional self-doubt and negative attitudes toward teletherapy.
- **Orange Bars**: Represent mixed impacts on the therapeutic relationship and presence during teletherapy.
- **Neutral Threshold Line**: Helps to distinguish between more positive and less favourable influences.

DISCUSSION

Döllinger and colleagues (2023) explored the role of training and recognition of multimodal expressions and facial micro expressions and found that initial training improved the therapists' recognition of multimodal expressions (facial, bodily, vocal cues) and facial micro expressions. However, what they also found was that after 1.5 years of training, therapists plateaued in their ability to recognize these expressions, suggesting that AI tools can fill this gap by providing "continuous, real-time analysis" of client's emotions (Abd Yusof et al., 2024)

Based on the above review, the author believes that the only way one will be able to address the issues posed by AI in its integration with therapy is through implementation. With AI taking over every sector in the world, it is increasingly important for us to psycho educate therapists on how they can complement their knowledge and skills with AI tools. Humans are prone to error and AI lacks empathy. However, the two make a wonderful combination that can revolutionise the way mental health care is delivered.

The introduction of emotion detection technology in therapy by AI will improve accuracy in symptom assessment and diagnosis tools although this will require the interference of an empathic and understanding psychotherapist who is capable of fusing these findings into a diagnosis report. Such a way the clients will experience a better feeling of being understood thus improving their confidence in therapy.

In general, we feel that a novel direction for AI integration in psychotherapy is the so-called "Human-AI Collaborative Therapy Models", or MHEs, that are intended for purposes other than simply enabling AI as a tool. Specifically, an AI would function not only as an artifice, but rather would engage with the therapist in real time, adapting as per the therapy. This

would involve the ability of AI to recognize patterns and the emotions of the therapist to facilitate the creation of turning interventions whenever the client's emotions, changes in facial appearance or even voice outbursts change.

In addition, it is necessary to engage in the designing process of not only the experts on artificial intelligence, but also therapists and other practitioners in mental health. Their involvement would assist in creating mental health technologies, which evolved in practice and are historically consistent development. In those cases where therapists have participated in the design of the artificial intelligence system, the therapy provided has included variations designed to fit the emotional state and psychology of the client.

This integrated treatment model, in which a role of "co-therapist" is assigned to the AI, is expected to enhance the quality of mental health practices in a way that remains therapeutically productive. This interaction of AI and human skills in improving health care services could be very beneficial. It could improve the quality of care for the patients using sophisticated, precise clinical interventions which also possess a therapeutic element aimed at healing the patient emotionally.

CONCLUSION

Emotional insights and interventions in teletherapy using artificially intelligent systems provides hope for advancements in mental healthcare services. Though digital services promote accessibility, they come with other issues such as low non-verbal communication and depersonalization. Through the enhancement of emotional recognition in real-time via AI, it can greatly reduce this challenge such that the therapist is able to alter treatment directions seamlessly.

It is important to strike a happy medium, one that sees the embracing of technology but also upholds the foundational rules of any treatment. AI's role in therapy will require additional training programs for therapists to be effective. On a positive note, AI as a 'co-therapist' could improve results so utilising "Human-AI Collaborative Therapy Models" will be beneficial. All issues of responsibility, including trust in AI systems and the risks involved with health data, cannot be wished away if AI is to be healthy in a constructive manner. All these courtesy nuances will contribute significantly towards elevation of therapy practices to a more lucid and humane level.

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Conflict of Interest

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