

The Present and Future of Artificial Intelligence Applications in Psychiatry

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Archives of Neuropsychiatry, with roots dating back to 1919 as a traditional sequel of the journal "İstanbul Seririyatı" and has been published continuously since 1964, is celebrating its 60th anniversary! The last 60 years have witnessed extraordinary developments in the fields of science and technology, and Archives of Neuropsychiatry is happy and proud to keep pace with this new era by embracing the future.

As the journal steps into its seventh decade, this article explores the increasing usage of artificial intelligence (AI) technologies in psychiatry, their future potential, and their limitations that remain to be solved.

Applications of Artificial Intelligence in the Research Field

AI is the field of computer science that deals with the development of problem-solving and decision-making abilities by machines, similar to the human brain (1). Machine learning algorithms are used to train AI-based systems with large amounts of data to gain these skills (2). Unlike traditional computer systems, AI focuses on development of hypotheses rather than testing a given hypothesis (3).

AI applications have opened up a new research field on early diagnosis and prevention of psychiatric disorders. AI can be used to detect common patterns and identify high-risk individuals in big data collected from hundreds of thousands of participants, obtained through methods such as brain imaging, genetic examinations, electroencephalography, polysomnography, blood tests, and physical measurements (4). In predicting whether the person is in the healthy control group or the patient group up to 98% accuracy in results has been reported, based on brain imaging data (5). In addition to data obtained through sophisticated methods, successful results have also been achieved with AI in predicting diagnosis and treatment response by incorporating sociodemographic information such as patients' age, gender, ethnicity, and income level (6). In summary, based on complex data, AI allows making stronger predictions than traditional methods of analysis in many diseases such as mood disorders, schizophrenia, addiction, sleep disorders, Alzheimer's disease (2, 3, 7, 8).

With the launch of the large language model (LLM) ChatGPT in November 2022, the use of AI in the academic field has become increasingly widespread. ChatGPT is a chatbot that provides human speech-like responses to requests and questions. In addition to providing spelling suggestions and assistance with language and grammar, ChatGPT can respond to requests such as analyzing and presenting data, writing computer code, drafting review articles, preparing project applications, and providing feedback on written articles as a reviewer. However, there are important problems regarding the reliability of the information provided by AI.

Due to the nature of its operating style, it is not possible to determine conclusively how the AI achieves the results it offers. Being a closed box in this regard, possible incorrect or biased data in the material on which AI is trained may lead to significant effects on the conclusions reached. This is a very important limitation in the field of scientific research, where methodological transparency is especially essential for reliability. Some seemingly plausible information provided by LLMs may be outdated, contradictory, or largely inaccurate, and non-existent publications may be presented as references (9, 10). In this regard, publishing organizations have also published various restrictions and guidelines regarding the use of AI. Since AI applications cannot take responsibility for the published information, it is generally accepted that they should not be listed among the authors, and if AI was used at any stage in the research or preparation of the article, it should be explained in detail in the methods and/or information sections (9, 11).

Applications of Artificial Intelligence in the Clinical Field

In addition to research, AI can be used in daily life to instantly monitor and evaluate data collected with smartphones or wearable devices, such as social media activity, internet searches, medication compliance, geographical location, physical activity and even change in the amount of speech (2). One of the areas where AI is most successful compared to humans is rapidly analyzing data

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Highlights

- **Artificial intelligence (AI) has opened new areas in the screening, diagnosis, and treatment of psychiatric diseases.**
- **The use of AI applications is becoming increasingly widespread in many stages of scientific research.**
- **AI applications have led to new problems regarding reliability and privacy.**

collected from different databases and reaching conclusions. It appears possible for AI to rapidly compile data collected in daily life along with medical records allowed by individual, particularly enabling the early detection of exacerbations in mood disorders and psychotic disorders (7).

AI can contribute to optimization in disease diagnosis and monitoring, as well as in the delivery of healthcare services. There are numerous studies showing that AI-based robots, chatbots and virtual therapists have been used successfully despite various shortcomings compared to face-to-face meetings. These tools have the potential to assist numerous patients at a low cost, as they are easily accessible regardless of geographical location and are not adversely affected by human factors such as fatigue, stress, and burnout (8).

AI-based tools have significant limitations in the clinical field too. Although computer technologies and the Internet offer very effective ways to spread information, in clinical practice they are quite insufficient to bring up the thought of being understood and to provide the relief that direct contact with an empathetic person creates. For example, although AI-based models provide the opportunity to reach a large number of people quickly in extraordinary situations such as natural disasters, the lack of an empathetic approach is a significant limitation in conditions of severe stress. Another limitation is that standards regarding the security of personal information processed with AI, have not yet been established. Daily life data and medical records especially carry significant risks regarding the violation of personal privacy. In this sense, there is a need to determine the principles and rules regarding security and privacy in AI applications.

An international survey about psychiatrists' perspectives on AI applications conducted in 2019 reported that approximately 50% believed AI would significantly change their profession, while 17% believed it could replace humans in providing empathic patient care (12). The increasing use of telepsychiatry during the Coronavirus Disease 2019 (COVID-19) pandemic and the growing accessibility of AI applications in various fields may have influenced psychiatrists' opinions on this matter. However, considering its current strengths and limitations, it is possible to predict that AI will be more easily integrated into diagnostic processes than treatment applications (7).

Conclusion

While current studies on AI focus on increasing the success of screening, diagnosis and treatment in psychiatric practice, they also seek solutions for new problems related to reliability and confidentiality. Although we have limited information to predict potential benefits and drawbacks, it is likely that AI will have profound impacts on both research and clinical practice:

Today, one of the most accessible and successful areas of AI is the correction of texts in terms of language and grammar. This provides great convenience for researchers to ensure the fluency and accuracy of the language in their scientific publications. The generally accepted approach is to clearly state how AI is utilized in the article and not to include AI among the authors.

AI has made great progress in analyzing big data. However, significant biases may arise depending on the characteristics of the data on which the AI is trained. For this reason, the results obtained by AI should not be directly accepted as the truth, but their reliability should be evaluated by the human mind.

While overcoming issues related to reliability may be possible in the future, it is also possible that the contamination arising from accumulated data can make it difficult to distinguish between real and fabricated. Therefore, the importance of peer reviews by human reviewers and editors remains essential for scientific publications.

In the field of clinical psychiatry, AI offers significant opportunities for rapid screening of large populations and for providing psychoeducation. While AI applications may be useful adjunct tools for accurate diagnosis and treatment, it does not seem possible for them to entirely replace the role of an empathetic clinician.

Artificial Intelligence Use: Artificial intelligence was used for the English language editing of this article.

REFERENCES

1. Surianarayanan C, Lawrence JJ, Chelliah PR, Prakash E, Hewage C. Convergence of Artificial Intelligence and Neuroscience towards the Diagnosis of Neurological Disorders—A Scoping Review. Vol. 23, *Sensors*. MDPI; 2023. [\[Crossref\]](#)
2. Sun J, Dong QX, Wang SW, Zheng YB, Liu XX, Lu TS, et al. Artificial intelligence in psychiatry research, diagnosis, and therapy. *Asian J Psychiatr*. 2023;87:103705. [\[Crossref\]](#)
3. Graham S, Depp C, Lee EE, Nebeker C, Tu X, Kim HC, et al. Artificial Intelligence for Mental Health and Mental Illnesses: an Overview. Vol. 21, *Current Psychiatry Reports*. Current Medicine Group LLC 1; 2019. [\[Crossref\]](#)
4. You J, Zhang YR, Wang HF, Yang M, Feng JF, Yu JT, et al. Development of a novel dementia risk prediction model in the general population: A large, longitudinal, population-based machine-learning study. *EClinicalMedicine*. 2022;53. [\[Crossref\]](#)
5. Qureshi MNI, Oh J, Lee B. 3D-CNN based discrimination of schizophrenia using resting-state fMRI. *Artif Intell Med*. 2019;98:10-7. [\[Crossref\]](#)
6. Acion L, Kelmansky D, Laan MD Van, Sahker E, Jones DS, Arndt S. Use of a machine learning framework to predict substance use disorder treatment success. *PLoS One*. 2017;12(4):e0175383. [\[Crossref\]](#)
7. Minerva F, Giubilini A. Is AI the Future of Mental Healthcare? *Topoi*. 2023;42(3):809-17. [\[Crossref\]](#)
8. Ray A, Bhardwaj A, Kumar Malik Y, Singh S, Gupta R. Artificial intelligence and Psychiatry: An overview. *Asian J Psychiatr*. 2022;70. [\[Crossref\]](#)
9. Flanagan A, Bibbins-Domingo K, Berkwitz M, Christiansen SL. Nonhuman "authors" and Implications for the Integrity of Scientific Publication and Medical Knowledge. Vol. 329, *JAMA*. American Medical Association; 2023. p. 637-9. [\[Crossref\]](#)
10. Zhong Y, Chen Y jun, Zhou Y, Lyu YAH, Yin JJ, Gao Y jun. The Artificial intelligence large language models and neuropsychiatry practice and research ethic. Vol. 84, *Asian Journal of Psychiatry*. Elsevier B.V.; 2023. [\[Crossref\]](#)
11. Tools such as ChatGPT threaten transparent science; here are our ground rules for their use. *Nature*. 2023;613(7945):612.
12. Doraiswamy PM, Bleese C, Bodner K. Position Paper Artificial intelligence and the future of psychiatry: Insights from a global physician survey. 2019; [\[Crossref\]](#)