



**PEER-REVIEW REPORT**

**Name of journal:** *World Journal of Meta-Analysis*

**Manuscript NO:** 82682

**Title:** Artificial Intelligence Ecosystem for Computational Psychiatry: Ideas to Practice

**Provenance and peer review:** Invited Manuscript; Externally peer reviewed

**Peer-review model:** Single blind

**Reviewer’s code:** 05382551

**Position:** Editorial Board

**Academic degree:** PhD

**Professional title:** Associate Professor

**Reviewer’s Country/Territory:** Spain

**Author’s Country/Territory:** China

**Manuscript submission date:** 2022-12-26

**Reviewer chosen by:** AI Technique

**Reviewer accepted review:** 2023-01-02 09:27

**Reviewer performed review:** 2023-01-02 10:18

**Review time:** 1 Hour

<b>Scientific quality</b>	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Very good <input type="checkbox"/> Grade C: Good <input checked="" type="checkbox"/> Grade D: Fair <input type="checkbox"/> Grade E: Do not publish
<b>Novelty of this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input checked="" type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No novelty
<b>Creativity or innovation of this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No creativity or innovation



<b>Scientific significance of the conclusion in this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input checked="" type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No scientific significance
<b>Language quality</b>	<input type="checkbox"/> Grade A: Priority publishing <input type="checkbox"/> Grade B: Minor language polishing <input checked="" type="checkbox"/> Grade C: A great deal of language polishing <input type="checkbox"/> Grade D: Rejection
<b>Conclusion</b>	<input type="checkbox"/> Accept (High priority) <input type="checkbox"/> Accept (General priority) <input checked="" type="checkbox"/> Minor revision <input type="checkbox"/> Major revision <input type="checkbox"/> Rejection
<b>Re-review</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Peer-reviewer statements</b>	Peer-Review: <input checked="" type="checkbox"/> Anonymous <input type="checkbox"/> Onymous
	Conflicts-of-Interest: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

### SPECIFIC COMMENTS TO AUTHORS

The article is within the scope of the journal and deals with an interesting topic. It is well written. The reading is fluent. The content of the article deals with a review of the application of artificial intelligence in psychiatry. The contribution of the article is interesting, however to be accepted it requires some improvements: a) It should explain what type of review has been carried out, the sources consulted, the criteria used to carry out the review. b) A discussion section is necessary where the results obtained in the review are established: current lines of work, relationship between the reviewed works, trends, .... c) In the conclusion section, the scientific contribution of the work should be synthesized and lines of future work should be established.



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**Reviewer's code:** 05327699

**Position:** Editorial Board

**Academic degree:** MBBS, MNAMS, MS

**Professional title:** Additional Professor

**Reviewer's Country/Territory:** India

**Author's Country/Territory:** China

**Manuscript submission date:** 2022-12-26

**Reviewer chosen by:** Dong-Mei Wang

**Reviewer accepted review:** 2023-02-23 04:46

**Reviewer performed review:** 2023-02-23 05:27

**Review time:** 1 Hour

<b>Scientific quality</b>	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Very good <input type="checkbox"/> Grade C: Good <input type="checkbox"/> Grade D: Fair <input type="checkbox"/> Grade E: Do not publish
<b>Novelty of this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No novelty
<b>Creativity or innovation of this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No creativity or innovation



<b>Scientific significance of the conclusion in this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No scientific significance
<b>Language quality</b>	<input type="checkbox"/> Grade A: Priority publishing <input checked="" type="checkbox"/> Grade B: Minor language polishing <input type="checkbox"/> Grade C: A great deal of language polishing <input type="checkbox"/> Grade D: Rejection
<b>Conclusion</b>	<input type="checkbox"/> Accept (High priority) <input type="checkbox"/> Accept (General priority) <input checked="" type="checkbox"/> Minor revision <input type="checkbox"/> Major revision <input type="checkbox"/> Rejection
<b>Re-review</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Peer-reviewer statements</b>	Peer-Review: <input type="checkbox"/> Anonymous <input checked="" type="checkbox"/> Onymous
	Conflicts-of-Interest: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**SPECIFIC COMMENTS TO AUTHORS**

Dear Authors, 1. In the Theory driven aspect of computational psychiatry - what were the different variables ? 2. What precautions were taken regarding the data-anonymity ? 3. Open AI platforms like AI Gym - how they stored the data and maintain anonymity ? 4. Sensitivity and specificity of supervised , unsupervised or semi-supervised applications ? Which are superior accordance to the present literature ? 5. Please mention the different biomarkers present in blood to assess mental disorders ? 6. What were the anomalies in colour vision noted in the patients of schizophrenia ? Thanks



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**Reviewer’s code:** 03527550

**Position:** Peer Reviewer

**Academic degree:** PhD

**Professional title:** Adjunct Professor

**Reviewer’s Country/Territory:** Canada

**Author’s Country/Territory:** China

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**Reviewer chosen by:** Dong-Mei Wang

**Reviewer accepted review:** 2023-02-26 07:32

**Reviewer performed review:** 2023-02-26 14:50

**Review time:** 7 Hours

<b>Scientific quality</b>	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Very good <input type="checkbox"/> Grade C: Good <input type="checkbox"/> Grade D: Fair <input checked="" type="checkbox"/> Grade E: Do not publish
<b>Novelty of this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input checked="" type="checkbox"/> Grade D: No novelty
<b>Creativity or innovation of this manuscript</b>	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input checked="" type="checkbox"/> Grade D: No creativity or innovation



<b>Scientific significance of the conclusion in this manuscript</b>	[ ] Grade A: Excellent [ ] Grade B: Good [ ] Grade C: Fair [ Y] Grade D: No scientific significance
<b>Language quality</b>	[ ] Grade A: Priority publishing [ ] Grade B: Minor language polishing [ ] Grade C: A great deal of language polishing [ Y] Grade D: Rejection
<b>Conclusion</b>	[ ] Accept (High priority) [ ] Accept (General priority) [ ] Minor revision [ Y] Major revision [ ] Rejection
<b>Re-review</b>	[ ] Yes [ Y] No
<b>Peer-reviewer statements</b>	Peer-Review: [ Y] Anonymous [ ] Onymous
	Conflicts-of-Interest: [ ] Yes [ Y] No

### SPECIFIC COMMENTS TO AUTHORS

Your choice if you want to share all or parts of this with the authors: Thank you for the opportunity to review the paper titled “Artificial Intelligence Ecosystem for Computational Psychiatry: Ideas to Practice.” Abstract The introductory sentence of the abstract is not altogether accurate because computational psychiatry not just study the biological basis of mental disorders, but also takes into account the art of diagnosis and what this can tell us related to potential mechanism. The biological basis of mental disorder is only one component of the complex matrix of factors, leading to and from mental disorder within the individual of biologically contained identity known as the ‘self’. In the abstract, are patterns different from tendencies? Tendency appears to refer to a vague mathematical boundary that is not significant if not insignificant. It is recommended to only use the term ‘patterns’. Employ this ‘may’ help rather than this ‘can’ help. We do not know if it can help at present. In what way has ‘continuous development and breakthrough’ not influenced clinical practice? Further breakthroughs in computational psychiatry will not follow education, rational thought, collaboration, etc. Computational psychiatry may inform education, rational thought, and



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collaboration, etc. which is in the reverse direction from the logic of the existing sentence structure. Overall the abstract is like a paper in and of itself. It should be constrained to a description of what follows for formal scientific publication form in terms of introduction, methods, results, and conclusions, depending on the format of the journal. Core tips: define tendencies that are invisible. Invisible to what? The core tip is largely a copy and paste of the abstract. Should be a one or two lines that give a take-away message - some main learning point. Introduction and Body The jury is still out on the effect of Covid on human health and mental health. Comparatively, most countries in the world face, in addition to COVID, much more difficult issues such as poverty, hunger, economic, marginalization, etc. that put the luxury of having any mental health services out of reach. Long before COVID some countries, families, especially rural families, had 3 month waiting lines for children's mental health assessment and would hire people to stand in line for them. Ultimately, the family (or representative) and the affected child would have a few minutes with a psychiatrist (if they were lucky) end up with a prescription for medication [Not enough psychiatrists per capita]. How does reference #3 lead to the conclusion that these theories are emerging "endlessly"? What specific artificial intelligence has come to the foreground in psychiatry? For example, a PubMed search for (artificial intelligence[Title]) AND (computational psychiatry[Title]) revealed only one 2020 publication that focused on digital phenotyping: Washington P, Park N, Srivastava P, Voss C, Kline A, Varma M, Tariq Q, Kalantarian H, Schwartz J, Patnaik R, Chrisman B, Stockham N, Paskov K, Haber N, Wall DP. Data-Driven Diagnostics and the Potential of Mobile Artificial Intelligence for Digital Therapeutic Phenotyping in Computational Psychiatry. *Biol Psychiatry Cogn Neurosci Neuroimaging*. 2020 Aug;5(8):759-769. doi: 10.1016/j.bpsc.2019.11.015. Epub 2019 Dec 13. PMID: 32085921; PMCID: PMC7292741. Of note is while the authors cited three of papers where Washington was an author, they failed to cite this detailed review. Further, the



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authors do not include reference to some of the largest population dataset and attending publications that have identified how psychiatry must reshape itself in the 21st Century (wpanet/comorbidity), yet there is no mention of these papers or such complicating factors that will have a cornerstone in both AI and computational psychiatry. These papers have arisen without AI or deep learning but are definitely computational and have concrete implications for clinical practice. How is this an 'industrial revolution' after the atomic age and the information age. There is no reference to the 'fourth industrial revolution' that has context for the inevitable choice of computational psychiatry. Try to avoid sweeping statements for which there is no evidence. With reference to references 12, 13, and 14 and the "Black Box", how do you know in reference to the statement about 'mechanism' that what gets turned off in the brain in terms of pathological conditions (let alone consciousness) is less important than what remains on. How does brain imagining target and identify what gets turned off. (eg, Languages of the Brain: Experimental paradoxes and principles in neuropsychology By Karl H. Pribram. (Pp. 432; illustrated; £4.75.) Prentice-Hall: Hemel Hempstead. 1972.) While the paper makes considerable reference to computational psychiatry helping to identify treatments, and its potential ability to solve challenges in clinical psychiatry, there is a little reference to any actual or putative mechanisms or identification of modes of treatment. Given the identified hopper of information related to metabolomics, big data, surveys, etc. how will an artificial intelligence information system interface with clinical practice ,and ultimately treatment? From the statement "it is worth mentioning that this field has accumulated rich data,...", yet there is no reference as to where this data might reside, how it is integrated, or any proposed mechanism as to how it will be put into assessment or treatment; somehow this happens, and while not in a 'black box', does this mechanism simply appear and while all the correct terms arise in Figure 1, these terms remain euphemistic. Consider the following mathematical model: Mann DW. A



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mathematical model of the self. *Psychiatry*. 1992 Nov;55(4):403-12. doi: 10.1080/00332747.1992.11024613. PMID: 1470678. In this simple model, the 'self' occurs in a one-sided shape, at most a membrane, yet to this day a clear definition remains elusive and it is this self-same entity that is the object most afflicted by mental disorder. It may be that all markers of mental disorder arise after the fact, and scientific perspectives are largely 'positivistic' as they require post facto measurement. The review needs to be revised extensively. Computational psychiatry is different from artificial intelligence. The paper attempts to bring these ideas together, but there is little discussion regarding how this is to be accomplished. In the first instance, the first definition of computational psychiatry stops before the concept of treatment: "Computational psychiatry is an emerging field that uses computational and mathematical techniques to study the biological basis of mental disorders. In short, let's see what AI has to write on the subject: From Open AI: Computational psychiatry is an interdisciplinary field that applies principles and techniques from computer science, mathematics, and engineering to understand the neural and cognitive mechanisms underlying psychiatric disorders, and to develop more effective and personalized treatments. It aims to bridge the gap between neuroscience and psychiatry by using computational models to capture the complex interactions between genetic, environmental, and neural factors that contribute to mental illness. Computational psychiatry combines insights from multiple levels of analysis, from genetic and molecular pathways to brain circuits and behavior, to generate predictive models that can inform diagnosis, prognosis, and treatment selection. These models can also be used to test and refine theories of psychopathology and to identify new targets for intervention. Ultimately, computational psychiatry seeks to transform psychiatric care by providing more precise and evidence-based approaches to diagnosis, treatment, and prevention of mental illness. AI (Artificial Intelligence) in psychiatry refers to the



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application of advanced technologies and computational methods to assist in the diagnosis, treatment, and management of mental health disorders. It involves the use of algorithms, machine learning, natural language processing, and other AI techniques to analyze patient data, predict outcomes, and provide personalized treatment recommendations. AI-based psychiatry tools can aid clinicians in detecting early signs of mental health disorders, tracking symptoms over time, identifying potential risk factors, and providing personalized treatment plans. They can also help in the development of more accurate and reliable diagnostic tools, which can improve the efficiency and effectiveness of mental health treatment. Overall, AI has the potential to transform the field of psychiatry by providing clinicians with powerful tools to enhance the accuracy and effectiveness of mental health care, and ultimately improve patient outcomes. AI (Artificial Intelligence) and computational psychiatry are closely related fields that both aim to improve our understanding and treatment of mental health disorders. Computational psychiatry involves the use of mathematical and computational models to study the neural and cognitive processes underlying mental health disorders, and to develop more accurate and personalized treatment approaches. This field draws on insights from neuroscience, psychology, and computer science to develop models of brain function and behavior that can be used to better understand mental health disorders and design more effective treatments. AI is a key tool in computational psychiatry, as it provides advanced computational methods and algorithms that can be used to analyze large datasets, identify patterns and correlations, and develop predictive models of mental health outcomes. For example, AI techniques such as machine learning and natural language processing can be used to analyze electronic health records, imaging data, and patient-reported outcomes to identify risk factors and develop personalized treatment plans. Overall, the relationship between AI and computational psychiatry is synergistic, as AI provides powerful computational tools that can be used



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to refine and extend computational models of mental health disorders, while computational psychiatry provides a rich theoretical framework and empirical data to guide the development and testing of AI-based mental health tools. Together, these fields have the potential to transform our understanding and treatment of mental health disorders and improve the lives of millions of people around the world. Identifying and implementing a novel psychiatric treatment using AI (Artificial Intelligence) and computational psychiatry would involve the following steps: Step 1: Data Collection and Analysis The first step would involve collecting large amounts of data on patients with a particular mental health disorder, such as depression or anxiety. This data could include demographic information, medical history, imaging data, genetic information, and patient-reported outcomes. This data would then be analyzed using AI algorithms to identify patterns, correlations, and potential risk factors. Step 2: Development of Computational Models The next step would involve the development of computational models that can simulate the neural and cognitive processes underlying the mental health disorder of interest. These models would be based on the data collected in step 1 and would be used to identify potential targets for treatment. Step 3: Identification of Novel Treatment Targets Using the computational models developed in step 2, AI algorithms would be used to identify novel targets for treatment. For example, the models may identify a particular neurotransmitter or neural pathway that is dysregulated in patients with the mental health disorder. Step 4: Design of Treatment Protocol Based on the novel treatment targets identified in step 3, a treatment protocol would be designed. This protocol may involve the use of pharmacological agents, behavioral interventions, or other approaches to modulate the dysregulated system and improve symptoms. Step 5: Implementation and Testing of Treatment Protocol The final step would involve the implementation and testing of the treatment protocol in a clinical setting. Patients would be enrolled in a randomized controlled trial, and their outcomes



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would be compared to those receiving standard of care treatments. AI algorithms would be used to monitor patient responses and optimize the treatment protocol as needed. As an example, a novel psychiatric treatment for depression identified using AI and computational psychiatry may involve targeting the glutamatergic system. The computational models developed in step 2 may identify dysregulation of this system in patients with depression, and the treatment protocol designed in step 4 may involve the use of a glutamate receptor modulator to normalize activity in this system. The treatment would then be tested in a clinical trial to assess its efficacy and safety. It is difficult to ascertain how this paper can add value to the field more than the review that was omitted from their references: Washington P, Park N, Srivastava P, Voss C, Kline A, Varma M, Tariq Q, Kalantarian H, Schwartz J, Patnaik R, Chrisman B, Stockham N, Paskov K, Haber N, Wall DP. Data-Driven Diagnostics and the Potential of Mobile Artificial Intelligence for Digital Therapeutic Phenotyping in Computational Psychiatry. *Biol Psychiatry Cogn Neurosci Neuroimaging*. 2020 Aug;5(8):759-769. doi: 10.1016/j.bpsc.2019.11.015. Epub 2019 Dec 13. PMID: 32085921; PMCID: PMC7292741.