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REVIEWER'S REPORT

Manuscript No.: IJAR-59696

Title: FROM COUNTERFACTUAL EXPLANATIONS TO CAUSAL ALGORITHMIC RECOURSE: A REVIEW OF METHODS UNDER IMPERFECT CAUSAL KNOWLEDGE .

Recommendation:

Accept as it is .....

Accept after minor revision.....

Accept after major revision .....yes.....

Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality			Y	
Techn. Quality			Y	
Clarity			Y	
Significance			y	

Reviewer's ID: JPR-Dr.Shaweta Sachdeva

Detailed Reviewer's Report

1. The manuscript addresses an important and emerging research area. However, the novelty and specific contribution of this review should be more clearly distinguished from existing review papers on counterfactual explanations and algorithmic recourse.
2. The literature review methodology requires further clarification. The authors should provide a more systematic description of the search strategy, including exact search strings, inclusion and exclusion criteria, and the process used to select the final 20 studies.
3. The authors have primarily relied on Google Scholar for literature identification. It is recommended that additional scholarly databases, such as IEEE Xplore, Scopus, Web of Science, and ACM Digital Library, be considered to improve the comprehensiveness of the review.
4. The selection of only 20 research papers needs stronger justification. The authors should explain how the selected studies adequately represent the developments in causal counterfactual explanations and algorithmic recourse between 2018 and 2026.
5. The discussion of individual approaches, including DiCE, FACE, CARMA, CEILS, and other causal recourse methods, is mostly descriptive. A deeper technical comparison of their underlying methodologies, assumptions, advantages, and limitations would improve the manuscript.
6. Table II provides a useful taxonomy; however, the classification criteria should be explained more explicitly. The authors should ensure consistency between the methodological descriptions in the main text and the information presented in the table.
7. The manuscript identifies three major research gaps: feasibility and actionability, incomplete causal knowledge, and confounding/non-identifiability. However, their interrelationships need to be discussed in greater technical detail.
8. The authors should include a comparative discussion of the computational complexity, scalability, robustness, and practical applicability of the reviewed approaches wherever relevant information is available.
9. The review would benefit from a dedicated discussion of real-world applications, particularly in healthcare, banking, financial services, and other high-stakes decision-making domains.
10. The future research directions are relatively general. The authors should provide more concrete research challenges and possible methodological solutions for developing reliable algorithmic recourse under incomplete causal knowledge.

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11. Some statements regarding the assumptions and limitations of the reviewed methods require stronger support from the original research publications. The authors should carefully verify the technical interpretations and ensure that the cited studies are represented accurately.
12. The manuscript should discuss the limitations of its own review methodology, including possible publication bias, database coverage, and the relatively small number of selected studies.
13. The conclusion largely reiterates the findings presented in earlier sections. It should be strengthened by highlighting the principal contributions, critical insights, and implications of the review for future research.
14. The manuscript requires careful language editing to improve grammatical accuracy, sentence structure, academic tone, and readability. Some sentences are lengthy and contain repetitive expressions.
15. The authors should carefully check the reference list for completeness, consistency, DOI availability, and uniform referencing style. The publication status of preprints and conference submissions should also be clearly indicated.

Overall Recommendation

Major Revision

The manuscript addresses a relevant and promising research topic and provides a useful initial taxonomy of counterfactual explanations and causal algorithmic recourse methods. However, the current presentation is predominantly descriptive and lacks sufficient methodological rigor and critical comparative analysis. The authors are encouraged to strengthen the literature review methodology, provide deeper technical comparisons, clarify the novelty, and improve the discussion of practical implications and future research directions. Addressing these concerns would significantly improve the quality and scholarly contribution of the manuscript.