**Response Letter**

Dear Editors and Reviewers:

Thank you for your letter and comments concerning our manuscript entitled " XXXXXX " with the number APIN-D-XX-XXXX. Those comments are all valuable and very helpful for revising and improving our manuscript, which has guiding significance to my co-authors and me.

We have substantially improved the manuscript accordingly. All comments and detailed responses are as follows. All the reviewers’ concerns and suggestions have been considered and fully addressed in the revised version.

We look forward to hearing from you regarding our revision. It would be our pleasure to respond to further questions and comments.

Kind regards,

Yours truly Xing Wu

**Response to Reviewers**

**Reviewer 1:**

**The paper discusses the importance of causal inference in the medical field and proposes a systematic survey to address challenges related to assessing treatment effects using traditional machine learning approaches. I have following observations.**

**Q1: The paper identifies challenges faced by traditional machine learning approaches for causal inference in the medical domain. The machine learning methods "Deep learning for obstacle avoidance in autonomous driving", "Enhancing assessment of corn growth performance using unmanned aerial vehicles (UAVs) and deep learning", "Machine Learning Based Comparative Analysis of Methods for Enhancer Prediction in Genomic Data", may be discussed.**

**A1:**

Thank you for your constructive comments. We have read these papers carefully and discussed them in the manuscript.

The modifications are as follows:

“Cur……………………”

References are listed as follows:

[1] Garg, M., Ubhi, J.S., Aggarwal, A.K.: Deep learning for obstacle avoidance in autonomous driving. In: Autonomous Driving and Advanced Driver-assistance Systems (ADAS), pp. 233–246. CRC Press, America (2021)

[2] Xiao, J., Suab, S.A., Chen, X., Singh, C.K., Singh, D., Aggarwal,A.K., Korom, A., Widyatmanti, W., Mollah, T.H., Minh, H.V.T., et al.: Enhancing assessment of corn growth performance using unmanned aerial vehicles (uavs) and deep learning. Measurement 214, 112764(2023)

[3] Kaur, A., Chauhan, A.P.S., Aggarwal, A.K.: Machine learning based comparative analysis of methods for enhancer prediction in genomic data. In: 2019 2nd International Conference on Intelligent Communication and Computational Techniques (ICCT), pp. 142–145 (2019). IEEE

***The above information has been updated on Introduction, Page 2 and References, Page 29 in the revised manuscript.***

**Q2: The paper portrays causal inference as a crucial tool for determining causal effects………………...**

**A2:** Thank you for your constructive comments. We have read these papers carefully and discussed them in the manuscript.

The modifications are as follows:

“…………………..”

References are listed as follows:

[4] Aggarwal, A.K.: Biological tomato leaf disease classification using deep

learning framework. Int J Biol Biomed Eng 16(1), 241–244 (2022)

[5] Srivastava, A., Aggarwal, A.K.: Medical image fusion in spatial and transform domain: a comparative analysis. In: Handbook of Research on Advanced Concepts in Real-time Image and Video Processing, pp. 281–300. IGI global, America (2018)

***The above information has been updated on Introduction, Page 2-3 and References, Page 29 in the revised manuscript.***

**Q3: A meta analysis of the causal inference in medical field using machine learning techniques is missing in the paper.**

**A3:**

Thank you for your constructive comments. In the revised manuscript, we have conducted a meta-analysis of machine learning techniques for causal inference in medicine.

The modifications are as follows:

“Causal inference methods play a pivotal role in medicine, where t……………….”

***The above information has been updated on 3.6 Method Summary , Page 21-23 in the revised manuscript.***

**Reviewer 2:**

**Q1: There are many reviews on causal inference, including on……………..**

**A1:** Thank you for your constructive comments. Regarding the review paper [31] on causal inference you mentioned, it differs from ……………..

The modifications are as follows:

“To the best of our knowledge,………………….”

***The above information has been updated on Introduction, Page 3-4 in the revised manuscript.***

**Q2:**

**A2:**

Thank you for your constructive comments. We have designed a new diagram to present the same concept in an original way to strictly comply with copyright regulations.

The modifications are as follows:

***The above information has been updated on Introduction, Page 4 in the revised manuscript.***

**Reviewer 3:**

**I think that a survey on this topic is necessary and will be useful to practitioners and researchers. But I have recommendations to make it more valuable:**

**Q1: ………………..**

**A1:**

Thank you for your constructive comments. We further elaborated the methods and explained the concepts in various subsections.

The modifications are as follows:

***The above information has been updated on section 3.1.2 Causal Graph, Page 9 in the revised manuscript.***

**Reviewer 4:**

**Q1: While the paper mentions limitations of various methods, a more in-depth discussion on how to………..**

**A1:**

Thank you for your constructive comments. We provide an in-depth discussion of the limitations of various approaches.

The modifications are as follows:

***The above information has been updated on 3.3.1 Naranjo Algorithm, Page 15-16 in the revised manuscript.***