Review of: "Artificial Intelligence & Nature-Based Solutions in Agriculture: A BT Cotton Pest Management Case Study in India"

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Potential competing interests: No potential competing interests to declare.

The research demonstrates that the case study focused on the implementation and outcomes of an AI-based pest management advisory system in cotton farming regions of Ranebennur, Karnataka, and Wardha, Maharashtra states. The study aims to evaluate the effectiveness of artificial intelligence in assisting farmers in making informed decisions regarding pest control measures. The primary objective of the research is to assess the impact of AI-based pest management advisory on pest attacks, crop damage, and farmer income in cotton farming regions. However, several aspects could be improved in the manuscript.

1. From a research perspective, the abstract should convey the research gap in the existing literature, the proposed methodology, and the target metric for the evaluation. Example: The abstract does not provide precise quantitative data regarding the effectiveness of the AI-based pest management system, such as the precise reduction percentage in pest infestations or the correlated rise in farmers' income. Incorporating such metrics would offer a more detailed understanding of the research results.

2. The introduction lacks a clear delineation between the broader agricultural challenges discussed initially and the specific focus on Pink Bollworm (PBW) infestation in cotton crops. This lack of focus might lead to confusion among readers regarding the primary objective of the research. Additionally, the introduction could benefit from a more detailed explanation of how the presented AI solutions directly address the identified agricultural challenges, particularly in the context of PBW management. Providing a stronger link between the discussed challenges and the proposed AI solutions would enhance the relevance and coherence of the research from a research perspective.

3. One notable disadvantage of the paper is the lack of a literature review. This absence prevents readers from gaining vital background information on past research and progress in AI-driven pest management methods. Most recent reference papers could be included in the literature.

4. To enhance the visual representation of the paper, the following elements could be included:

Flow Diagrams: Use flow diagrams to illustrate the various stages of the research process, such as the workflow of data collection, AI model development, and evaluation.

Images of Pests: Include images or illustrations of the pests discussed in the paper, such as the pink bollworm, to help readers visually identify them.

Block Diagrams: Utilize block diagrams to depict the architecture or components of the AI-based pest management system, showcasing how different modules interact with each other.

Life Cycle Diagrams: Create life cycle diagrams to illustrate the biology and life stages of pests like the pink bollworm, providing a clear visual representation for readers to understand.

Charts and Graphs: Incorporate charts and graphs to present experimental results, trends, and statistical analyses in a visually appealing and easy-to-understand format.

5. Datasets are not explicitly mentioned in the study. Mention the dataset with relevant information.

6. The novelty of the research findings could be elaborated based on the AI-based application as mentioned in the abstract.

7. The methodology section lacks sufficient detail on the specific AI algorithms and technologies used in the development of the cottonace smartphone application. Providing more information on the technical aspects of the AI system would enhance the reproducibility and transparency of the research.

8. Although the experimental results highlight the benefits of using the AI-driven pest management system, such as increased production and income, a more in-depth examination of the underlying drivers of these outcomes would strengthen the study. Examining specifics, such as identifying the particular pest species and determining the corresponding population decreases, would provide a deeper understanding of the AI framework's effectiveness. Furthermore, the experimental results section might benefit from including a discussion of any unexpected challenges or restrictions observed during the AI system's integration. Discussing the preventive measures used to address these problems would add useful context and expand the scope of the key findings. The results of the proposed method may be compared with the existing state-of-the-art methods based on the relevant evaluation metrics.

9. The conclusion may benefit from a more comprehensive summary of the key research findings, emphasizing their importance for future agricultural approaches. Furthermore, it could examine future research areas and potential enhancements to the AI-driven pest management system, building on the findings of the current study.

While the research focuses on the benefits of AI in pest management, there is a possibility for an additional detailed examination of the potential constraints and challenges associated with AI integration in agriculture. This includes issues such as data privacy concerns, technology disparities among farmers, and the need for ongoing technical assistance and education. In summary, the study will be improved by addressing the drawbacks and limitations mentioned above, providing a stronger platform for future agricultural research and applications of artificial intelligence. In light of these observations, it is strongly recommended that the authors undertake a thorough revision of the entire manuscript.