REVIEWER'S REPORT

Manuscript No.: **IJAR-53868**   Date: 18-09-2025

Title: ENHANCING PDF MALWARE CLASSIFICATION USING CTGAN-BASED DATA AUGMENTATION AND SUPERVISED LEARNING.

Recommendation:
Accept as it is …………………………….
Accept after minor revision………………
Accept after major revision ………………
Do not accept (*Reasons below*) ………

Rating	Excel.	Good	Fair	Poor
Originality	✓			
Techn. Quality	✓			
Clarity		✓		
Significance	✓			

Reviewer Name: Mr Bilal Mir

Reviewer's Comment for Publication.

Strengths

- **Innovative Approach:**

  The use of CTGAN to address dataset imbalance is original and effectively strengthens model generalization.

- **Methodological Rigor:**

  Clear workflow detailing preprocessing, augmentation, hyperparameter tuning, and evaluation across six algorithms.

- **Practical Relevance:**

  Results have direct implications for securing organizational systems where PDF documents are common attack vectors.

Areas for Minor Revision

1. **Conciseness & Organization:**
   - Some sections (e.g., detailed mathematical foundations of CTGAN) could be summarized for readability without losing technical depth.

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2. **Figures & Tables:**

   o Ensure all referenced figures (e.g., Figure 1 and Tables 1–2) are included with high-resolution images and consistent captions.

3. **Discussion of Limitations:**

   o Expand on potential challenges for real-time deployment (e.g., computational cost of CTGAN generation) and any steps needed for large-scale production use.

Conclusion

The paper makes a significant contribution to malware detection research by combining synthetic data generation with supervised learning and explainable AI. With minor refinements to clarity and figure presentation, the manuscript is suitable for publication.