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REVIEWER'S REPORT

Manuscript No.: **IJAR- 52907** Date: 21-07-2025

Title: Analyzing Supervised Learning Models for Intrusion Detection Towards Robust Wireless Sensor Network

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: **Sudhanshu Sekhar Tripathy** **Date:** 21-07-2025

Reviewer's Comment for Publication.

(*To be published with the manuscript in the journal*)

The reviewer is requested to provide a brief comment (3-4 lines) highlighting the significance, strengths, or key insights of the manuscript. This comment will be Displayed in the journal publication alongside with the reviewer's name.

Reviewer's Comment for Publication

The manuscript presents a relevant and well-structured study on the comparative analysis of supervised learning models for intrusion detection in Wireless Sensor Networks (WSNs). By evaluating classifiers such as Decision Tree, Random Forest, SVM, and hybrid approaches (e.g., RF+XGBoost, SVM+DBSCAN), the paper offers practical insights into model performance under constrained environments.

The use of the NSL-KDD dataset ensures a standard benchmark, and the experimental results are clearly presented. The methodology is sound, and the conclusions are supported by the findings. However, **minor revisions** are necessary to improve table/figure formatting, section structuring, and citation consistency. With these addressed, the manuscript will make a valuable contribution to the field of intelligent intrusion detection systems.

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Detailed Reviewer's Report

Recommendation: **Accept after minor revision**

Comments & Suggestions for Improvement

1. Scope & Relevance:

- The manuscript focuses on a critical and well-established area in cybersecurity - Intrusion Detection Systems (IDS) for Wireless Sensor Networks (WSNs).
- The comparative evaluation of Decision Tree, SVM, RF, RF+XGBoost, and SVM+DBSCAN is highly relevant and contributes practical insights for researchers and practitioners.
- The discussion on computational constraints in WSNs and the importance of lightweight, interpretable models is timely and well-contextualized.
- The use of benchmark datasets like NSL-KDD makes the study replicable and benchmark-friendly.

2. Structure & Technical Presentation:

- The manuscript includes all essential sections: Abstract, Introduction, Related Work, Methodology, Results, Discussion, and Conclusion.
- Section headings are clearly defined, but section numbering is missing. Adding hierarchical numbering (**e.g., 1. Introduction, 2. Related Work, 3. Methodology...) will improve navigation.**
- However, a key concern is the **absence of a clearly defined Experimental Setup section**. Details such as the programming environment, hardware specifications, software libraries, parameter settings, and evaluation workflow are missing.
- Table I caption is incorrectly placed below the table. **As per academic standards, table captions must be above the table.**
- Figure 1 and 2 caption is incorrectly placed above the figure. **As per academic standards, figure captions must be below the figure.**
- Figures lack detailed captions (e.g., Fig: Performance Comparison) and should include figure numbers and meaningful descriptions (e.g., "Figure 1: Accuracy comparison across IDS models").

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- Clarify which figure corresponds to which metric (Accuracy, F1-score, etc.) and ensure all visuals are clearly cited in-text.
- Consider inserting a block diagram of the system workflow or model comparison strategy to enhance comprehension.

3. References & Citations:

- The reference list includes a good balance of foundational and recent sources (up to 2024).
- However, some references appear in the reference list but are not cited in the manuscript text (e.g., References [5]– [8]).

Example fix: If [5] relates to IoT-based models, cite it where you discuss WSN security or future work.

- In-text citations should be consistently formatted using square brackets with commas between multiple citations: e.g., [2], [4], [6] (not [2][4][6]).

4. Language & Style:

- The manuscript is generally well-written, but a **few grammatical issues** and **awkward phrases** need refinement.

- Example: "The models, Random Forest (RF), Decision Tree (DT)..." → can be rewritten for flow as: "This study evaluates several models, including Random Forest (RF), Decision Tree (DT)..."

- Use a more formal tone in the discussion (e.g., avoid phrases like "our findings show" unless clearly defined).
- Improve **sentence transitions** between sections to support logical flow.
- Avoid redundancy in the results and discussion section.
- Carefully proofread the manuscript for small but important edits (articles, punctuation, sentence length).

Final Feedback to Author:

Please carefully follow the above suggestions and implement the required **minor revisions** as per the **journal's formatting and submission guidelines**. Ensuring consistency in structure, **figure/table captions**, **citation style, and inclusion of the experimental setup** will significantly enhance the clarity, professionalism, and overall quality of your manuscript for successful publication.