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REVIEWER'S REPORT

Manuscript No.: IJAR-53410 Date:19 aug 2025

Title: Intelligent Cybersecurity for IoMT Systems in Psychiatry: An AI-Driven Approach in Health 4.0

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

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

Reviewer Name:Dr.Shaweta Sachdeva **Date:19 august 2025**

Reviewer's Comment for Publication.Accepted with Minor Revision in Manuscript

(*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 reviewers name.

Strengths

1. Addresses a critical issue of cybersecurity in psychiatric IoMT systems, where data sensitivity is extremely high.
2. Combines network traffic data (BoT-IoT) with psychiatric clinical data (PHQ-9, GAD-7), which is innovative and context-aware using Hybrid Approach.
3. Four-layer architecture (IoMT, Edge, AI Cloud, Clinical Supervision) is well-structured and easy to follow.
4. Outperforms the benchmark SNN-IoMT model in all evaluation metrics, especially Recall and F1-score, which reduces false negatives.
5. Includes GDPR compliance, anonymization, and encryption, showing awareness of regulatory and privacy issues.
6. Figures, tables, and equations are clearly explained and support the analysis.

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Weaknesses

1. The dataset is simulated with 1,000 virtual patients. Real-world clinical validation is needed for stronger credibility.
2. Random Forest is robust and interpretable, but deeper justification (vs. neural networks, ensemble hybrids) would strengthen the choice.
3. Only compared with SNN-IoMT. More benchmarks (XGBoost, CNN-LSTM, FL approaches) should be included.
4. Deployment feasibility on large-scale, resource-constrained IoMT devices is only briefly discussed. Needs more performance/latency analysis.
5. Paper highlights interpretability, but no SHAP/feature importance results are shown to validate which clinical/network variables contributed most.
6. The study acknowledges adversarial attacks only in the conclusion. A small experiment or simulated test would make the results stronger.
7. Results are presented as single values; confidence intervals, statistical tests, or cross-validation could make the findings more rigorous.
8. While psychiatry use case is mentioned, the actual workflow for clinicians (alerts, decisions, false alarms) could be explained in more detail.

Detailed Reviewer's Report

- Include **real-world psychiatric IoMT datasets** or at least discuss ongoing collaborations for data collection.

- Expand the **comparative study** to more models and recent state-of-the-art approaches.

- Add **feature importance analysis** to show which psychiatric/biometric indicators most influence intrusion detection.

- Provide more discussion on **deployment challenges** (edge computing, latency, resource limits).

- Include **robustness checks** against adversarial/malicious data manipulation.

- Present **error analysis** (e.g., which types of anomalies are missed or misclassified).

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- Improve **clinical interpretation**: how psychiatrists/nurses would practically use this system in real-time monitoring.

- Consider future **federated learning experiments** to enhance privacy-preserving training.