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REVIEWER'S REPORT

Manuscript No.: **IJAR-52591** Date: 03-07-2025

Title: Comparative Study of Deep Learning Models for Human Activity Recognition

Recommendation:
Accept as it is .....YES.....
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 Mir Bilal

Reviewer's Comment for Publication.

Strengths of the Submission:

1. **Timely and Technologically Relevant Topic:**
   The paper addresses a high-impact area within mobile and ubiquitous computing—Human Activity Recognition (HAR). Given the surge in health monitoring and wearable technologies, the study is both relevant and necessary.
2. **Comprehensive Comparison Across Multiple Architectures:**
   The evaluation includes a diverse range of deep learning models: MLP, 1D-CNN, LSTM, CNN-LSTM hybrid, and Transformer. This breadth gives readers a well-rounded understanding of the strengths and trade-offs of each approach.
3. **Balanced Evaluation Metrics:**
   The paper doesn't focus solely on accuracy and F1-score but also includes crucial deployment-related metrics such as inference latency and model size. This multifaceted evaluation is highly valuable for real-world, edge-based HAR applications.
4. **Strong Empirical Basis:**
   The use of the UCI-HAR dataset provides a recognized benchmark that ensures reproducibility and facilitates comparative analysis with other work in the field.
5. **Clear Highlight of Practical Trade-offs:**
   The conclusion that the Transformer architecture, while top-performing in accuracy, is resource-intensive and not ideal for edge computing is a nuanced and practically important insight. Similarly, the CNN-LSTM hybrid is recognized as an optimal middle ground, which adds depth to the study.
6. **Solid Problem Framing in the Introduction:**
   The introduction effectively sets up the historical background and current limitations in HAR. It

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bridges the gap between academic model performance and practical deployment needs, thereby justifying the study's focus and contribution.

7. **Well-Structured and Readable Abstract:**
   The abstract is clear, concise, and informative. It accurately summarizes the objectives, methods, results, and implications of the study without overwhelming the reader with unnecessary technical detail.
8. **Use of Real-World Deployment Context:**
   The emphasis on edge devices such as smartphones and wearables, along with considerations like power efficiency and inference time, underscores the paper's real-world applicability and engineering relevance.
9. **Logical Organization of Content:**
   The transition from classical methods to modern deep learning approaches in the introduction is smoothly handled, offering a coherent narrative that caters to readers from both machine learning and application domains.
10. **Effective Use of Terminology and Keywords:**
    The selected keywords (e.g., HAR, CNN, RNN, MLP, SVM) accurately reflect the study's scope and help in ensuring discoverability in academic databases.

Overall Evaluation:
This paper presents a well-structured, empirically sound, and application-focused comparison of deep learning models for Human Activity Recognition. It successfully bridges the gap between research excellence and practical deployability. The study contributes meaningfully to both academic understanding and engineering practice by offering a nuanced view of how model choice impacts performance under real-world constraints. It stands as a strong candidate for publication in journals related to machine learning, mobile computing, and sensor-based systems.