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REVIEWER'S REPORT

Manuscript No.: IJAR-57814

Title: AI-Powered Multilingual OCR System for Digitization of Historical Handwritten and Registered Documents in Regional Indian Languages.

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		Y		
Techn. Quality		Y		
Clarity		Y		
Significance		y		

Reviewer's ID: JPR-Dr Shaweta sachdeva

Detailed Reviewer's Report

1. The manuscript addresses an important and socially relevant problem related to the digitization of historical and handwritten regional language documents in India. The topic has strong practical significance for e-governance and cultural heritage preservation.
2. The introduction effectively explains the challenges associated with multilingual handwritten OCR systems and clearly motivates the need for region-specific AI solutions.
3. The research objectives are clearly defined and aligned with the proposed system architecture. The inclusion of both handwritten and printed document processing strengthens the scope of the study.
4. The literature review provides a broad overview of existing OCR methods and Indian language OCR research. However, the manuscript would benefit from including more recent Transformer-based OCR and Vision-Language Model studies published during 2024–2026.
5. The proposed multi-layer OCR architecture is comprehensive and technically well structured. The separation into preprocessing, OCR, NLP, storage, and deployment layers improves clarity and system understanding.
6. The image preprocessing section is detailed and demonstrates a strong understanding of challenges in degraded document restoration. The use of CLAHE, Sauvola thresholding, and Hough Transform is appropriate for historical document processing.
7. The hybrid CNN-Transformer OCR model is an interesting choice for multilingual handwritten text recognition. However, the manuscript should provide more technical details regarding model training parameters, optimizer selection, learning rates, and hardware configuration.
8. The dataset strategy is commendable because it combines benchmark datasets, synthetic datasets, and real government archive scans. Nevertheless, additional discussion regarding annotation methodology and dataset balancing across languages would strengthen reproducibility.
9. The augmentation techniques are relevant and realistic for historical document restoration tasks. Including experimental results showing the impact of each augmentation technique on OCR accuracy would further improve the manuscript.

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10. The comparative analysis against Tesseract and ABBYY FineReader is useful, but the evaluation lacks experimental validation on publicly available benchmark datasets. Quantitative experimental results should be expanded.
11. The performance metrics section clearly defines CER, WER, accuracy, and throughput targets. However, actual experimental results and confusion matrix analysis are missing and should be included.
12. The manuscript includes useful implementation details and sample code snippets, which improve practical understanding of the proposed system.
13. The inclusion of UI screenshots and workflow diagrams enhances readability and demonstrates the practical deployment potential of the system.
14. The conclusion effectively summarizes the contribution of the proposed OCR framework and highlights its potential role in large-scale digitization initiatives in India.
15. The future work section is promising, especially the discussion on federated learning, blockchain-based document authentication, and multimodal document understanding.
16. The manuscript contains several formatting inconsistencies, spacing issues, and grammatical errors that should be corrected through careful proofreading before publication. Some sections contain abrupt transitions and repeated terminology.
17. Overall, the manuscript presents a valuable and application-oriented contribution in the field of multilingual OCR and document digitization. With stronger experimental validation, improved technical depth, and language refinement, the work has good publication potential.