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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.....

Accept after major revision✓.....

Do not accept (*Reasons below*)

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

Reviewer's ID: JPR- 098

Detailed Reviewer's Report

Decision: Accept after Major Revision

Summary:

The manuscript proposes an **AI-powered multilingual OCR system** for digitizing historical handwritten and registered documents in regional Indian languages (Tamil, Telugu, Kannada, Malayalam, and Hindi) using a hybrid **CNN-Transformer architecture**, language-specific preprocessing, NLP-based post-processing, and cloud-based deployment infrastructure.

Strengths:

- Addresses a highly relevant problem of **digitizing historical and government records in Indian regional languages.**
- Comprehensive architecture covering document ingestion, preprocessing, OCR, NLP, storage, and deployment layers.
- Incorporates modern AI approaches including **ResNet-50, Transformers, NER, and language-specific correction models.**
- Supports multiple Indian languages and large-scale government digitization initiatives.

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- Well-defined technology stack and deployment framework using modern cloud-native technologies.

Major Issues:

- The manuscript is primarily a **technical specification and conceptual framework**, with no actual implementation results or experimental validation.
- Performance metrics ($\geq 95\%$ printed accuracy and $\geq 88\%$ handwritten accuracy) are stated as targets rather than experimentally verified outcomes.
- No training, testing, validation results, confusion matrices, CER/WER scores, or benchmark experiments are reported.
- The proposed dataset composition is largely planned, and availability of several datasets and government archives is not sufficiently demonstrated.
- Novelty is limited because CNN-Transformer OCR architectures, TrOCR models, and language-model-based correction approaches are already widely studied.
- Comparative analysis with Tesseract and ABBYY is based on projected performance rather than validated experimental comparisons.
- The included code example uses Tesseract OCR rather than the proposed CNN-Transformer framework, creating inconsistency between the proposed methodology and implementation description.

Minor Issues:

- Numerous grammatical, formatting, and punctuation inconsistencies throughout the manuscript.
- Several figures are conceptual mockups rather than actual system outputs.
- Section numbering is inconsistent (e.g., Dataset and Training Specifications labeled as 3.1 under Section 3.3).
- Some references are outdated, while others require verification and standardization.
- The literature review is descriptive and lacks critical comparative analysis.

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Final Comment:

The manuscript addresses an important national-scale digitization challenge and presents a comprehensive conceptual architecture for multilingual OCR in Indian regional languages. However, the current work lacks implementation evidence, experimental validation, quantitative performance analysis, and demonstrated novelty. Substantial methodological and experimental improvements are required before the manuscript can be considered for publication.