ISSN: 2320-5407

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: IJAR-53538 Date:27/08/25

Title: **Visual Correspondence-Based Explanations Improve Convolutional Neural Networks For Clasificationof Mammograms**

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:** 27/08/25

Reviewer's Comment for Publication.Accepted with some minor revisions

(*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.

Significance

1. The work addresses an important problem in **medical imaging and breast cancer detection**, where early and accurate diagnosis is crucial for patient survival.
2. It contributes to the growing field of **Explainable Artificial Intelligence (XAI)** in healthcare, where interpretability is essential for clinical adoption.
3. The study leverages **large-scale real-world mammography data** (15,040 images from Vietnam National Cancer Hospital), which increases the reliability and applicability of findings.

Strengths

1. **Novelty in approach** – The proposed Visual Correspondence-Based Explanations (EMD-Corr) introduces patch-level interpretability that goes beyond image-level similarity.

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2. **Comparative evaluation** – By benchmarking against both ResNet-18 and kNN, the study clearly demonstrates performance trade-offs while highlighting interpretability gains.
3. **Clinical relevance** – Unlike purely accuracy-focused works, this study emphasizes **localization of abnormal regions**, which is crucial for radiologists to trust AI outputs.
4. **Efficiency** – The method improves upon earlier patch-based approaches by limiting analysis to the top-5 patch pairs, balancing **interpretability with computational efficiency**.
5. **Strong dataset partitioning** – Clear separation into training, validation, and testing sets ensures reproducibility and robustness of results.

Key Insights

1. **kNN slightly outperforms EMD-Corr in classification accuracy**, but EMD-Corr provides superior explainability and localization—highlighting the trade-off between raw performance and interpretability.
2. **Patch-level correspondence captures fine-grained tumor features** that whole-image methods might overlook, aligning AI decisions more closely with radiologists' annotations.
3. The relatively high **tumor finding rate (up to 85.62%)** shows that even with limited patch pairs, the model identifies meaningful regions relevant to diagnosis.
4. The framework demonstrates how **prototype-based and correspondence-based learning** can be integrated into medical AI for more trustworthy and transparent predictions.
5. The research bridges the gap between **black-box CNNs and clinically usable AI systems**, paving the way for broader acceptance of XAI in medical imaging.

Detailed Reviewer's Report

1. Correct *"Clasification"* → *"Classification"* in the title. Ensure uniform spelling of *"ResNet-18"* (sometimes written as *Resnet 18* or *Resnet-18*). Replace *"Beural"* with *"Neural"* in keywords.
2. Make captions more descriptive. For example:
   "Figure 5: Comparison between patch locations (left) versus doctor's annotation (right)" →
   "Figure 5: Visual comparison of EMD-Corr identified patch locations with radiologist annotations of malignant regions."
3. Streamline sentences for clarity. Example:
   "Our visual correspondence model (EMD-Corr) improves kNN and ResNet-18 where EMD-Corr slightly underperforms kNN model" →
   "Our EMD-Corr model outperforms ResNet-18 and achieves performance close to kNN."

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4. Provide clarity on patch size (64×64) earlier in methods section for readers unfamiliar with patch-based approaches.Briefly explain *why* only top-5 patch pairs were chosen (trade-off between efficiency and accuracy).
5. Ensure all equations (cosine similarity, IoU) are numbered consistently (Eq. 1, Eq. 2, etc.). Check subscripts and notation (e.g., *f(Q)* vs *f(Q)* spacing).
6. In Table 3, check consistency of totals (e.g., Benign count differs between earlier Table 1 and Table 3). Provide a clarifying note if due to filtering.
7. Highlight that while kNN slightly outperforms EMD-Corr in classification, **EMD-Corr offers interpretability and localization**, which is the unique strength of your method.