Qeios

Peer Review

Review of: "Development of a Lung Cancer Detection System Using Residual Network 50 on Computed Tomography Scans"

Dr.vijay Kumar Gugulothu[1]

1. Independent researcher

Review of the Manuscript

This manuscript presents a deep learning-based framework for lung cancer detection from CT scan images using a transfer learning approach based on ResNet50. The study combines images from three publicly available datasets and reports excellent classification performance. The topic is clinically important, and the work demonstrates the potential of artificial intelligence in supporting early lung cancer diagnosis.

However, several methodological and reporting issues should be addressed before the work can be considered for publication.

Strengths

1. **Relevant Clinical Problem**
    - Lung cancer remains a major global health challenge, and early detection is critical for improving patient survival rates.
    - The study addresses a significant healthcare problem with practical implications.
2. **Use of Transfer Learning**
    - Employing a pre-trained ResNet50 model is appropriate for medical image classification, especially when dataset sizes are limited.
    - Transfer learning reduces computational requirements and training time.
3. **Multiple Data Sources**

doi.org/10.32388/YDoTZV

- Combining images from IQOTH/NCCD, LIDC-IDRI, and BIR datasets increases dataset diversity and may improve model robustness.

4. **Strong Performance Metrics**
   - The reported accuracy (98.46%), recall (99.21%), precision (97.69%), and F1-score (98.45%) indicate excellent classification performance.
5. **Practical Implementation**
   - Deployment as a web application enhances the translational value of the research and demonstrates potential clinical utility.

Minor Concerns

1. The manuscript does not report:
   - learning rate,
   - optimizer,
   - batch size,
   - number of epochs,
   - augmentation techniques.
2. Confidence intervals for performance metrics are not provided.
3. ROC curves and AUC values should be included.
4. Computational complexity and inference time are not discussed.
5. The web application architecture and deployment details require further explanation.

Questions for the Authors

1. Was dataset splitting performed on a patient basis or image basis?
2. What specific balancing technique was used to achieve the 50:50 class ratio?
3. Were any data augmentation methods applied during training?
4. How does ResNet50 compare with other state-of-the-art CNN architectures on the same dataset?
5. Has the web application been tested in a clinical environment?
6. Were Grad-CAM or other explainability methods considered?

Overall Recommendation

Recommendation: Minor Revision

The manuscript addresses an important clinical problem and demonstrates promising results using transfer learning with ResNet50. However, concerns regarding dataset handling, potential data leakage, class balancing methodology, lack of external validation, and absence of explainability analysis limit confidence in the reported performance. Addressing these issues would significantly strengthen the scientific rigor and clinical relevance of the study.

Top of Form

Bottom of Form

Attachments: available at https://doi.org/10.32388/YD0TZV

Declarations

Potential competing interests: No potential competing interests to declare.