Review of: "An Improved Hybrid Transfer Learning-Based Deep Learning Model for Alzheimer's Disease Detection Using CT and MRI Scans"

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Potential competing interests: No potential competing interests to declare.

Some limitations of the work include:

1. The success of deep learning models heavily depends on the quality and quantity of data available. If the dataset used in the study is small, unrepresentative, or contains noise or bias, it could limit the generalizability of the results.
2. Alzheimer's disease diagnosis can be challenging, and labeling the data accurately is crucial. The accuracy of the ground truth used for training and evaluation can impact the model's performance.
3. Data augmentation techniques can introduce synthetic variations into the dataset, but the appropriateness and effectiveness of these techniques need to be carefully considered. Inaccurate or excessive data augmentation can potentially distort the data.
4. The choice of pre-trained models and their applicability to the specific problem is important. Some pre-trained models may not be well-suited for Alzheimer's disease classification, and their effectiveness should be thoroughly evaluated.
5. Deep learning models are often considered as "black boxes," making it challenging to interpret the features and decision-making processes. Understanding why the model makes a particular classification can be important in medical applications.
6. The study should assess the potential bias in the data, model, or approach. Ensuring that the model generalizes well across diverse populations and demographics is crucial for practical clinical applications.
7. While high accuracy is a desirable outcome, it's essential to validate the model's performance in a clinical setting. The study should discuss how well the model performs in real-world scenarios and how it might integrate into clinical workflows.
8. The use of medical data for research raises ethical concerns, including patient privacy and consent. The study should detail how these ethical considerations were addressed.
9. The results should ideally be validated on an external dataset to confirm the model's performance and its potential for generalization.
10. Alzheimer's disease is a progressive condition, and long-term data on patients' progression can provide valuable insights. If the study lacks longitudinal data, it may not capture the disease's evolution adequately.
11. Deep learning models, especially large ones like VGG16, ResNet50, and DenseNet121, require significant computational resources. The study should mention the computational infrastructure used and whether this might limit the model's accessibility in real-world healthcare settings.

12. The abstract mentions improved accuracy, but the clinical impact of this improved accuracy should be discussed. How does it affect patient care, diagnosis, or treatment plans?