Review of: "Application of Ensemble Learning in CXR Classification for Improving COVID-19 Diagnosis"

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Potential competing interests: No potential competing interests to declare.

This type of work has been published many times. While the article primarily focuses on the advancements and potential of computer-aided diagnosis (CAD) systems in detecting COVID-19 through chest X-ray (CXR) images, it does touch upon some challenges and limitations that can be considered as negative results or drawbacks. Here are the key negative aspects highlighted:

Limited Dataset Challenges:

- **Generalization Issues**: Many studies rely on limited datasets, which hampers the ability to generalize findings across diverse populations. This limitation affects the reliability and robustness of the proposed models.
- **Validation Problems**: The efficacy of these models on larger, more diverse samples remains uncertain due to the restricted size and scope of the datasets used in initial studies.

Algorithmic Performance Variability:

- **Inconsistent Results**: The performance of different machine learning algorithms can vary significantly, leading to inconsistent diagnostic outcomes. For instance, while some methods like Bayesian optimization achieved high accuracy, others did not perform as well across different datasets.
- **Model Overfitting**: Certain models may perform well on training data but fail to generalize to new, unseen data, indicating overfitting. This is particularly problematic in medical diagnostics where accuracy and reliability are crucial.

Complexity and Implementation Challenges:

- **Technical Complexity**: The sophisticated nature of the discussed machine learning techniques may pose implementation challenges in real-world clinical settings. The complexity of these methods can also be a barrier to adoption by radiologists who may not have a technical background.
- **Computational Resources**: High computational requirements for processing and analyzing CXR images using advanced machine learning models can limit the scalability and practical application of these methods, especially in resource-constrained settings.

Integration with Clinical Practice:

- **Workflow Disruption**: Integrating advanced CAD systems into existing clinical workflows can be challenging. Issues such as the need for clinician training, changes in diagnostic protocols, and potential disruptions to established

practices are not thoroughly addressed.

- **Regulatory and Ethical Concerns**: The implementation of AI-driven diagnostic tools raises regulatory and ethical issues, including the need for rigorous validation, potential biases in AI algorithms, and ensuring patient data privacy and security.