Pros and Cons:

VGG (e.g., VGG16, VGG19):

* Pros: Simple architecture, easy to understand and implement.
* Cons: Can be computationally expensive and may not be as parameter-efficient as more modern architectures.

Inception V3:

* Pros: Good at capturing multi-scale features due to its inception modules.
* Cons: Can be computationally intensive compared to simpler architectures.

ResNet (e.g., ResNet50, ResNet152):

* Pros: Introduces residual connections, making it easier to train very deep networks. Generally, performs well on various tasks.
* Cons: Can be relatively more complex than earlier architectures.

EfficientNetB7:

* Pros: Achieves high accuracy with fewer parameters, making it computationally efficient.
* Cons: May require larger computational resources during training.

Conclusion

In this study, we evaluated four deep learning models—VGG16, Inception V3, ResNet50, and EfficientNet7B—for the task of skin cancer prediction. The models were assessed based on various metrics, with a particular emphasis on F1-score, as it is considered a robust measure that balances precision and recall.

Model Performance:

VGG16:

F1-score (malignant): 0.85

F1-score (benign): 0.89

Inception V3:

F1-score (malignant): 0.84

F1-score (benign): 0.86

ResNet50:

F1-score (malignant): 0.84

F1-score (benign): 0.84

EfficientNet7B:

F1-score (malignant): 0.88

F1-score (benign): 0.90

Decision Criteria:

Considering the emphasis on the F1-score as a key evaluation metric, EfficientNet7B emerged as the most promising model for skin cancer prediction. It exhibited the highest F1 scores for both malignant and benign classes, indicating a balanced performance between precision and recall.

Implications:

The choice of EfficientNet7B is particularly relevant in the context of skin cancer prediction, where the consequences of false positives and false negatives need to be carefully balanced. Its superior performance in terms of the F1-score suggests that it can effectively minimize both types of errors, making it a suitable candidate for practical deployment.

Recommendations for Future Work:

While EfficientNet7B demonstrates promising results, further investigation and validation on diverse datasets and clinical settings are recommended. Additionally, the interpretability of the model and its computational requirements should be considered in real-world applications.

In conclusion, based on the comprehensive evaluation of these models, EfficientNet7B stands out as the preferred choice for skin cancer prediction in this study.