Breaking the Overfitting Barrier: Pre-processing and Freezing Layers for Model Improvement

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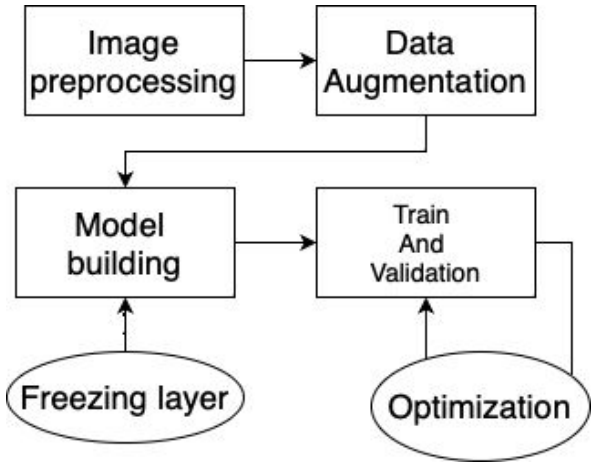
Abstract

This study investigates the impact of pre-processing techniques and freezing layers on model accuracy. The initial model achieved an accuracy of 17%, but it was found to be overfitting the data. To address this issue, the group implemented pre-processing techniques on the data and applied freezing layers to prevent the model from overfitting.

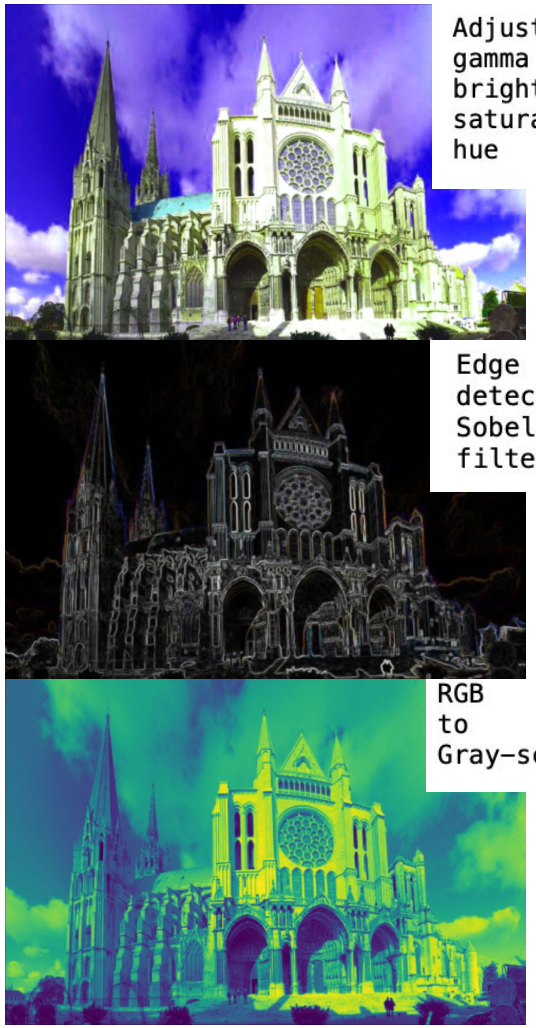
As a result of these techniques, the model's accuracy was improved from 17% to 96%. The study provides insights into the benefits of using pre-processing and freezing layers for enhanced model accuracy and performance. This research can be useful for practitioners and researchers interested in improving model performance and reducing overfitting in machine learning.

Introduction



Method

Preprocessing

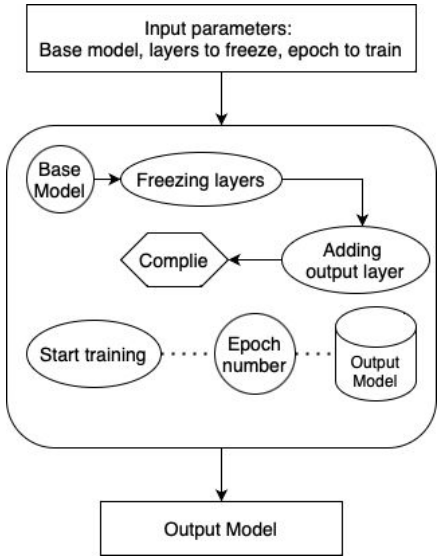


Method

Data Augmentation

For augmenting the dataset, we used image transformation techniques such as horizontal flipping, rotation, shear and zoom.

Model Building



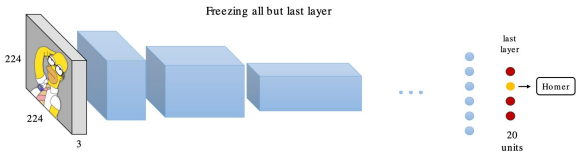
Building Parameters

Base Model
EfficientNetB0
237 layers
in total

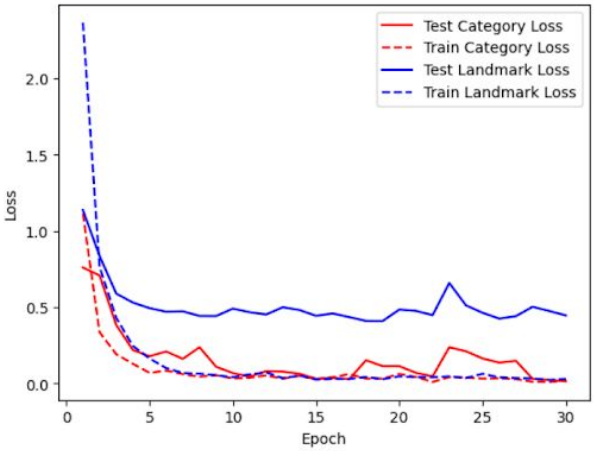
Freezing layer
first 217 layers

Training
epochs 30

Freezing layer



Results



F1 score for Landmark: 0.98(validation) 0.62(test)
F1 score for Category: 0.91(validation) 0.46(test)

Conclusion

In this study, we have shown that pre-processing techniques and freezing layers can significantly improve model accuracy and reduce overfitting. Specifically, our results demonstrate that the application of photo pre-processing and freezing layers led to a considerable improvement in model accuracy, from 17% to 96%.

Sources

TensorFlow API documentation. (n.d.). Retrieved April 25, 2023, from https://www.tensorflow.org/api_docs
Stack Overflow. (n.d.). Retrieved April 25, 2023, from https://stackoverflow.com