Deep Learning for Image Classification: A ResNet50 Animal-Image Study

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***Abstract*—This thesis studies convolutional neural networks for classifying animal images, with a practical focus on ResNet50. The author reviews neural-network concepts and the ResNet architecture, prepares an animal-image dataset, adapts the model's classification layers, and presents training and prediction screens. The report also shows a VGG16 result for comparison. In its comparison section, it reports ResNet50 accuracy of 0.965 on 11339 images with four labels and VGG16 accuracy of 0.953 on 25000 images with two labels. The conclusion reports a different ResNet50 accuracy of 0.98 and an approximate loss of 0.094. Because the tasks and datasets differ and the reported ResNet50 results are inconsistent, these figures do not establish superiority of one architecture. The author also notes that classification of unfamiliar or low-quality animal images remains unreliable despite high training accuracy. More data and a consistent evaluation protocol are needed. The contribution is a documented learning and implementation exercise in transfer-based image classification, with a clear need for stronger empirical validation.**

***Index Terms*—image classification, deep learning, ResNet50, VGG16, animal images, evaluation**

I. Introduction

Animal-image classification is a practical setting for exploring convolutional neural networks. The thesis reviews deep learning concepts and chooses ResNet50 as a model for identifying animal categories. It describes the motivation for using learned visual features rather than manually designed rules. The report includes a separate VGG16 result, but the two model settings are not held constant. The study should therefore be read as an implementation and preliminary assessment rather than a controlled architecture benchmark [1]. Earlier ICTU student work on related designs is included here for context [4], [5]. Related published studies provide context for the subject and methods [6], [7], [8], [9], [10]. These contextual works were selected for this English summary; they are not asserted to appear in the original thesis bibliography.

II. Methods

The author reviews CNN layers and residual connections, then adapts a ResNet50 classifier for an animal-image task. The implementation chapter describes image preparation, model construction, training, prediction, and display of results. A VGG16 model is also shown in the evaluation chapter. The ResNet50 example uses 11339 images across four labels; the VGG16 example uses 25000 images across two labels. These different data and label settings limit direct comparison of the reported accuracy values [1].

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III. Results

The comparison section reports a ResNet50 accuracy of 0.965 and a VGG16 accuracy of 0.953, accompanied by training-result figures. The conclusion instead reports ResNet50 accuracy of 0.98 and approximate loss of 0.094. The manuscript does not reconcile those values or document a shared test set for the two architectures. The author observes that high training accuracy did not translate into consistently correct recognition on varied animal images. The reported numbers therefore describe preliminary runs, not a verified comparative benchmark [1].

IV. Discussion

The source attributes recognition errors to limited and uneven images, changes in environment, many animal types, and poor image quality. It proposes collecting additional data and exploring other models. A robust assessment would require fixed class definitions, comparable train and test partitions, and the same test images for each architecture. The thesis does not supply that controlled protocol, and its two ResNet50 accuracy statements differ. The result is useful as an implementation study but cannot substantiate a general claim about model superiority [1].

V. Conclusion

The thesis demonstrates a ResNet50-based animal-image classification workflow and documents training and prediction screens. It reports promising accuracy values, while also acknowledging classification errors and the need for more data. The comparison with VGG16 uses different datasets and label counts, and the ResNet50 metric differs between sections. Future work should use a reproducible evaluation design before drawing stronger conclusions about recognition quality or practical deployment [1].

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