Capstone weekly report#7

The reason why the accuracy of my base model is too low is that I chose ReLU as the activation function. Sigmoid/ReLU Activation is commonly used for binary classification problems. Obviously, ReLU is not a suitable activation function for this multiclass classification project. Softmax Activation is commonly used for multiclass classification. It normalizes the outputs for each class into a probability distribution, ensuring that the sum of the probabilities for all classes is 1. This makes it ideal for problems where each instance belongs to exactly one class. The output can be interpreted as the probability of the input belonging to each class. So I decided to use Softmax as the activation function in my base model.

I’ve tried 3 different pre-trained models in my base model: Xception, a model that performs really well on fruit classification; VGG16, a model that has been widely used in image classification; and BiT, a model whose accuracy on various image classification tasks is usually higher than other models (see figure 1). After resizing all the images to the default image size of the base models, the accuracy of each model achieved a higher score, as indicated by Farasana et al. (2023) [4]. The accuracy had significantly increased from 84% to 99% when using Xception as the base model. Their accuracies of the base model at the setup of the optimizer of SGD are 27%, 66%, and 87%.A graph of different colored bars

Description automatically generated with medium confidence

Firgure1

Now, the accuracy of the base model has significantly increased. For the coming week, I am going to try more different pre-trained models. Once I find the best pre-trained model that has the best performance on my task, I will move forward to hyperparameter tuning.

References:

1. Big Transfer (BiT): General Visual Representation Learning. <https://arxiv.org/pdf/1912.11370.pdf>
2. <https://www.analyticsvidhya.com/blog/2020/08/top-4-pre-trained-models-for-image-classification-with-python-code/>.
3. AN EVALUATION OF PRE-TRAINED MODELS FOR FEATURE EXTRACTION IN IMAGE CLASSIFICATION. <https://arxiv.org/pdf/2310.02037.pdf>
4. DenseNet-201 and Xception Pre-Trained Deep Learning Models for Fruit Recognition. <https://www.mdpi.com/2079-9292/12/14/3132>