



Weekly Report

Comparative Analysis of Image Classification Models for Efficient and Accurate Classification across Diverse Image Types

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Short info about Research

The fundamental objective of this **quantitative** research is to identify the best image classification models in terms of both time efficiency and accuracy, under different image scenarios such as rotated images, flipped images, occluded images and images of low quality. Several widely recognized models, including AlexNet, VGGNet, ResNet, EfficientNet will be considered for this analysis. **Qualitative** analysis has been made to pick those models since they are considered by experts to be the best.

The dataset chosen for this experiment will be vegetable custom datasets that incorporate the required image conditions. Data preprocessing will be carried out to facilitate the suitable conditions for each model, involving rotating, flipping, and reducing image quality.

To achieve an in-depth and unbiased analysis, the study will take into account several performance metrics. Classification accuracy will primarily measure the model's performance. Simultaneously, precision, recall, and F1-Score will also be considered to provide a good understanding of the model's performance. Moreover, the time taken for training and prediction will be recorded to measure the model's efficiency. Additionally, the model's size in terms of parameters will also be observed.

Week 2

Have been done:

After discussion with project leaders, it was decided that using ImageNet, Cifar-10 and other popular image datasets will be wrong since some of models might be pretrained on those datasets. That is why it was decided to find a new dataset. Moreover, it was opted to focus more on noisy images and find optimal parameters for models to increase their accuracy. For that purpose, gaussian noise was chosen to be added to images to produce noise images. Considering all of these a list of steps that have been done are following:

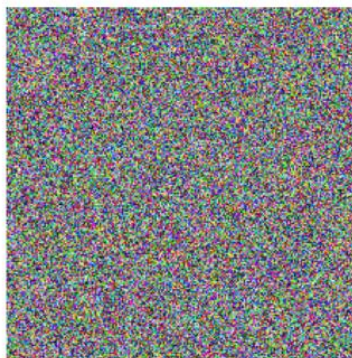
1. Vegetable dataset has been found and opted to be the main data for this project.
2. Noisy images have been created and saved by adding gaussian noise. There are 4 noisy image types that were generated by adding 10, 30, 50, 70 and 100% of gaussian noise. The example for 100% gaussian noise has been illustrated below:

100%

Original



Gaussian Noise



Combined



3. Code for training dataset on pretrained AlexNet, VGG16 and Resnet models was created.

To do list:

Based on the progress made, the following tasks are planned for the upcoming week:

1. To train and find the accuracy of classification models on those three datasets.
2. To do hyper tuning to find out optimal parameters for those models to increase accuracy.