A Comparison of the Design of a CNN on Accuracy and Performance.

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Problem

The purpose of our study is to identify a type of convolutional neural network (CNN) architecture that is best suited to identify different types of fruits. In doing so, we will examine each of these CNN architectures [1]:

VGG16 & VGG19 [6]
Google Inception [3]
Resnet [4]
Xception [2]

We will train each architecture of convolutional neural network to be able to recognize and categorize different images of fruit. Once we have trained the different architectures we will evaluate each of them and determine which one has the highest accuracy and greatest performance.

1. Work previously done

Mureşan and Oltean [5] used a convolutional neural network, recurrent neural network, and deep belief neural network to help classify images of fruit.

2. Proposed work

Our research will use different architectures of convolutional neural networks to determine which one is the best at categorizing different pictures of fruit. We will also quantify how much better any one specific design of neural network is over another at the aforementioned task. A comparison of our work will be made to that of Mureşan and Oltean to determine which (out of all the studied neural network designs) deep learning architecture is the most effective for fruit categorization.

3. Preliminary plan

3.1. Design

We will design and implement each of the neural network architectures mentioned in the problem statement.

3.2. Training

We will train each of the neural networks with the given data set of fruit photographs for an appropriate amount of time.

3.3. Analysis

Data about correct / incorrect classification of fruit pictures will be analyzed in order to select an appropriate model.

References

[1] F. Altenberger and C. Lenz. A non-technical survey on deep convolutional neural network architectures, 2018.
[2] F. Chollet. Xception: Deep learning with depthwise separable convolutions, 2017.
[3] Google. https://github.com/google/inception, 2018. Accessed March, 2018.
[4] K. He, X. Zhang, S. Ren, and J. Sun. Deep residual learning for image recognition, 2015.
[5] H. Mureşan and M. Oltean. Fruit recognition from images using deep learning, 2018.
[6] K. Simonyan and A. Zisserman. Very deep convolutional networks for large-scale image recognition, 2015. Conference paper from ICLR 2015.