[[1]](#footnote-1)

Iteration on the Fruit-360Dataset

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*Abstract*—In this paper I iterate o the work done on the Fruit-360 dataset available on Kaggle () to create a classifier of fruit and vegetables using convolutional neural networks. My project introduces improvements on the models proposed by the authors by trying new tunings of the parameters and by adding dropout layers between the fully connected layers of the Neural Network. I also train a model starting from the pre-trained model based on MobileNet V2. The results of the classifiers are then compared to the ones of the original paper and to a model based on logistic regression.

# INTRODUCTION

## The Dataset

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he dataset used in this project is called Fruit-360 and can be downloaded from the addresses pointed by references. Currently, the dataset contains 90483 images of 131 different fruits and vegetables. At the time of writing *Mureșan, H., & Oltean, M. (2018)*, only 82213 images of 120 fruits and vegetables were available. The authors invite the reader to access the latest version of the dataset from the above indicated addresses.

The images were obtained by filming the fruits while they are rotated by a motor and then extracting the frames. A white sheet of paper was placed behind the fruits as background. Further work has been put to make sure the background was independent of the lighting conditions. Finally, fruits were scaled to fit a 100x100 pixels image. Each image contains one and only one fruit.

The dataset is already split between a training set (67692 images) and a test set (22688 images).

## Motivation and Applications

I chose this dataset because I was interested in applying what I studied about Deep Learning to a real-life scenario starting from good quality data so that I could focus on the implementation, tuning and training of the machine learning model. Specifically, I wanted to work on Convolutional Neural Networks as they currently are the state-of-the-art classes of algorithms for image classification and detection. I also wanted to experiment with transfer learning, so I decided to train a network from scratch and compare it to a network that I could train from a pre-trained lightweight model such as MobileNet V2. I chose MobileNet V2 for its small size yet good performance, as I wanted my models to be small enough to work on mobile devices. Lastly, I decided to work on this dataset because, by reading *Mureșan, H., & Oltean, M. (2018)*, I realized that the authors did not use certain techniques in their model architecture that are known to improve generalization, so I wanted to see if by introducing them there would be improvements in the performance of the classifiers. Specifically, I’m referring to adding Dropout layers between each couple of consecutive fully connected layers.

My work may be applied across multiple domains. For example, the trained models could be inserted into a portable device to be used by visually impaired people to get help to recognize between different fruits and vegetables. It may also be applied to autonomous fruit harvesting in greenhouses or to the identification of out of place items in the aisles of stores.

# The Method

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# Results

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# Discussion

Hsdfjshdfj

# Conclusion

References

1. Mureșan, H., & Oltean, M., “Fruit recognition from images using deep learning” (2018).

1. [↑](#footnote-ref-1)