

Analyzing Types of Cantaloupe Using Deep Learning

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Abstract: *The name cantaloupe was derived within the eighteenth century via French cantaloup from Italian Cantalupo, that was once a apostolical seat close to Rome, once the fruit was introduced there from Hayastan.[3] it absolutely was initial mentioned in English literature in 1739.[2] The cantaloupe possibly originated in a very region from South Asia to continent.[1] it absolutely was later introduced to Europe and, around 1890, became a poster crop within the u. s. Melon derived from use in Old French as meloun throughout the thirteenth century, and from Medieval Latin melonem, a sort of pumpkin.[4] it absolutely was among the primary plants to be domesticated and cultivated.[2] The South African English name spanspek is alleged to be derived from Afrikaans Spaanse spek ('Spanish bacon'); purportedly, Sir Harry Smith, a 19th-century governor of province, Ate bacon and eggs for breakfast, whereas his Spanish-born partner Juana María Diamond State los Dolores Diamond State León Smith most popular cantaloupe, thus South Africans nicknamed the eponymic fruit Spanish bacon.[3][4] but, the name seems to predate the Smiths and date to 18th-century Dutch Suriname: J. van Donselaar wrote in 1770, "Spaansch-spek is that the name for the shape that grows in Dutch Guiana that, thanks to its cutis and small flesh, is a smaller amount consumed. In this paper, machine learning based approach is presented for identifying type cantaloupe with a dataset that contains 1,312 images use 788 images for training, 196 images for validation and 328 images for testing. A deep learning technique that extensively applied to image recognition was used. use 80% from image for training and 20% from image for validation.*

Keywords: Cantaloupe, Deep Learning, Classification, Detection.

INTRODUCTION:

The cantaloupe may not get as much respect as other fruits, but it should. This tasty, though odd-looking, melon is filled with nutrients. If you don't suppose nabbing a cantaloupe on every occasion you hit your grocery store's turn out section, browse on to be told why you'll need to re-examine. Adding fruit of any kind to your diet is useful. Cantaloupe, a range of musk melon, may be a significantly good selection.

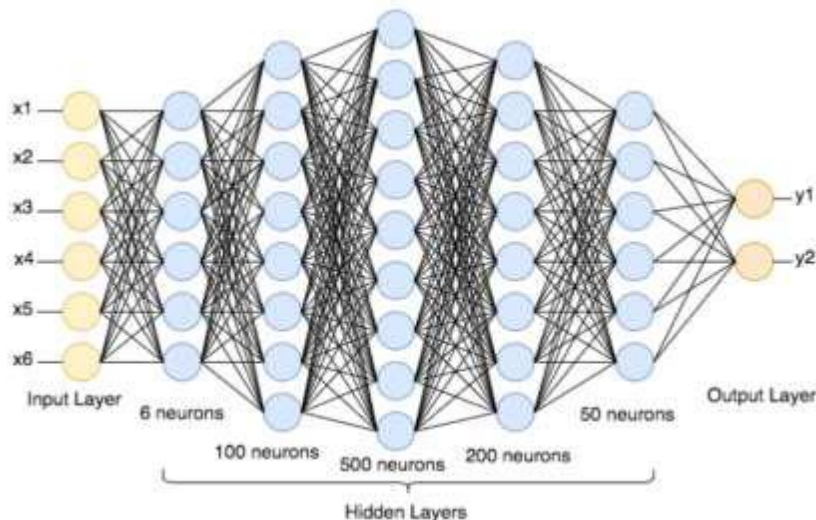
Cantaloupe is providing human by many health benefits, below 7 Health benefits:

1. Cantaloupe is a Beta-carotene source which is either converted into vitamin A or acts as a powerful antioxidant to help fight free radicals that attack cells in your body. Vitamin A is important to:
 - a. eye health
 - b. healthy red blood cells
 - c. a healthy immune system
2. Vitamin C: According to the USDA Trusted Source, 1 cup of balled cantaloupe contains over 100 percent of the recommended daily value (DV) of vitamin C. According to the Mayo Clinic, vitamin C is involved in the production of:
 - a. blood vessels
 - b. cartilage
 - c. muscle
 - d. collagen in bones
3. Source for Folate: Folate is well-known for preventing neural-tube birth defects like spinal bifida.
 - a. It may also help:
 - b. reduce the risk of some cancers.
 - c. address memory loss due to aging, although more research is needed.
4. Source of water: Like most fruits, cantaloupe has high water content, at almost 90 percent. Eating cantaloupe helps you stay hydrated throughout the day, which is important for heart health. When you are hydrated, your heart doesn't have to work as hard to pump blood. Good hydration also supports:
 - a. digestion
 - b. healthy kidneys
 - c. a healthy blood pressure
5. Source of Fiber The health benefits of fiber go beyond preventing constipation. A high-fiber diet may:
 - a. reduce your risk of heart disease and diabetes.
 - b. help you lose weight by making you feel fuller longer.

6. Source of Potassium: One wedge of a medium-sized cantaloupe provides 4 percent of your potassium daily value. Potassium is an essential electrolyte mineral.
7. Source of Other vitamins and minerals: One cup of cantaloupe contains 1.5 grams of protein. It also has small amounts of many other vitamins and minerals, including:
 - a. vitamin K
 - b. niacin
 - c. choline
 - d. calcium
 - e. magnesium
 - f. phosphorous
 - g. zinc
 - h. copper
 - i. manganese
 - j. selenium

Deep Learning

Deep learning (also known as deep structured learning or hierarchical learning) is part of a broader family of machine learning methods based on learning data representations, as opposed to task-specific algorithms. Learning can be supervised, semisupervised or unsupervised. In deep learning, each level learns to transform its input data into a slightly more abstract and composite representation. In an image recognition application, the raw input may be a matrix of pixels; the first representational layer may abstract the pixels and encode edges; the second layer may compose and encode arrangements of edges; the third layer may encode a nose and eyes; and the fourth layer may recognize that the image contains a face. Importantly, a deep learning process can learn which features to optimally place in which level on its own. (Of course, this does not completely obviate the need for hand-tuning; for example, varying numbers of layers and layer sizes can provide different degrees of abstraction).



Types of Machine Learning Algorithms:

There is more than one dimension of how to define the types of Machine Learning Algorithms but also defined into categories according to their purpose below are the main categories are the following:

Supervised Learning:

How it works: This algorithm consists of a target / outcome variable (or dependent variable) which is to be predicted from a given set of predictors (independent variables). Using these set of variables, we generate a function that map inputs to desired outputs. The training process continues until the model achieves a desired level of accuracy on the training data. Examples of Supervised Learning: Regression, Decision Tree, Random Forest, KNN, Logistic Regression etc.

Unsupervised Learning

How it works: In this algorithm, we do not have any target or outcome variable to predict / estimate. It is used for clustering population in different groups, which is widely used for segmenting customers in different groups for specific intervention. Examples of Unsupervised Learning: Apriori algorithm, K-means.

Reinforcement Learning

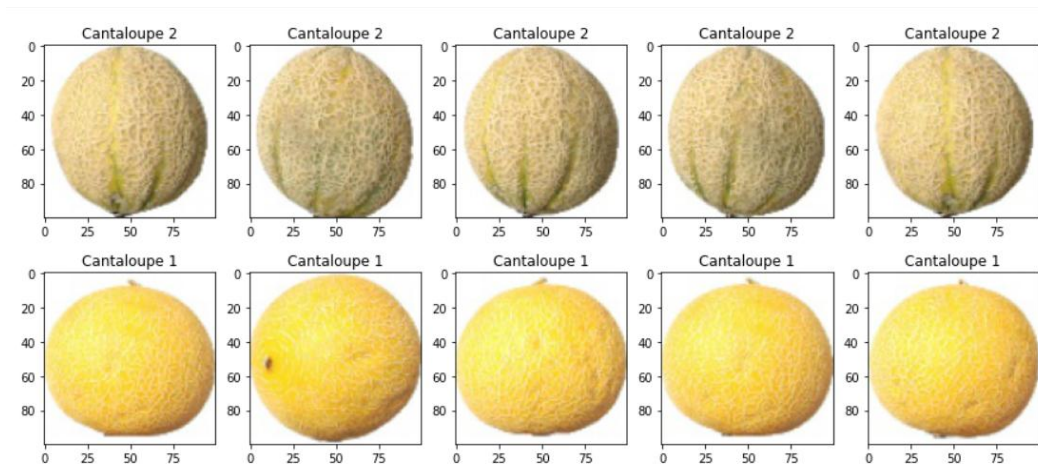
How it works: Using this algorithm, the machine is trained to make specific decisions. It works this way: the machine is exposed to an environment where it trains itself continually using trial and error. This machine learns from experience and tries to capture the best possible knowledge to make accurate business decisions.

Study Objective

Demonstrating the feasibility of using deep convolutional neural networks to classify Type cantaloupe.

Dataset:

Dataset that contains 1,312 images use 788 images for training, 196 images for validation and 328 images for testing. A deep learning technique that extensively applied to image recognition was used. use 80% from image for training and 20% from image for validation.



Model:

We used CNN - VGG16 application, As following:

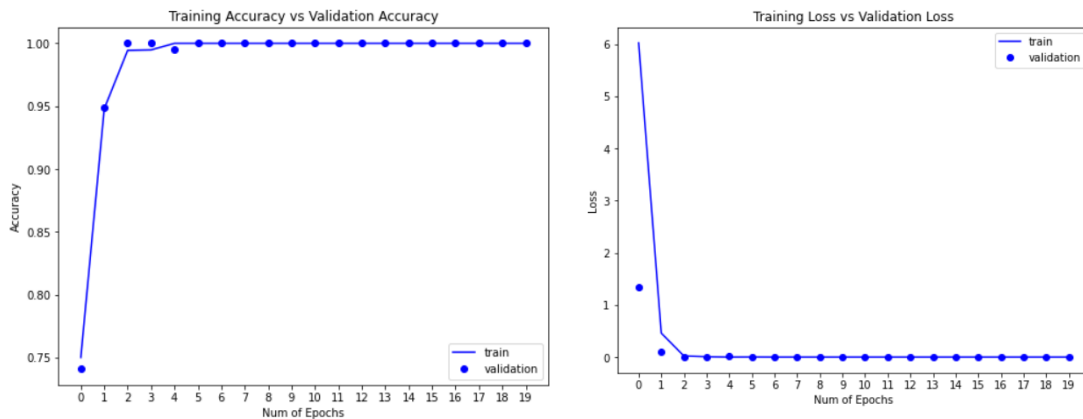
| Layer (type) | Output Shape | Param # |
|----------------------------|-----------------------|---------|
| input_1 (InputLayer) | (None, 256, 256, 3) | 0 |
| block1_conv1 (Conv2D) | (None, 256, 256, 64) | 1792 |
| block1_conv2 (Conv2D) | (None, 256, 256, 64) | 36928 |
| block1_pool (MaxPooling2D) | (None, 128, 128, 64) | 0 |
| block2_conv1 (Conv2D) | (None, 128, 128, 128) | 73856 |
| block2_conv2 (Conv2D) | (None, 128, 128, 128) | 147584 |
| block2_pool (MaxPooling2D) | (None, 64, 64, 128) | 0 |
| block3_conv1 (Conv2D) | (None, 64, 64, 256) | 295168 |
| block3_conv2 (Conv2D) | (None, 64, 64, 256) | 590080 |

| | | |
|-------------------------------|---------------------|---------|
| block3_conv3 (Conv2D) | (None, 64, 64, 256) | 590080 |
| block3_pool (MaxPooling2D) | (None, 32, 32, 256) | 0 |
| block4_conv1 (Conv2D) | (None, 32, 32, 512) | 1180160 |
| block4_conv2 (Conv2D) | (None, 32, 32, 512) | 2359808 |
| block4_conv3 (Conv2D) | (None, 32, 32, 512) | 2359808 |
| block4_pool (MaxPooling2D) | (None, 16, 16, 512) | 0 |
| block5_conv1 (Conv2D) | (None, 16, 16, 512) | 2359808 |
| block5_conv2 (Conv2D) | (None, 16, 16, 512) | 2359808 |
| block5_conv3 (Conv2D) | (None, 16, 16, 512) | 2359808 |
| block5_pool (MaxPooling2D) | (None, 8, 8, 512) | 0 |
| global_max_pooling2d_1 (Glob) | (None, 512) | 0 |
| dense_1 (Dense) | (None, 2) | 1026 |

Total params: 14,715,714
 Trainable params: 14,715,714
 Non-trainable params: 0

System Evaluation

Cantaloupe dataset that consists of 1,312 images. We divided the data into training (80%), validation (20%). The results comes as following:



Conclusion

We proposed a solution to help people determine the type of Cantaloupe, 100% accurately for your best model, builds a model using deep learning (VGG16) and uses this model to predict the type of cantaloupe.

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