



Vegetable Image Classifier

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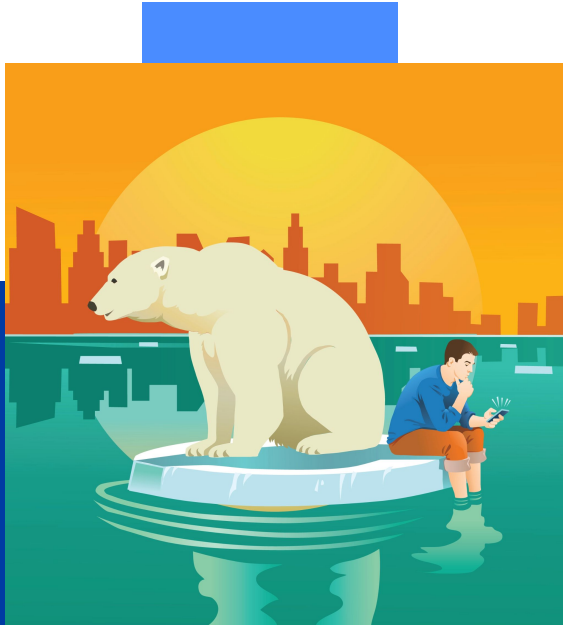
04

Improvements



01 Problem

Climate Change



Problem

- Climate change and global warming
- Reasons for climate change
 - Burning of fossil fuels
 - Deforestation
 - Growing population
 - Overfishing

A decorative graphic on the left side of the slide consisting of two blue squares. One is a medium blue square positioned higher and to the right, and the other is a darker blue square positioned lower and to the left, partially overlapping the first one.

Overfishing Problems

- Threat to biodiversity some driven to extinction
- Marine species decreased by 39% in last 40 years
- Large amounts of bycatch
- Plastic pollution
- Oceans store large amounts of carbon



02

Proposal

Vegetable Classifier

Vegetable Classifier

- Image classifier using convolutional neural network and transfer learning
- Aims to promote a more sustainable diet to combat overfishing
- Educate people on the variety of produce





03

Methodology

Data Gathering Survey



Scraping Images

Cleaning

Checking for
imbalance classes

5 class model

No transfer learning

72% accuracy

5- class model

Transfer Learning on:

VGG16,
Resnet50, InceptionV3

Best Model: VGG16
83.4% Accuracy

Created confusion
matrix

Visualize misclassified
images

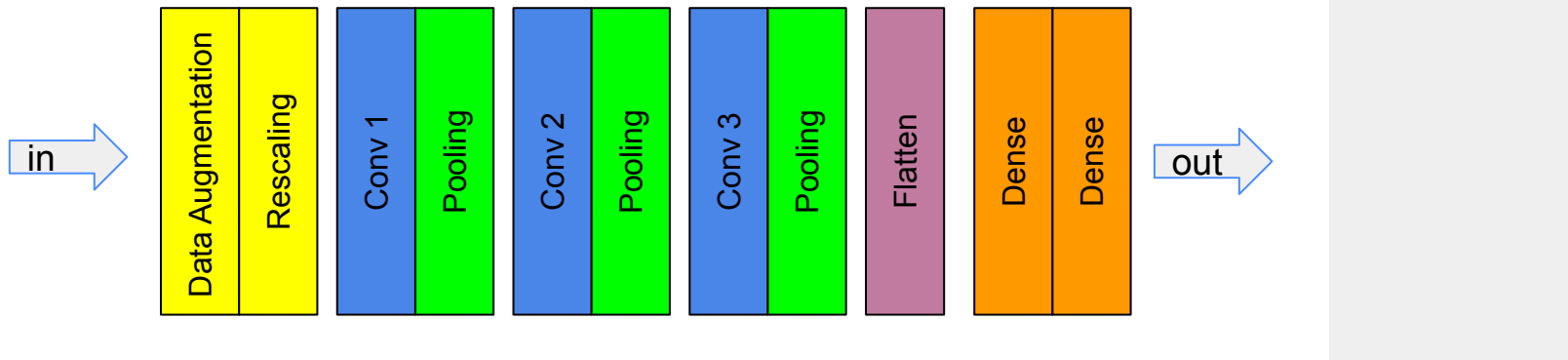
Data

- Images scraped from google images using a script
- 1000 images per class
- Cleaned down to around 500 images per class

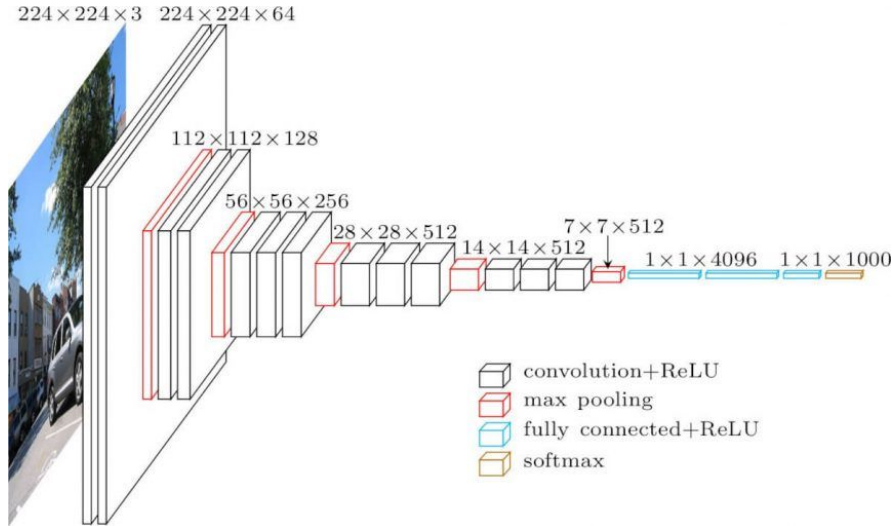


Experimental Model

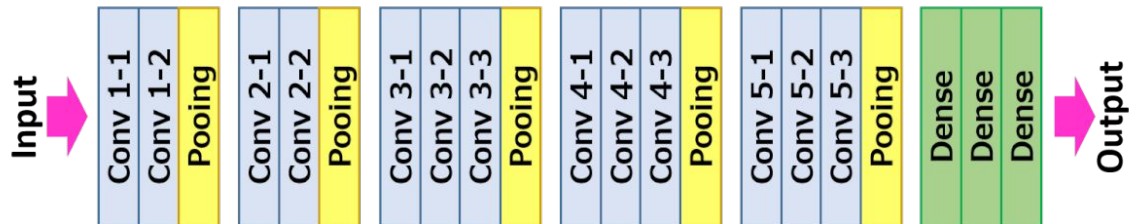
- 5-classes
 - Tomato, Avocado, Lotus Root, Daikon, Bok Choy
- Custom model
- No Augmentation: 21%
- 72% accuracy
- Layers



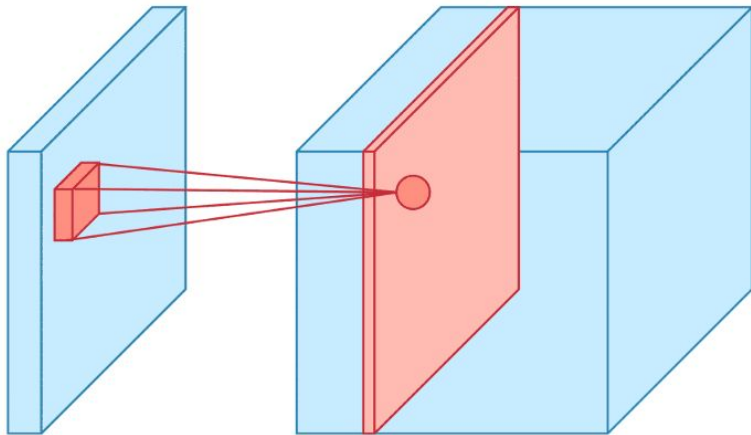
VGG16 Architecture



VGG-16

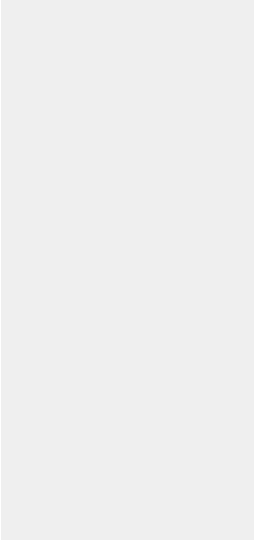


Convolution Visualization



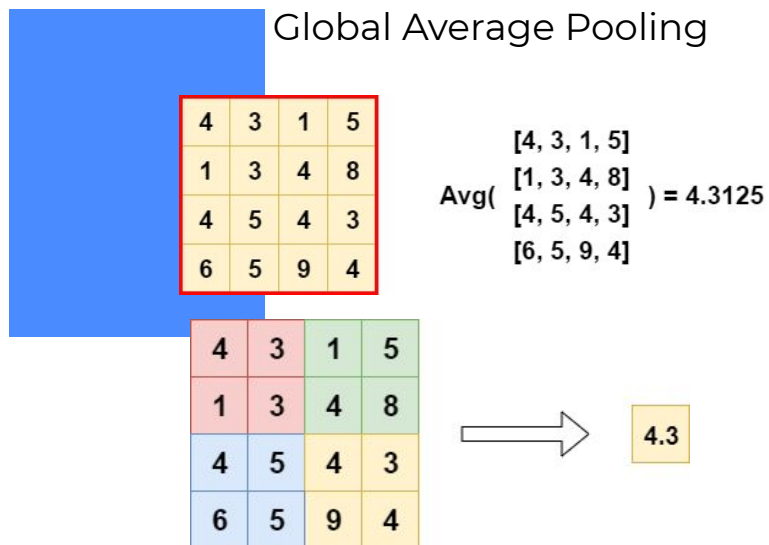
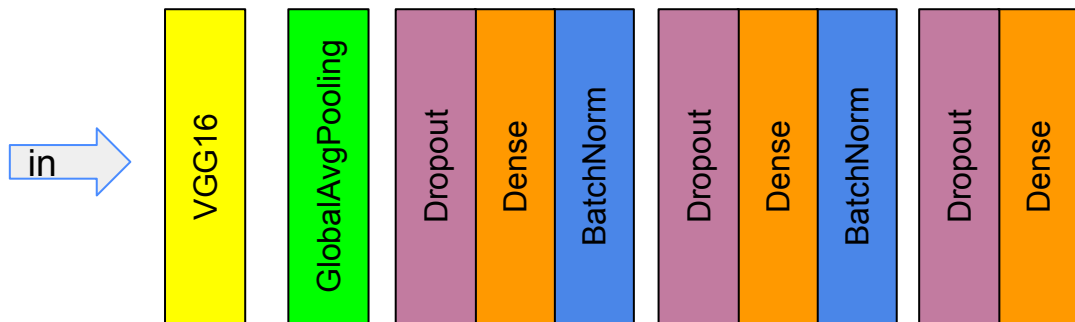
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0x0	1x1	1x0	1	0
0x1	0x0	1x1	1	1
0	0	1	1	0
0	1	1	0	0

4		

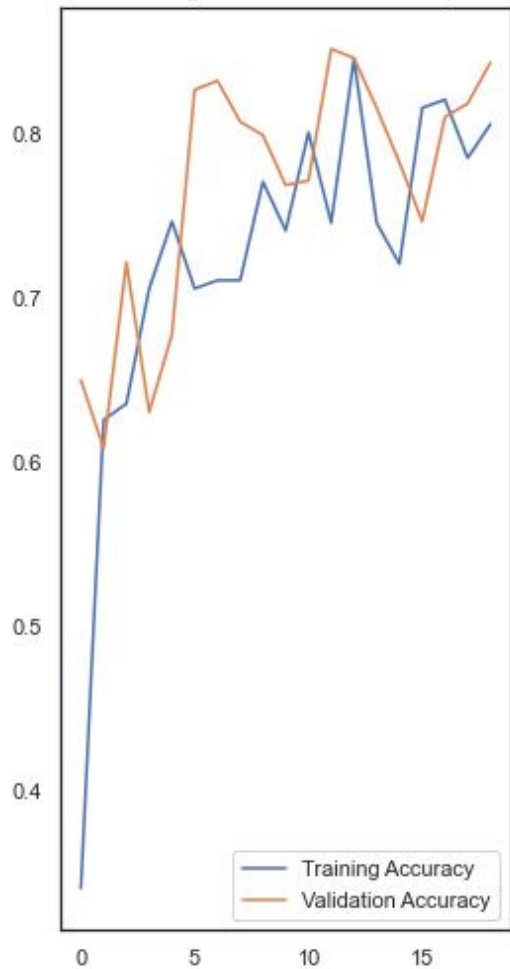


Transfer Learning Model

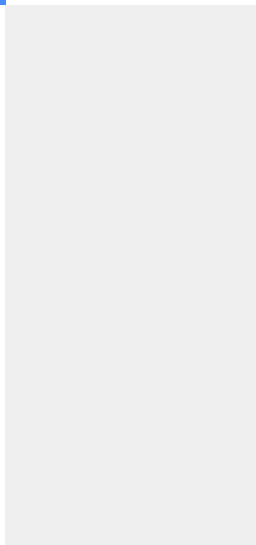
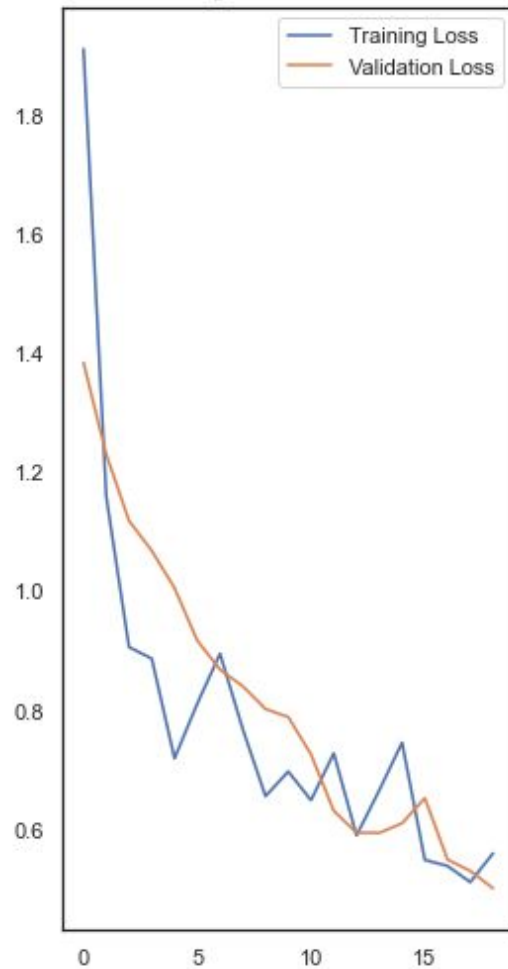
- 5-classes
 - Tomato, Avocado, Lotus Root, Daikon, Bok Choy
- Custom model
- 83.4% accuracy
- Regularization: Batch Normalization, Dropout



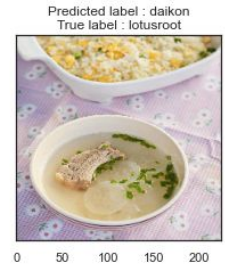
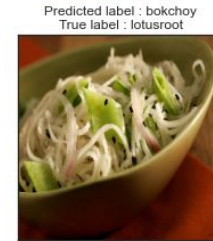
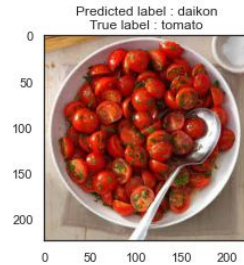
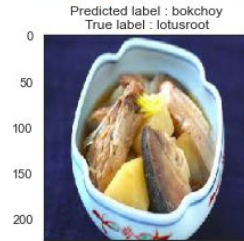
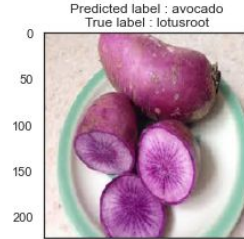
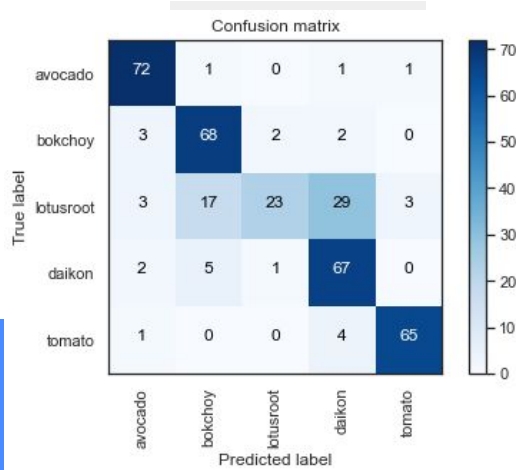
Training and Validation Accuracy



Training and Validation Loss



Misclassified Images





04

Improvements

Improvements

Collecting a larger dataset and including more classes

More diverse but also consistent images

Consistent by shape and object, diverse by background

Next Steps

Deploy app

Feeding images into classifier returns nutritional value and recipes

Incorrectly classified images can be manually classified to feed back into the model

thanks

