Portable Object Detection

Computer vision via Raspberry Pi, Tensorflow & Keras

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Tweet @grepLeigh

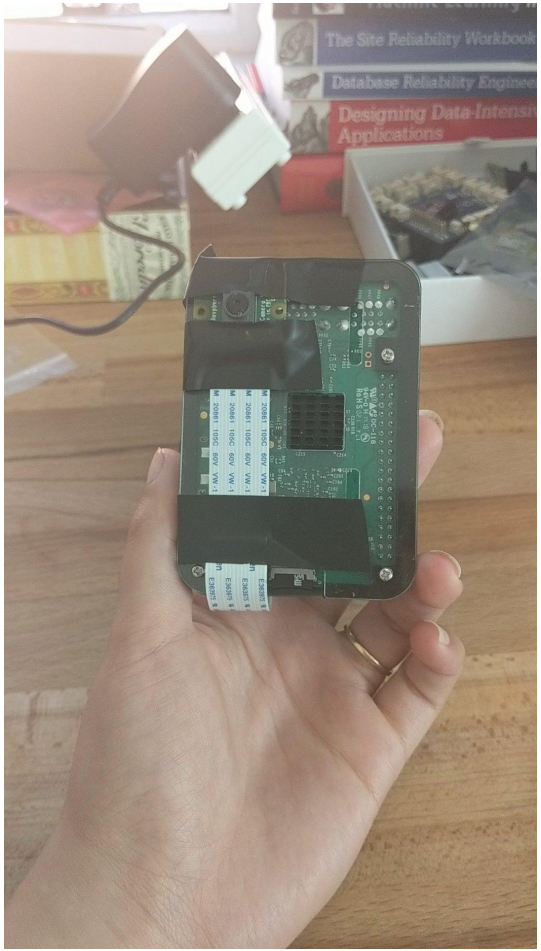
Code @ github.com/leigh-johnson/rpi-vision

Hardware Essentials

Raspberry Pi 3 Model B

PiCamera v2

3.5” 480x320 TFT with XPT2046 controller



What is machine learning?

Automated pattern recognition

What is a neural network?

Automated optimization of machine learning pattern recognition

Keras

What is TensorFlow?

What is Keras?

Convolutional Neural Network (CNN)

- Fixed input / output size
- Inspired by animal visual cortex
- Ideal for images and video processing

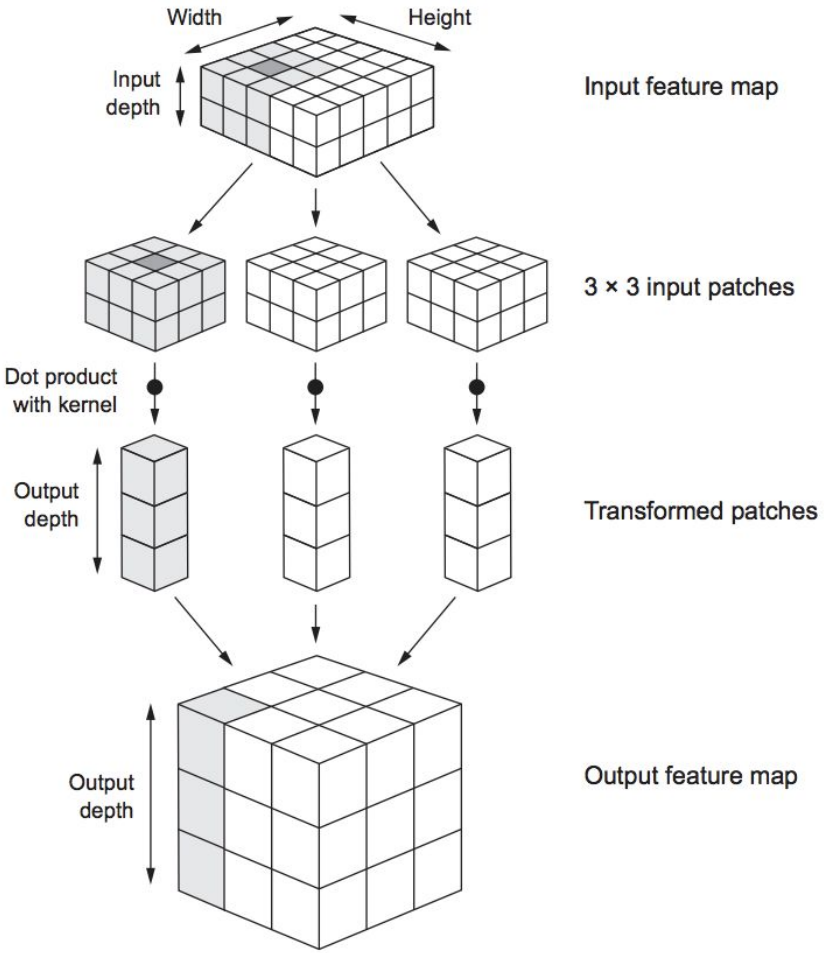


Image credit:
Deep Learning with Python, François Chollet

Useful properties of CNNs

- Small local patterns in first layers
- Larger learning patterns in next layers
- Builds spatial hierarchy
- Patterns still recognized when input is translated

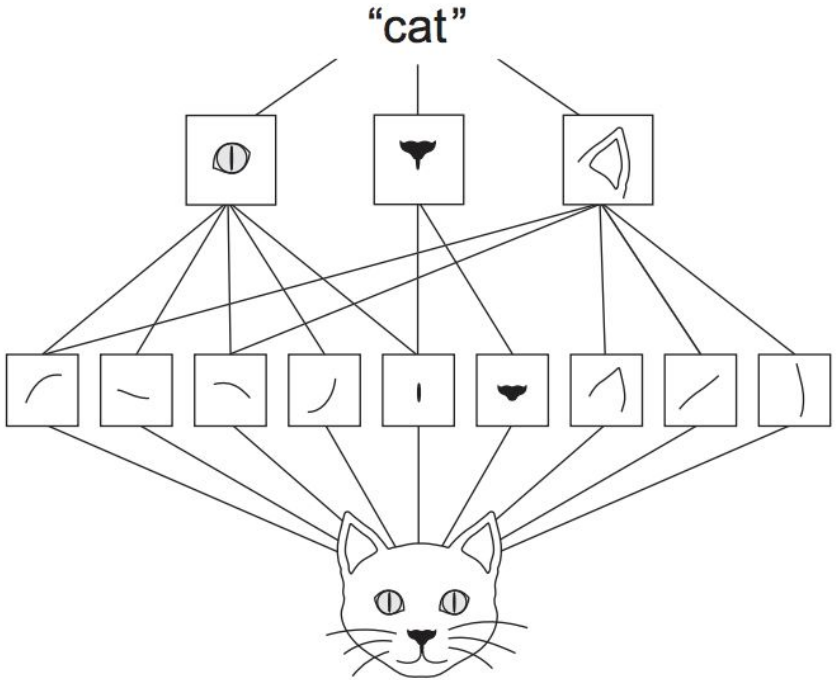


Image credit:
Deep Learning with Python, François Chollet

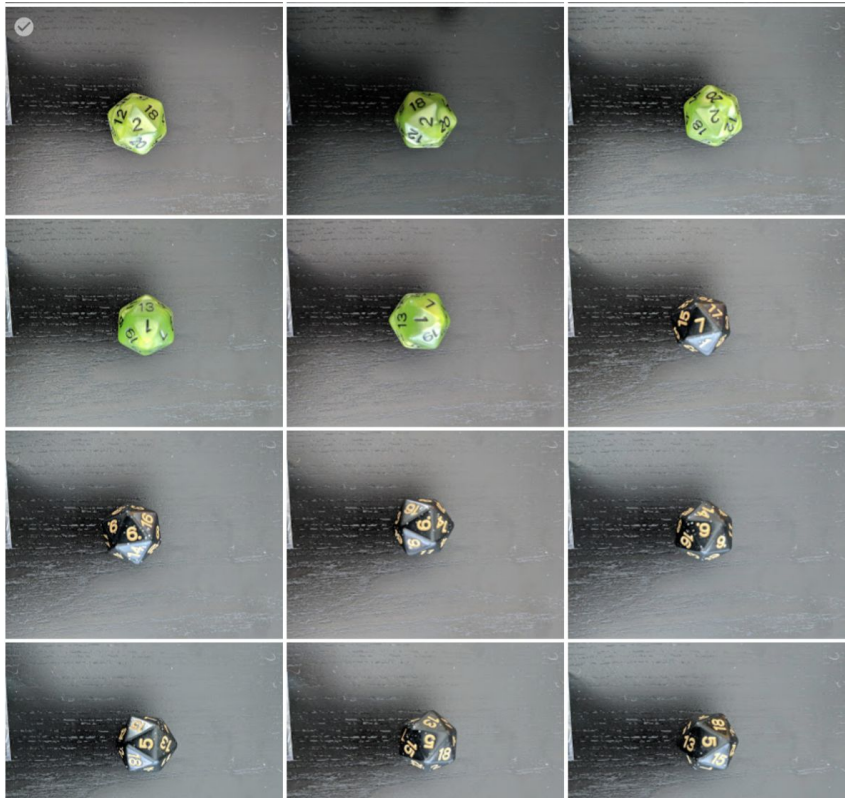
Software Architecture - Model Trainers

Run locally (GPU Accel Recommended)

```
python -m \
'rpivision.trainer.dice.task'
```

Run via Google Cloud ML Engine

```
./utils/submit_training.sh dice
```

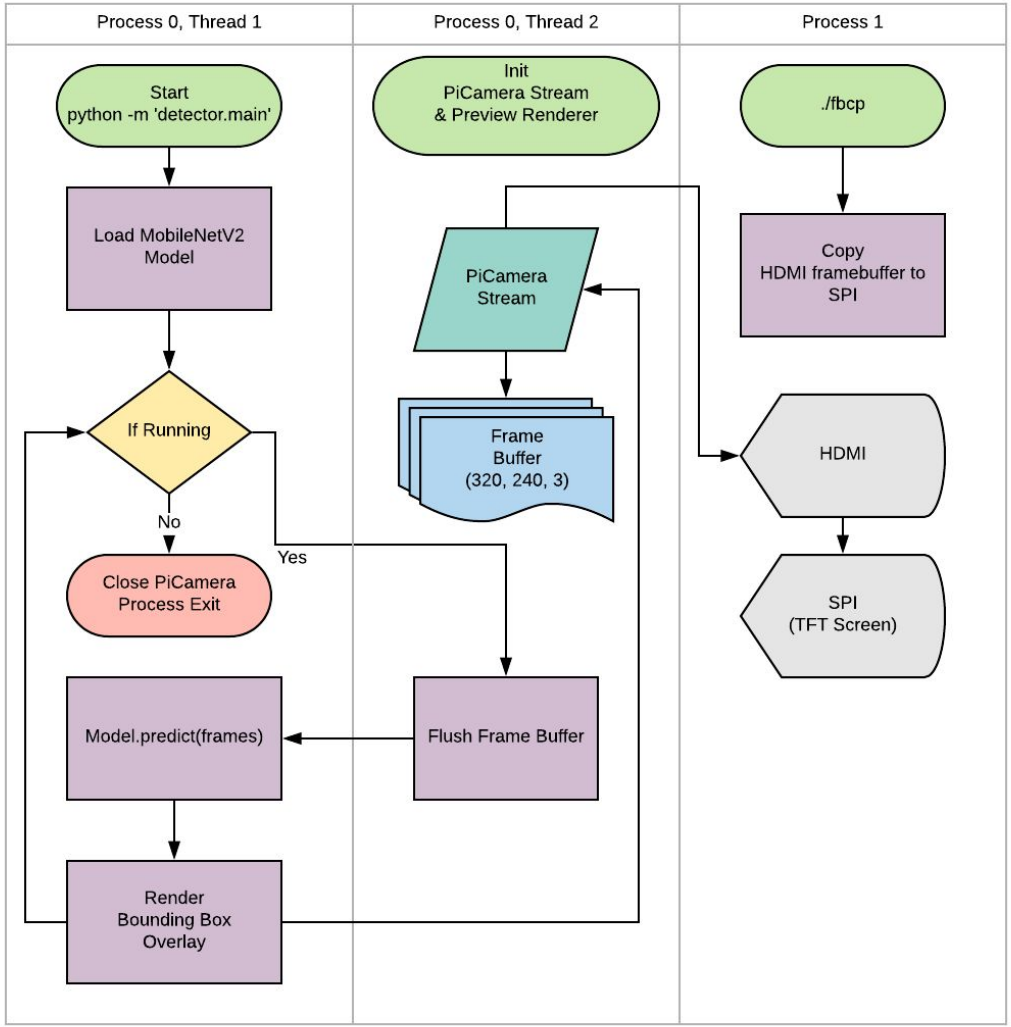


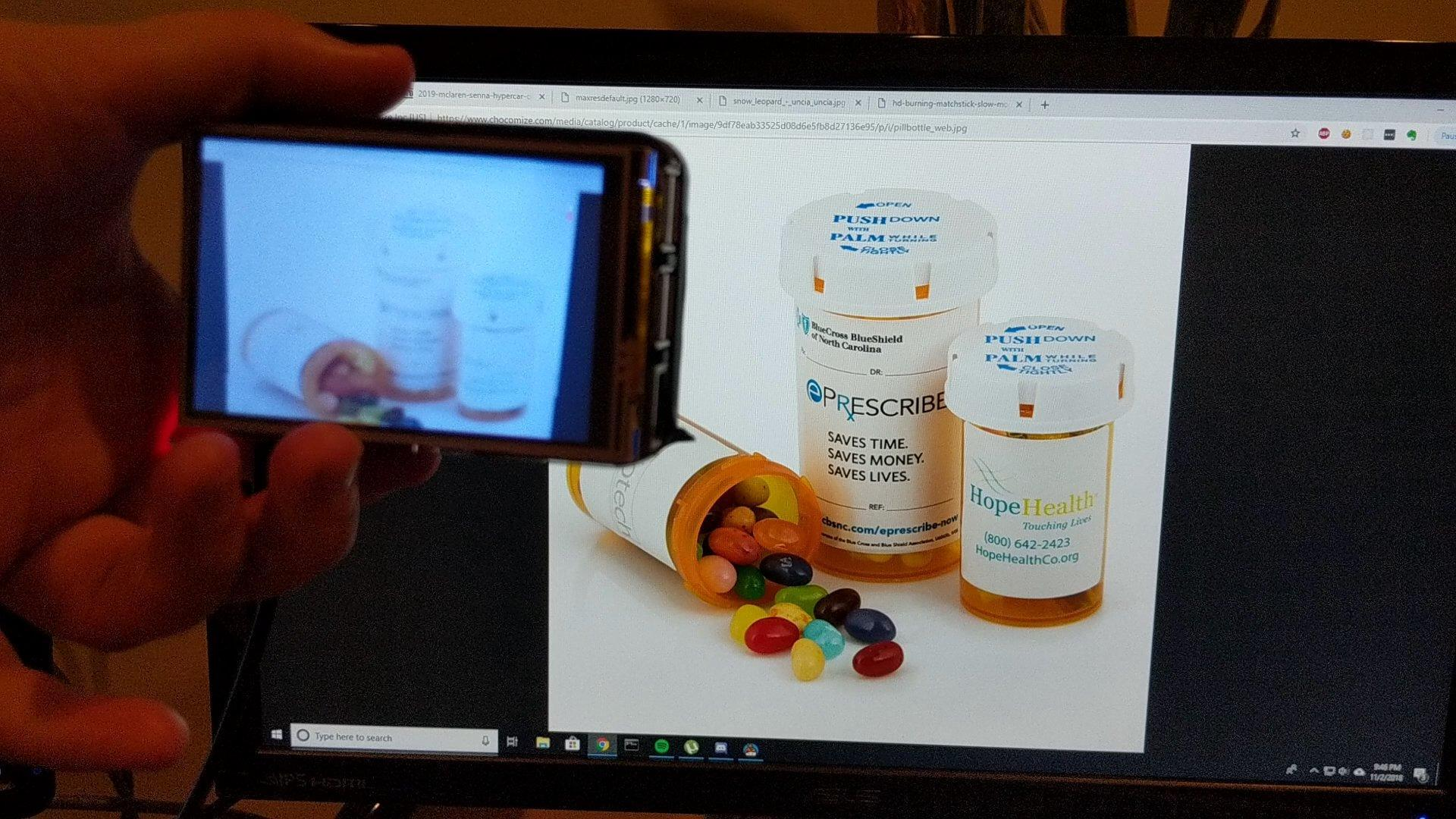
Software Architecture

Object Detection

```
python -m \
'rpivision.detector.main \
--model=MobileNetV2'
```

[About MobileNetV2](#) @
Google AI Blog

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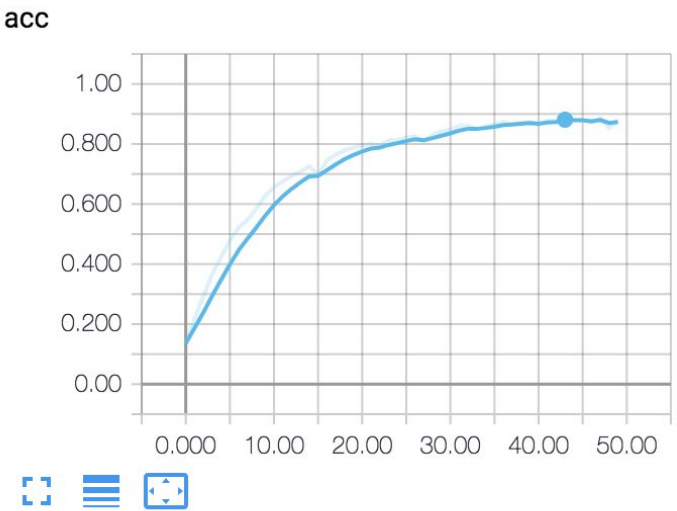
SAVES MONEY.
SAVES LIVES.
REF:
cbsnc.com/eprescribe-now
HopeHealth
Touching Lives
(800) 642-2423
HopeHealthCo.org
Type here to search

Tensorboard - Visualizations

```
$ tensorboard --logdir \
gs://raspberry-pi-vision/dice/logs/
```



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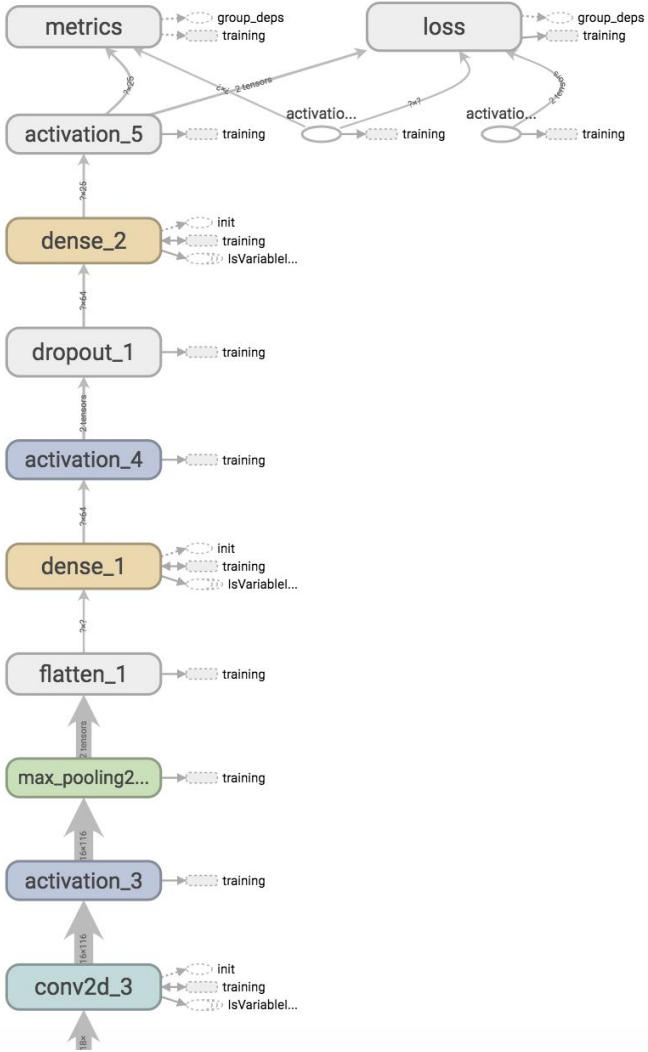

Need a dataset?

https://toolbox.google.com/datasetsearch

Thank you!

github.com/leigh-johnson/rpi-vision