Carnegie Mellon University

15-494 Final Project: Partial Cube Recognition

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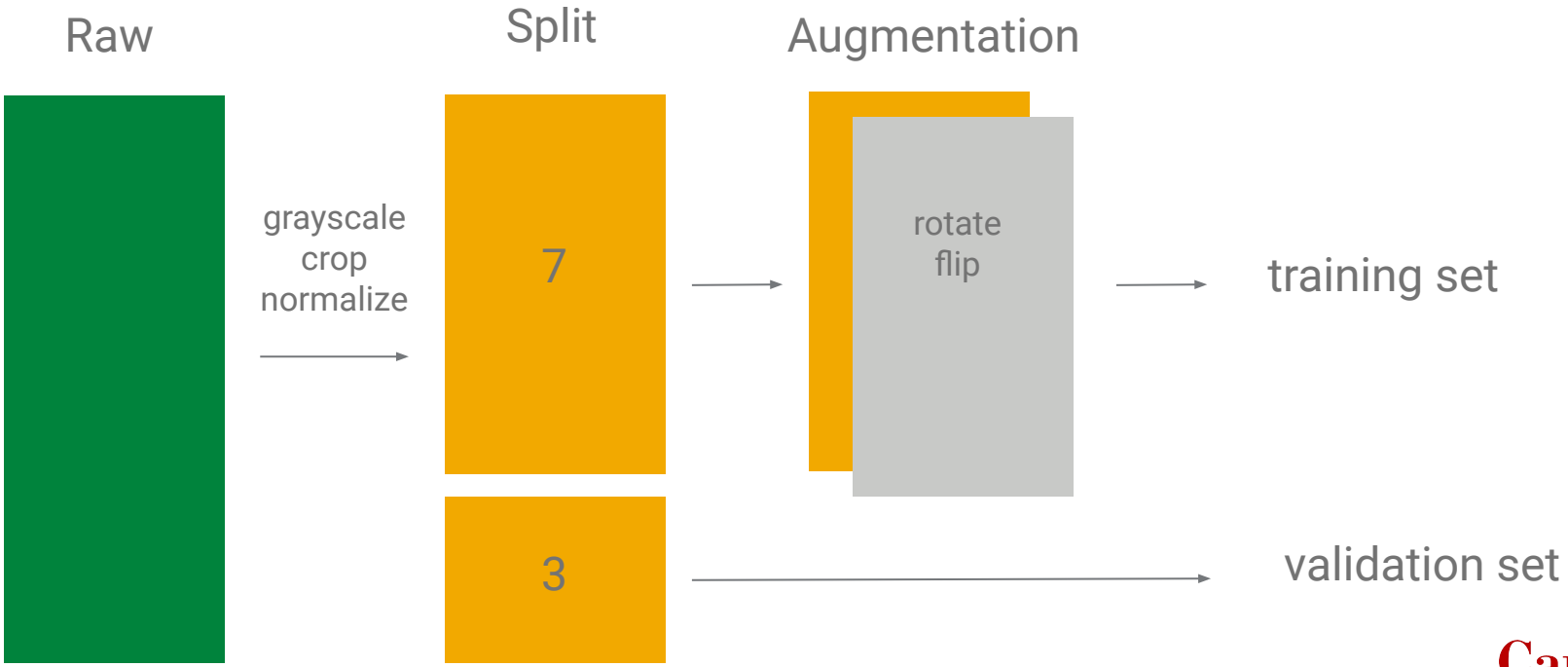
Outline

1. Data Preprocessing
2. Neural Network Architecture
3. Evaluation
4. Final Result

Data Preprocessing



Neural Network Architecture (ctd.)

Loss function: BCELoss
Optimizer: SGD

Our Parameters of Architecture

Conv1:

kernel size = 9

Stride = 1

Padding = 4

# of kernel = 16

Conv2:

kernel size = 7

Stride = 1

Padding = 3

# of kernel = 32

Pooling:

Maxpool = 2 x 2

Activation function:

Relu, Sigmoid

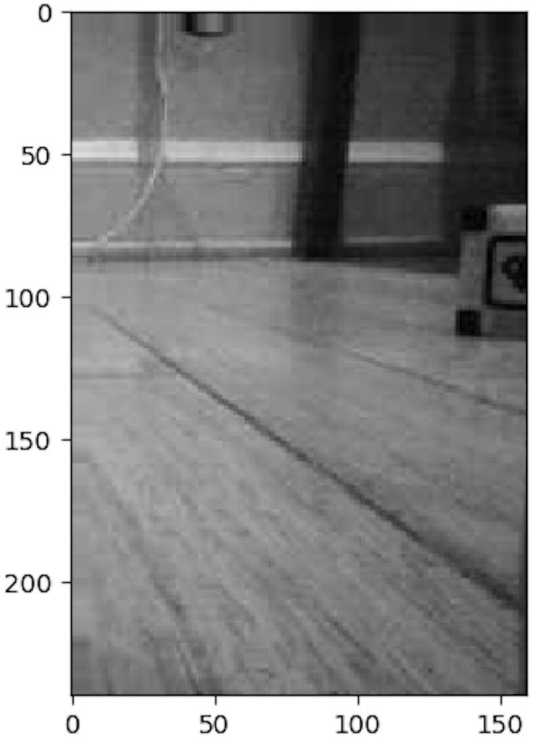
Result

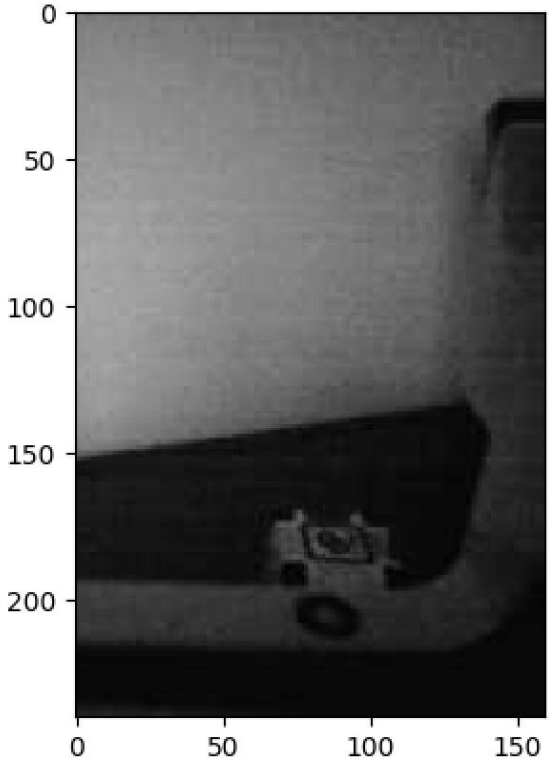
- Training accuracy: 95.623%
- Validation accuracy: 98.746%

```
200 total loss:    0.1186  correct 95.623
Finished Training
Accuracy of the network on the 319 test images: 98.746 %
correct: 315 total: 319
```

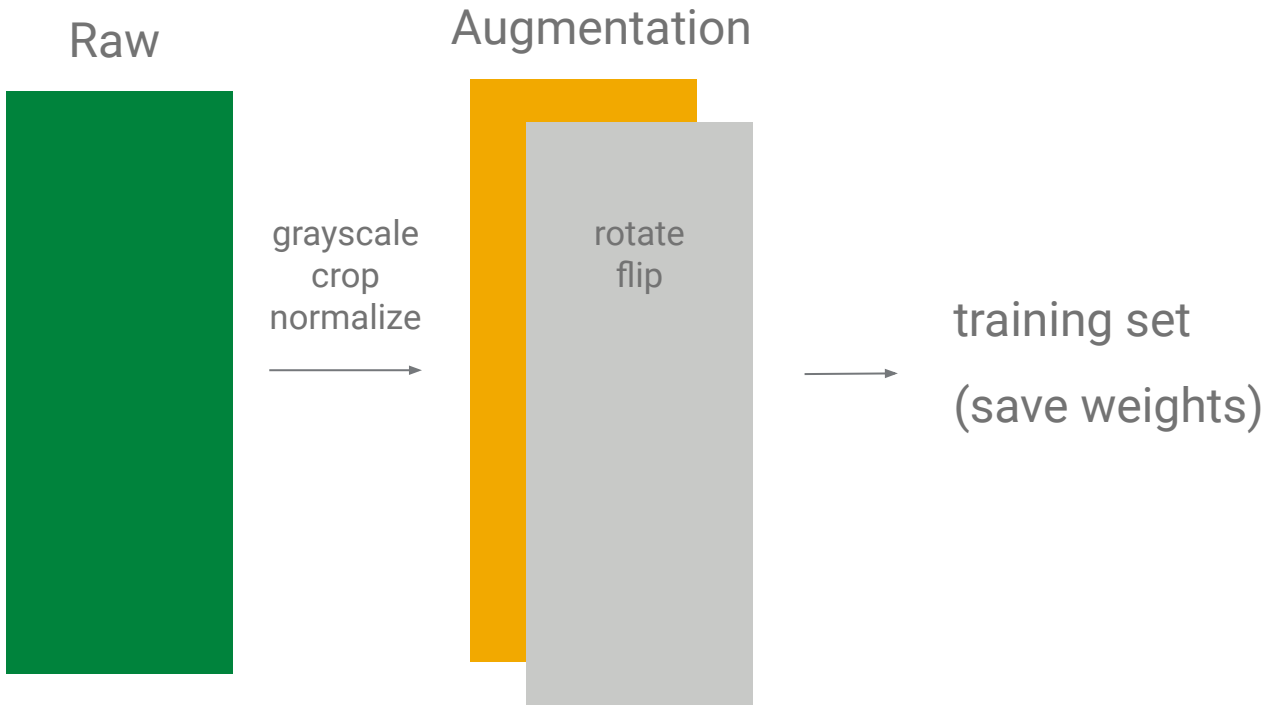
```
parser = argparse.ArgumentParser()
parser.add_argument("--save", type=int, default=1)
parser.add_argument('--data_path', type=str, default='/afs/cs.cmu.edu/academic/class/15494-s20/projects/cubes/common_dataset')
parser.add_argument('--batch_size', type=int, default=4)
parser.add_argument('--learning_rate', type=float, default=0.001)
parser.add_argument('--epoches', type=int, default=100)
args = parser.parse_args()
```

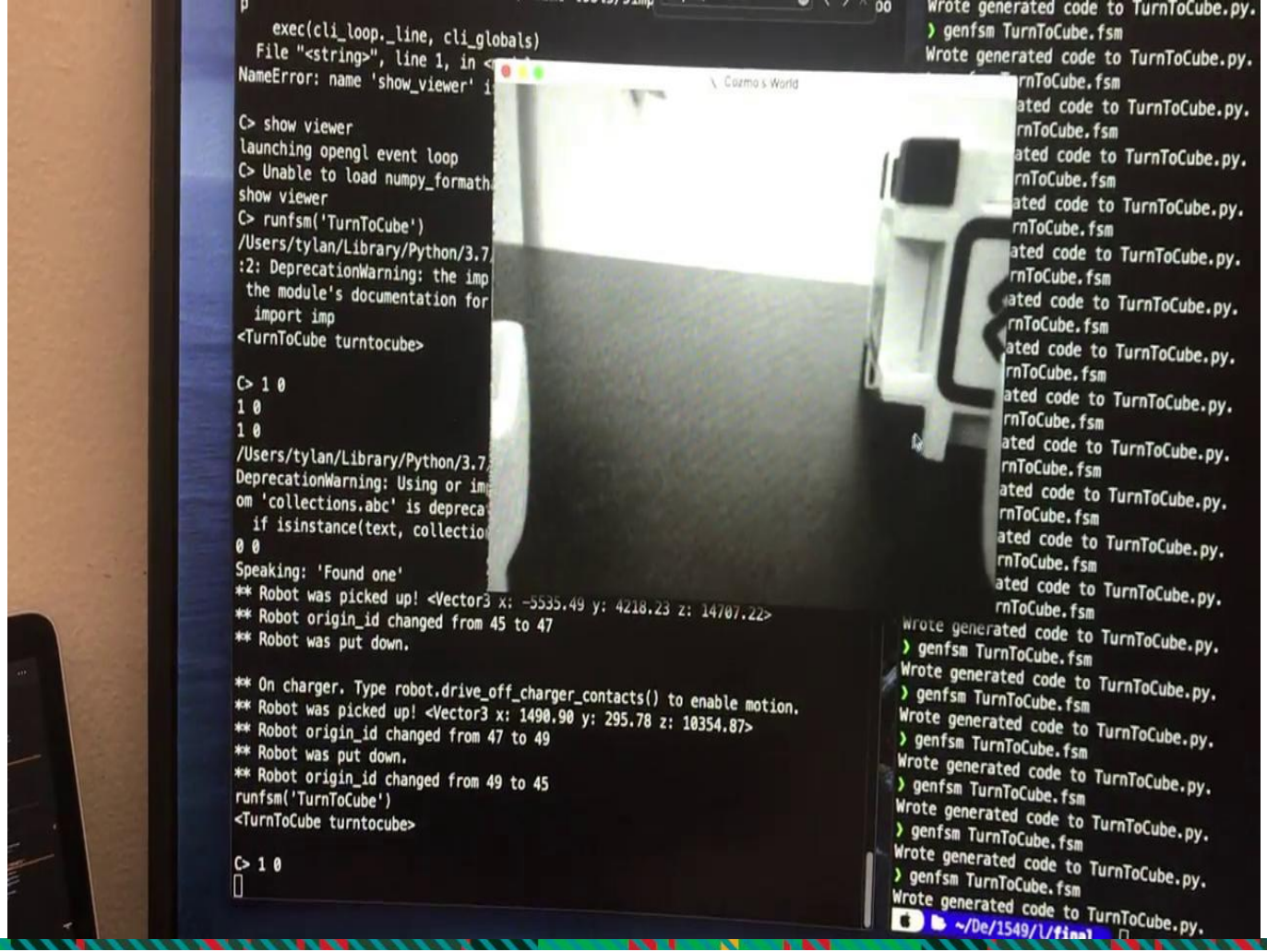
Wrong Cases





Final Weights




exec(cli_loop._line, cli_globals)
File "<string>", line 1, in
NameError: name 'show_viewer' i
C> show viewer
launching opengl event loop
C> Unable to load numpy_formath
show viewer
C> runfsm('TurnToCube')
/Users/tylan/Library/Python/3.7
:2: DeprecationWarning: the imp
the module's documentation for
import imp
<TurnToCube turntocube>
C> 1 0
1 0
1 0
/Users/tylan/Library/Python/3.7
DeprecationWarning: Using or im
om 'collections.abc' is deprec
if isinstance(text, collectio
0 0
Speaking: 'Found one'
** Robot was picked up! <Vector3 x: -5535.49 y: 4218.23 z: 14707.22>
** Robot origin_id changed from 45 to 47
** Robot was put down.
** On charger. Type robot.drive_off_charger_contacts() to enable motion.
** Robot was picked up! <Vector3 x: 1490.90 y: 295.78 z: 10354.87>
** Robot origin_id changed from 47 to 49
** Robot was put down.
** Robot origin_id changed from 49 to 45
runfsm('TurnToCube')
<TurnToCube turntocube>
C> 1 0
Cozmo's World
Wrote generated code to TurnToCube.py.
genfsm TurnToCube.fsm