

BUILD AND PROGRAM AN AUTONOMOUS VEHICLE

a little one.

BUZZWORDS AND BUILD BINGO

OPEN SOURCE	PYTHON	OPENCV	TENSORFLOW
KERAS	CNN	DEEP LEARNING	RASPBERRY PI
NVIDIA JETSON	GPU	GOOGLE CORAL TPU	BEHAVIORAL CLONING
DATA AUGMENTATION	3D PRINTING	AI	REINFORCEMENT LEARNING

- A **Host PC** = My Razer Blade with Nvidia 1060 GPU
- Any **Electric RC** with an electronic speed control or ESC, a separate servo for steering and a DC motor
 - [1/16 E-Revo | 1/16 RC Truck](#)
- An **onboard computer** and **motor controller**
 - [Raspberry Pi 3 Model B](#)
 - [16-Channel 12-bit PWM/Servo Driver - I2C interface](#)
- Wide Angle **Camera**
 - RaspberryPi Camera Module v2 with 160 degree lens
- **Chassis** to mount computer and camera
- **Wireless Gamepad** Controller (PS4)
- The **Instructions** - <https://docs.donkeycar.com>
- The **code** - <https://github.com/autorope/donkeycar>
- Supportive **community** - <https://donkeycar.slack.com>



**BUT WHERE'S
THE DATA
SCIENCE?**



DRIVING FOR DATA



```
{  
  "user/angle":0.0,  
  "user/throttle":0.5441419721060824,  
  "cam/image_array":"525_cam-image_array_.jpg",  
  "user/mode":"user"  
}
```



```
{  
  "user/angle":0.49330118717001864,  
  "user/throttle":0.4881566820276497,  
  "cam/image_array":"628_cam-image_array_.jpg",  
  "user/mode":"user",  
}
```

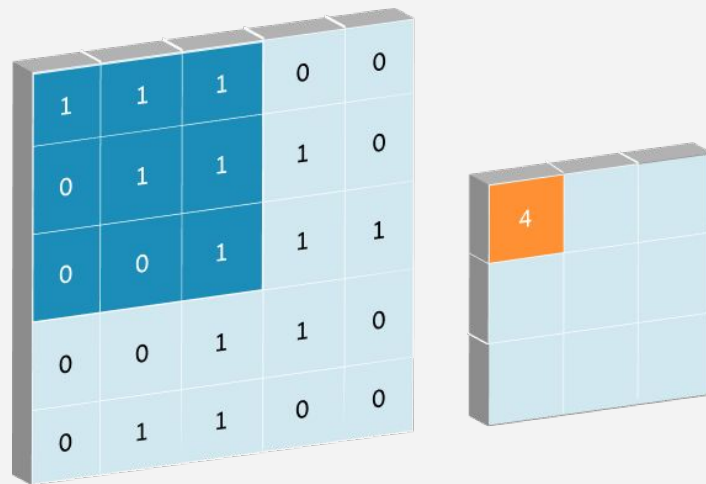
MAGIC BOX OF KERAS

Input: Image

Network: 5 Convolution layers

followed by two dense layers before
output

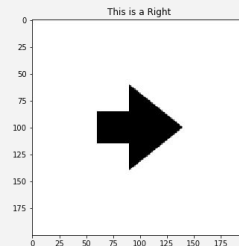
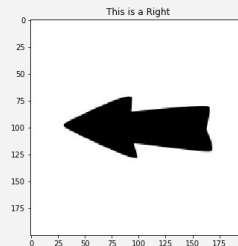
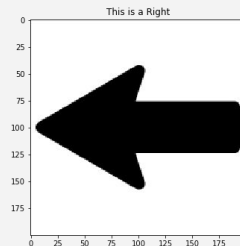
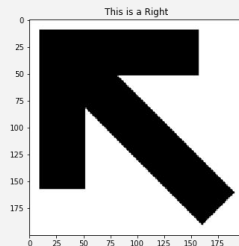
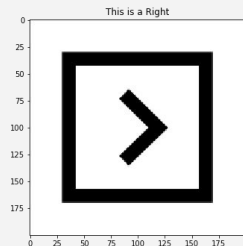
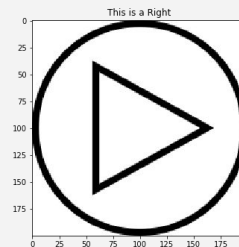
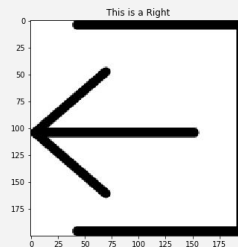
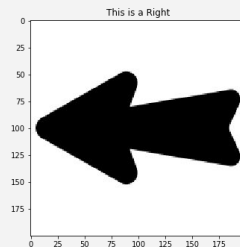
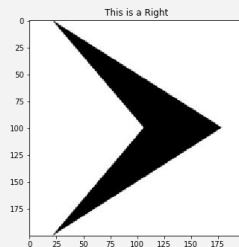
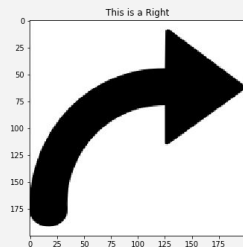
Output: Two dense layers with one
scalar output each with linear
activation for steering and throttle.



BONUS PROJECT!

CAN YOU PICK
LEFT FROM
RIGHT?

BECAUSE MY
MODEL CAN'T!



THANK YOU

When I update these
slides I'll thank
You!

