헬로 딥러닝

SOSCON 2017
남세동
VoyagerX
PLAYING ATARI

ima...

01151

[Graphical representation of an Atari game]
MACHINE LEARNING
import csv

# write stocks data as comma-separated values
writer = csv.writer(open('stocks.csv', 'wb', buffering=0))
writer.writerows([  ('GOOG', 'Google, Inc.', 505.24, 0.47, 0.09),  ('YHOO', 'Yahoo! Inc.', 27.38, 0.33, 1.22),  ('CNET', 'CNET Networks, Inc.', 8.62, -0.13, -1.49)])

# read stocks data, print status messages
stocks = csv.reader(open('stocks.csv', 'rb'))
status_labels = {-1: 'down', 0: 'unchanged', 1: 'up'}
for ticker, name, price, change, pct in stocks:
    status = status_labels[cmp(float(change), 0.0)]
    print '%s is %s (%s%%)' % (name, status, pct)
Traditional Programming

Data → Computer → Output
Program → Computer

Machine Learning

Data → Computer → Program
Output → Computer
Y = ? · X
NEURAL NETWORK
UNIVERSAL GATE

NAND

NOT

AND

OR
MULTILAYER PERCEPTRON

- **OR**
  - X1
  - X3
  - 1
  - 1
  - 1
  - 3
  - 3
  - 3
  - 3

- **AND**
  - X2
  - X4
  - 1
  - 1
  - 1
  - 1
  - 1
  - 1

<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>Out</th>
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<tbody>
<tr>
<td>0</td>
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DEEP LEARNING
DEEP LEARNING CAT

*
SUPERVISED LEARNING
your neural network

YIQ formula
DIMENSION

[r, g, b]  [r] [g] [b]

[Image of color model with red, green, and blue dimensions]
\[ Y = W \cdot X \]
FINDING WEIGHTS
After 1st stage "swings slightly"
FUNCTION FINDER
UNIVERSAL APPROXIMATION THEOREM
REFERENCES

- Playing Atari: https://www.youtube.com/watch?v=V1eYniJ0Rnk
- Algorithm: https://wiki.python.org/moin/SimplePrograms
- Universal Gate: http://gatedesignsnorit.blogspot.kr/2015/06/design-and-gate-using-2-1-mux.html
- CPU: https://www.intel.com/pressroom/archive/releases/2008/20081117comp_sm.htm
- Activation Function: https://en.wikipedia.org/wiki/Activation_function
- Neural Network Code: https://harthur.github.io/brain/
- Dimension: https://www.tensorflow.org/versions/r0.12/tutorials/mnist/beginners/index.html
- Weights: https://en.wikipedia.org/wiki/Mixing_console
- Learning to Swing: https://www.youtube.com/watch?v=q8i6wHCEF4
- TensorFlow Playground: http://playground.tensorflow.org/
- Universal Approximation Theorem: https://www.youtube.com/watch?v=SahmdQs6X74
- WaveNet: https://deepmind.com/blog/wavenet-generative-model-raw-audio/
- Doom: https://www.youtube.com/watch?v=oo0TraGu6QY
- Google Data Centers: https://www.wired.com/2012/10/ff-inside-google-data-center/