Deep Learning RoadMap

Jaegul Choo (주재걸), KAIST
https://sites.google.com/site/jaegulchoo/

Most slides made by my student, Hojoon Lee

SYSTEM PROMPT (HUMAN-WRITTEN)

In a shocking finding, scientist discovered a herd of unicorns living in a remote, previously unexplored valley, in the Andes Mountains. Even more surprising to the researchers was the fact that the unicorns spoke perfect English.

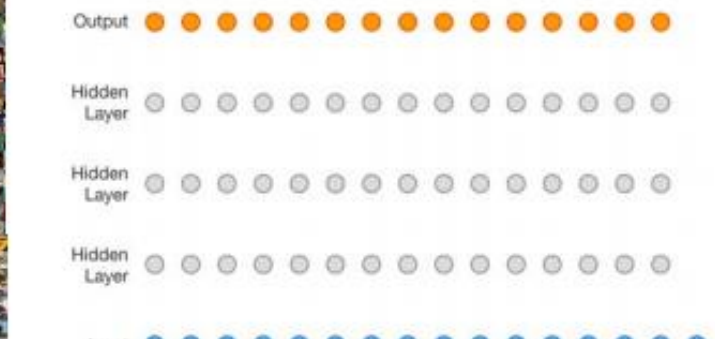
MODEL COMPLETION (MACHINE-WRITTEN, 10 TRIES)

The scientist named the population, after their distinctive horn, Ovid's Unicorn. These four-horned, silver-white unicorns were previously unknown to science.

Now, after almost two centuries, the mystery of what sparked this odd phenomenon is finally solved.

Dr. Jorge Pérez, an evolutionary biologist from the University of La Paz, and several companions, were exploring the Andes Mountains when they found a small valley, with no other animals or humans. Pérez noticed that the valley had what appeared to be a natural fountain, surrounded by two peaks of rock and silver snow.

Pérez and the others then ventured further into the valley. "By the time we reached the top of one peak, the water looked blue, with some crystals on top," said Pérez.



Computer Vision

Text and Speech

Control

Slides borrowed from deepmind

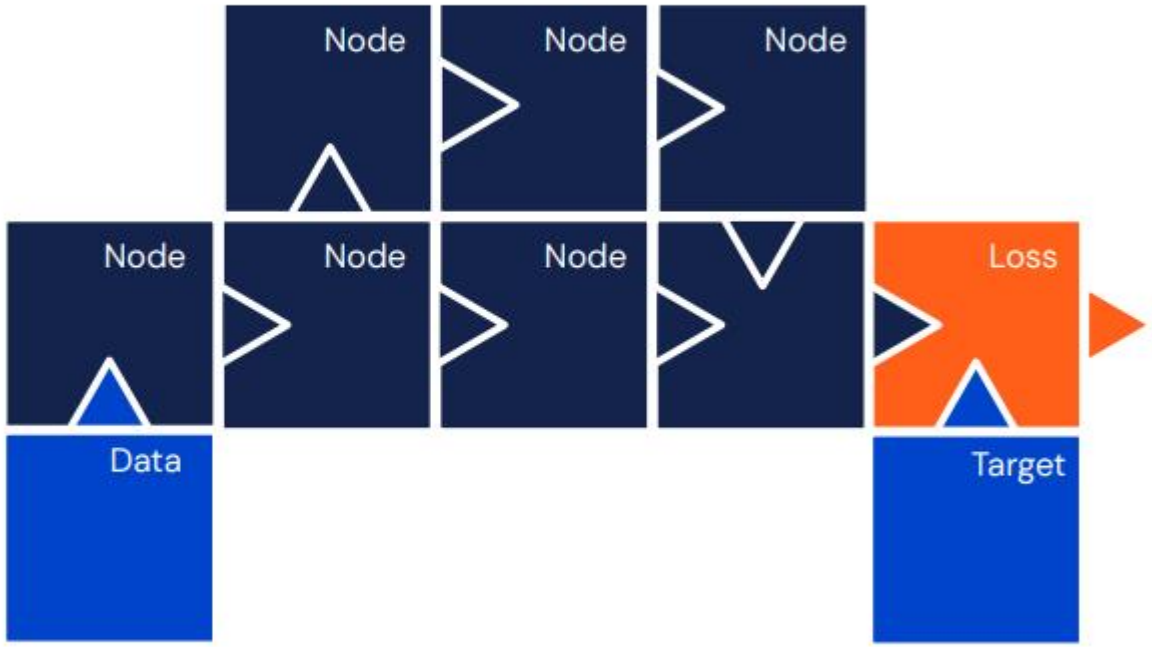
Compute

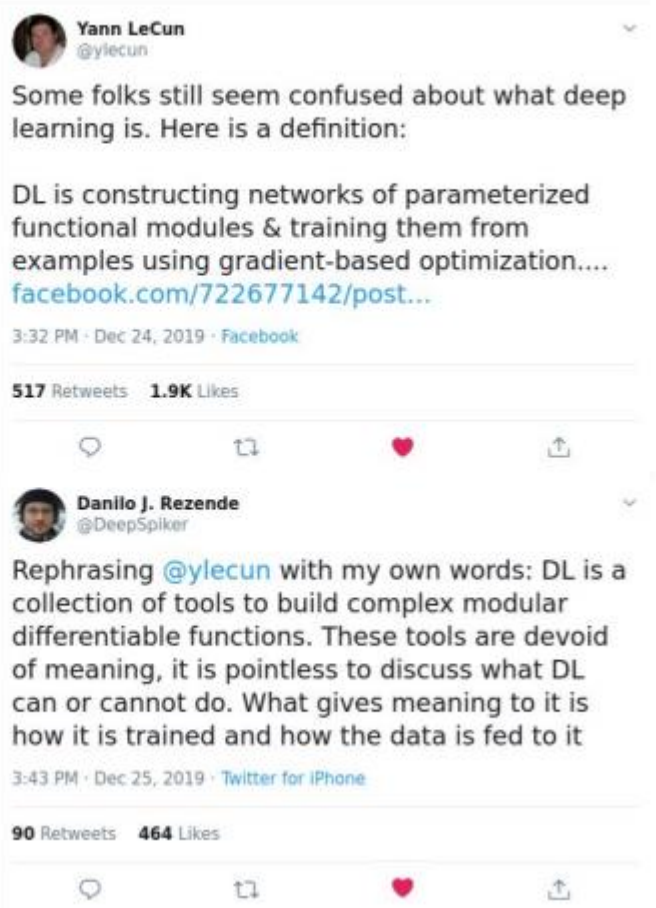
Data

Modularity

Slides borrowed from deepmind

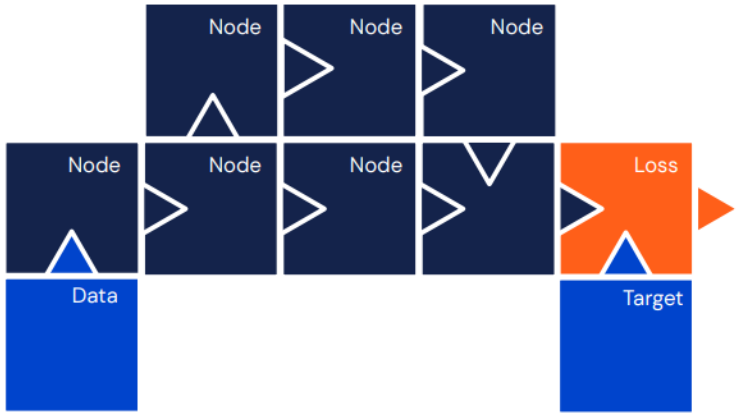
Deep Learning is a puzzle





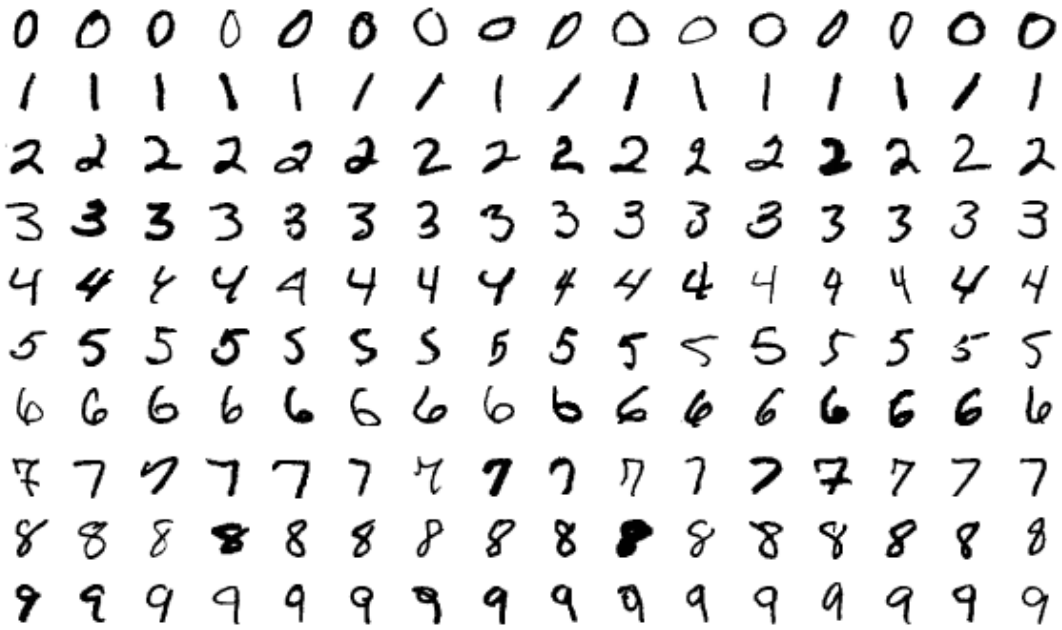
Contents

- Day 1: Basic Building Blocks
  - Fully-Connected Layer
  - Activation Function
  - Optimization
  - [HW] Logistic Regression vs MLP



Contents

- Day 1: Basic Building Blocks
  - Fully-Connected Layer
  - Activation Function
  - Optimization
  - [HW] Logistic Regression vs MLP
- Day 2: Blocks for Image Data
  - Convolutional Layer
  - [HW] Training Neural Network

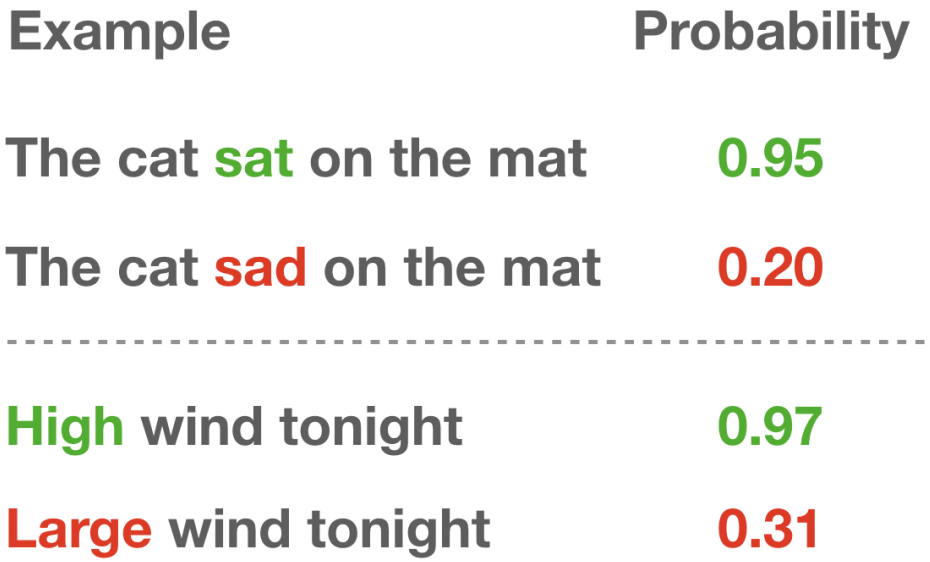


Contents

- Day 1: Basic Building Blocks
  - Fully-Connected Layer
  - Activation Function
  - Optimization
  - [HW] Logistic Regression vs MLP
- Day 2: Blocks for Image Data
  - Convolutional Layer
  - [HW] MLP vs CNN
- Day 3: Advanced Blocks for Image
  - Case Study for ImageNet Challenge
  - [HW] Advanced CNN

Contents

- Day 1: Basic Building Blocks
  - Fully-Connected Layer
  - Activation Function
  - Optimization
  - [HW] Logistic Regression vs MLP
- Day 2: Blocks for Image Data
  - Convolutional Layer
  - [HW] MLP vs CNN
- Day 3: Advanced Blocks for Image
  - Case Study for ImageNet Challenge
  - [HW] Advanced CNN
- Day 4: Blocks for Sequential Data (i.e., speech, text)
  - Recurrent Layer
  - [HW] Kaggle Competition



Contents

- Day 1: Basic Building Blocks
  - Fully-Connected Layer
  - Activation Function
  - Optimization
  - [HW] Logistic Regression vs MLP
- Day 2: Blocks for Image Data
  - Convolutional Layer
  - [HW] MLP vs CNN
- Day 3: Advanced Blocks for Image
  - Case Study for ImageNet Challenge
  - [HW] Advanced CNN
- Day 4: Blocks for Sequential Data (i.e., speech, text)
  - Recurrent Layer
  - [HW] Kaggle Competition
- Day 5: Mid-Term

Contents

- Day 6: Integrating the Building Blocks
  - Image Captioning
  - Attention
  - [HW] Recurrent Neural Networks

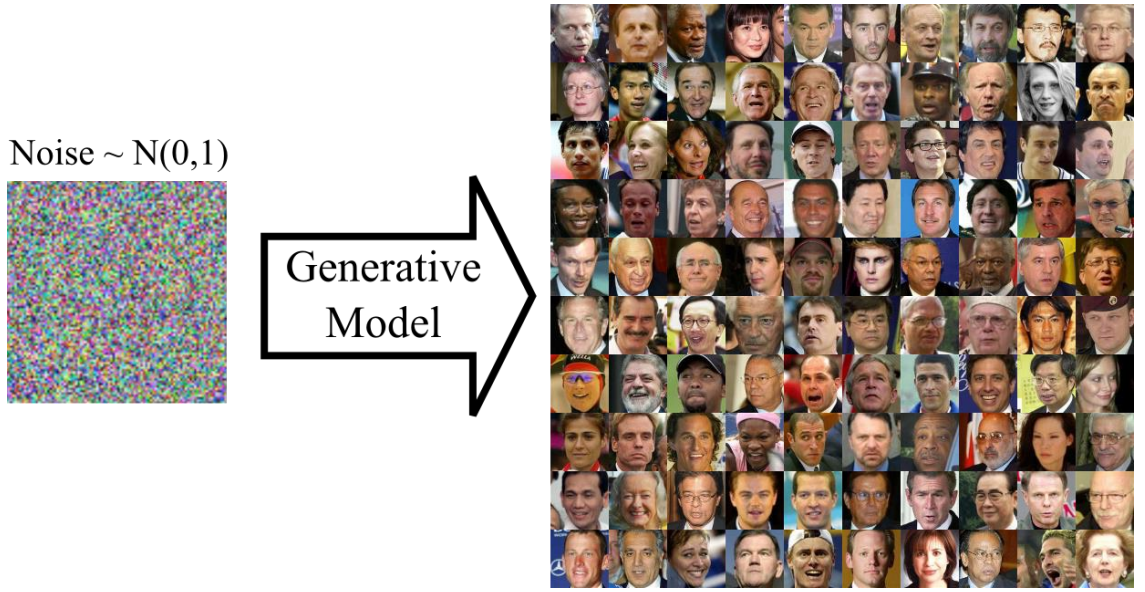
"man in black shirt is playing guitar."

"construction worker in orange safety vest is working on road."

"two young girls are playing with lego toy."

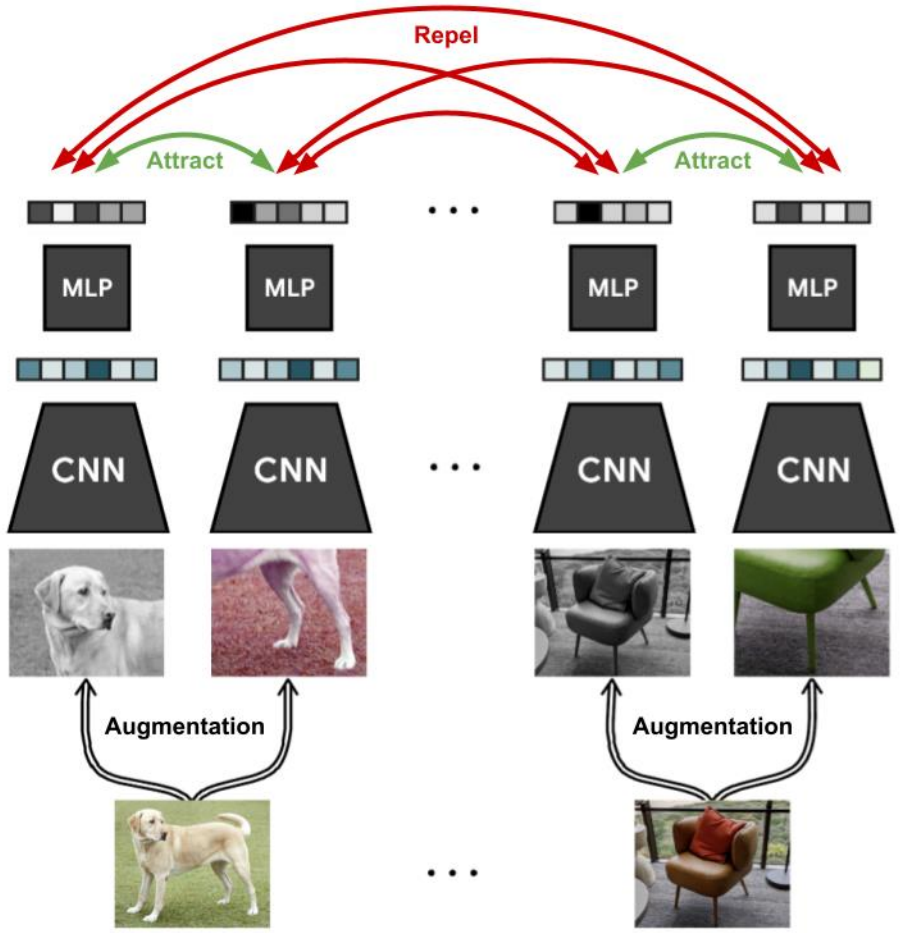
Contents

- Day 6: Integrating the Building Blocks
  - Image Captioning
  - Attention
  - [HW] Recurrent Neural Networks
- Day 7: Generation without Labels
  - Generative Adversarial Network
  - [HW] GAN



Contents

- Day 6: Integrating the Building Blocks
  - Image Captioning
  - Attention
  - [HW] Recurrent Neural Networks
- Day 7: Generation without Labels
  - Generative Adversarial Network
  - [HW] GAN
- Day 8: Representation Learning without Labels
  - Transfer Learning
  - Self-Supervised Learning



Contents

- Day 6: Integrating the Building Blocks
  - Image Captioning
  - Attention
  - [HW] Recurrent Neural Networks
- Day 7: Generation without Labels
  - Generative Adversarial Network
  - [HW] GAN
- Day 8: Representation Learning without Labels
  - Transfer Learning
  - Self-Supervised Learning
- Day 9: Final-Term

THANK YOU!