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Introduction to Deep Learning

Welcome



- AI is the new Electricity
- Electricity had once transformed countless industries: transportation, manufacturing, healthcare, communications, and more
- AI will now bring about an equally big transformation.

What you'll learn



Courses in this sequence (Specialization):

1. Neural Networks and Deep Learning
2. Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
3. Structuring your Machine Learning project *train/dev/test*
4. Convolutional Neural Networks *CNN* *end-to-end*
5. Natural Language Processing: Building sequence models
RNN, LSTM

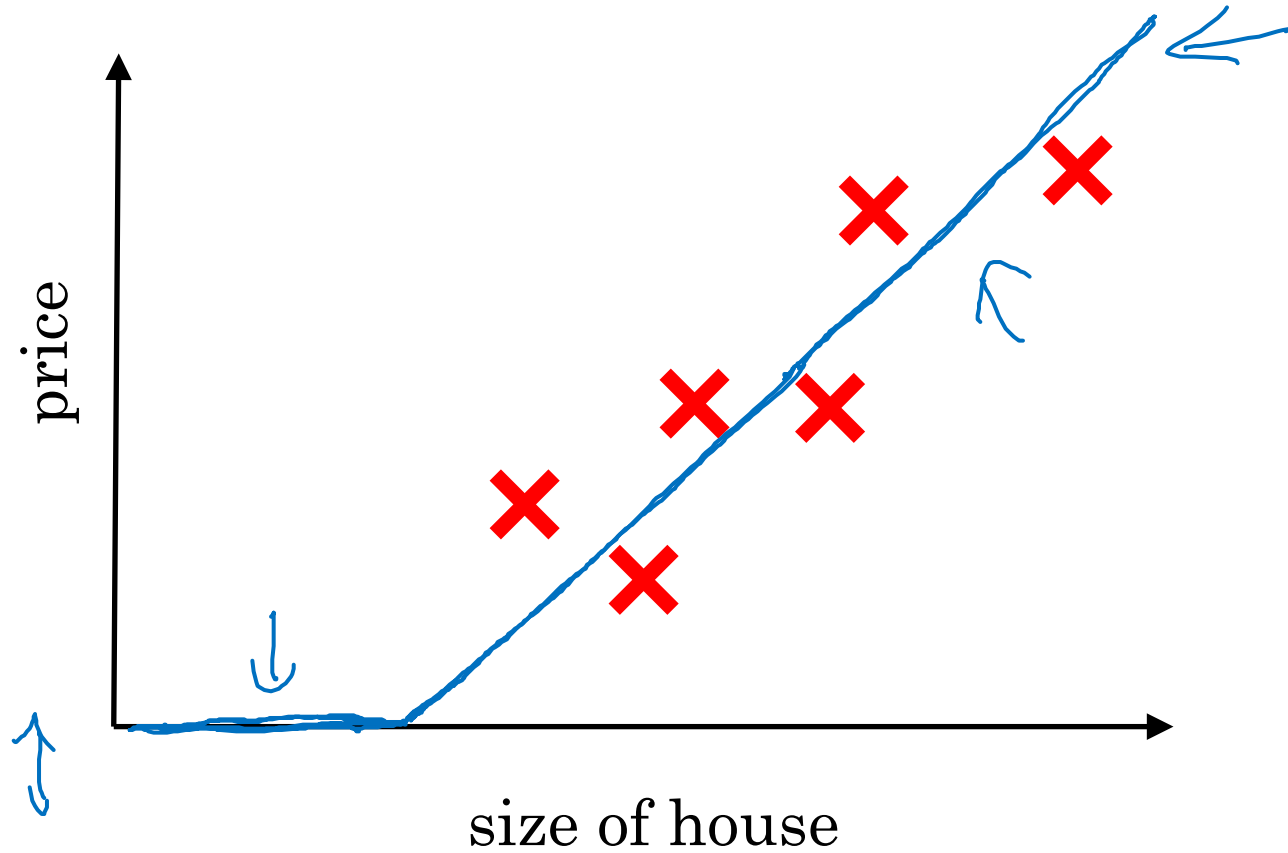


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Introduction to Deep Learning

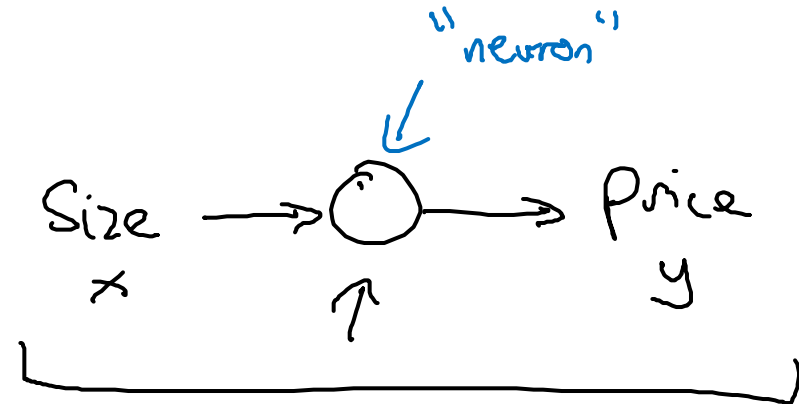
What is a Neural Network?

Housing Price Prediction

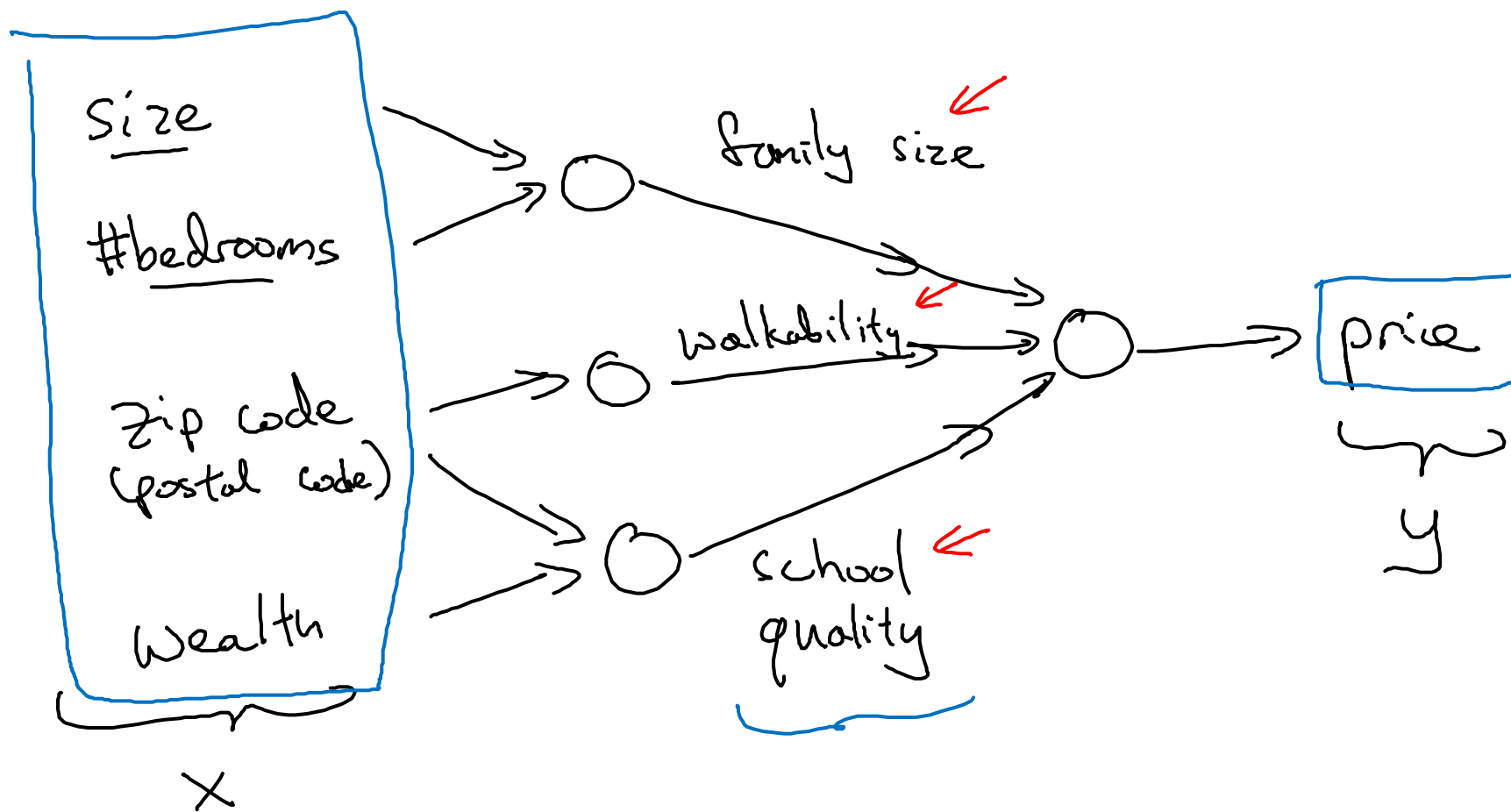


ReLU
Rectified
Linear
Unit

A hand-drawn graph of the ReLU function, showing a horizontal line at zero for negative inputs and a linear increase for positive inputs. An arrow points to the linear segment.

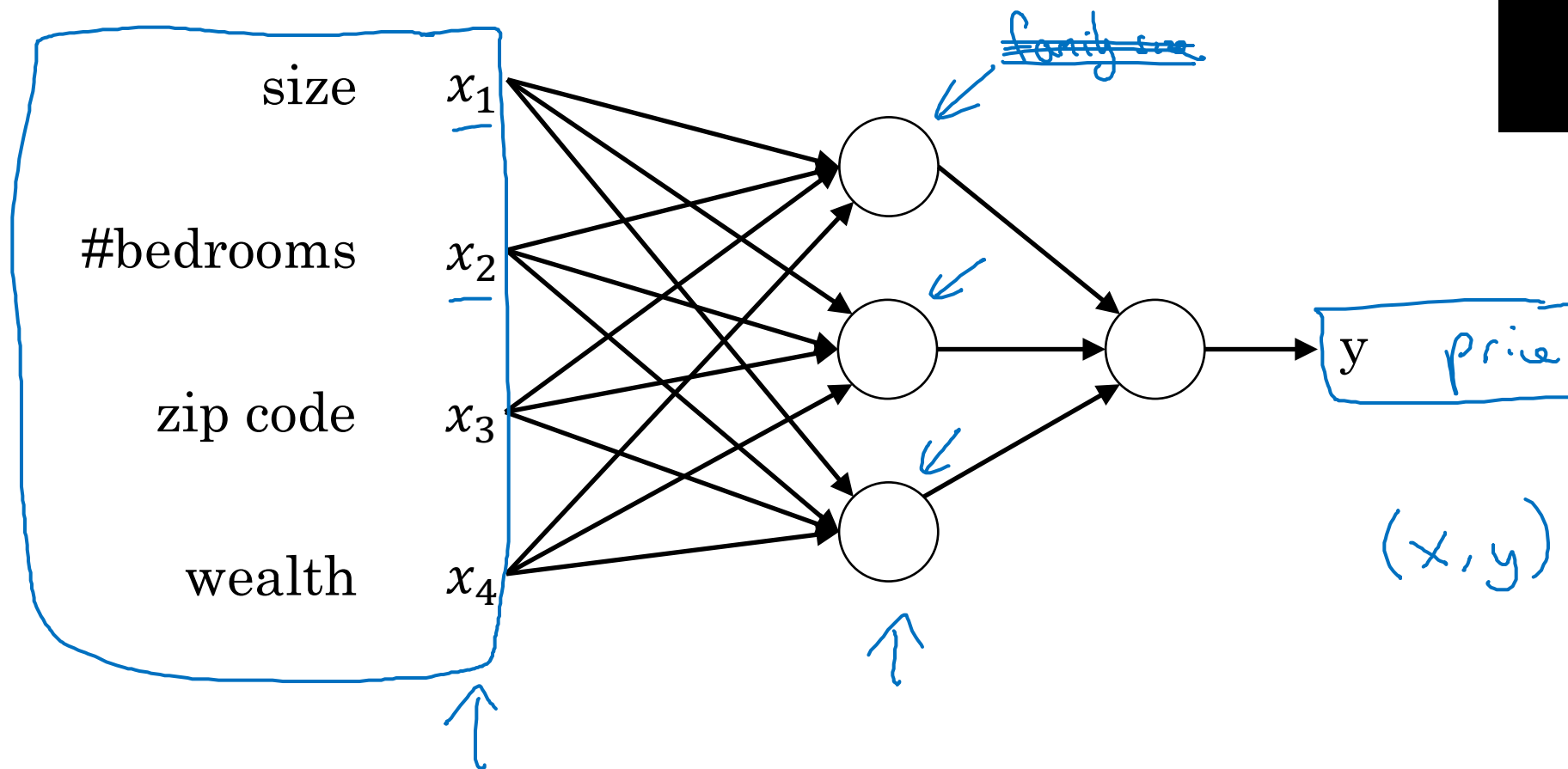


Housing Price Prediction



Housing Price Prediction

Drawing of
previous Image





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Introduction to Deep Learning

Supervised Learning with Neural Networks

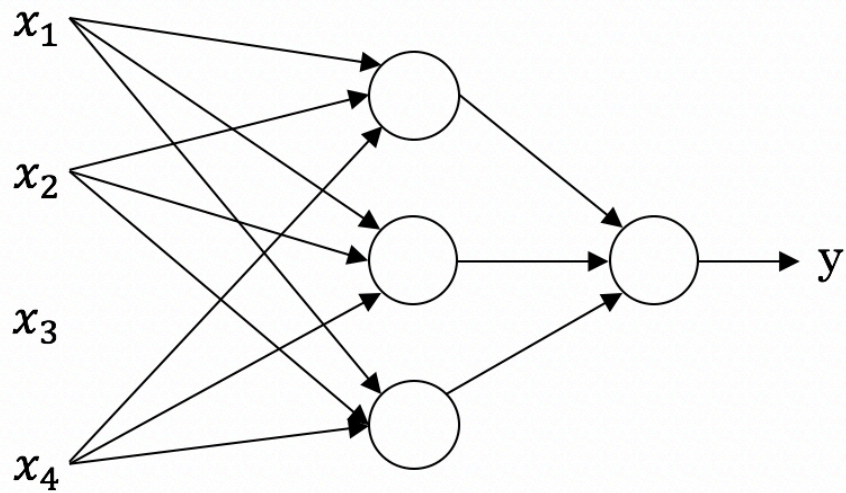
Supervised Learning

Input(x) ←	Output (y) ←	Application
Home features	Price	Real Estate
Ad, user info ←	Click on ad? (0/1)	Online Advertising
Image	Object (1,...,1000)	Photo tagging
<u>Audio</u>	Text transcript	Speech recognition
<u>English</u>	Chinese	Machine translation
<u>Image</u> , <u>Radar info</u>	Position of other cars ↑	Autonomous driving

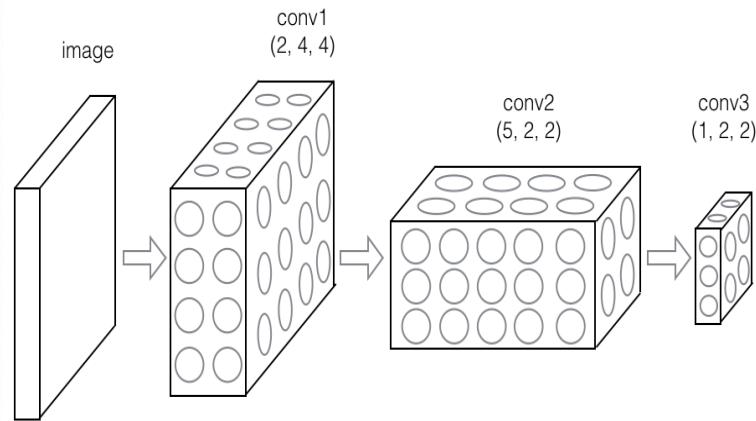
Handwritten annotations in blue:

- A bracket groups "Real Estate" and "Online Advertising" with the label "Standard NN".
- A bracket groups "Photo tagging" with the label "CNN".
- A bracket groups "Speech recognition" and "Machine translation" with the label "RNN".
- A bracket groups "Autonomous driving" with the label "Custom/Hybrid".
- Underlines are present under "Audio", "English", "Image", and "Radar info".
- Arrows point from "Ad, user info" to the left, and from "Image" and "Radar info" to the right.
- An arrow points from "Position of other cars" to the left.

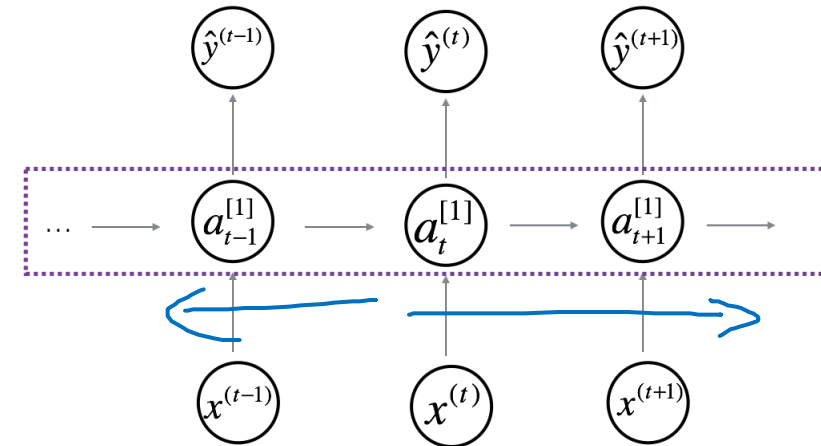
Neural Network examples



Standard NN



Convolutional NN



Recurrent NN

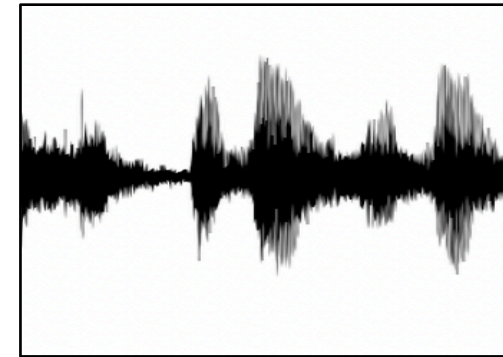
Supervised Learning

Structured Data

Size	#bedrooms	...	Price (1000\$s)
2104	3		400
1600	3		330
2400	3		369
⋮	⋮		⋮
3000	4		540

User Age	Ad Id	...	Click
41	93242		1
80	93287		0
18	87312		1
⋮	⋮		⋮
27	71244		1

Unstructured Data



Audio



Image

Four scores and seven years ago...

Text

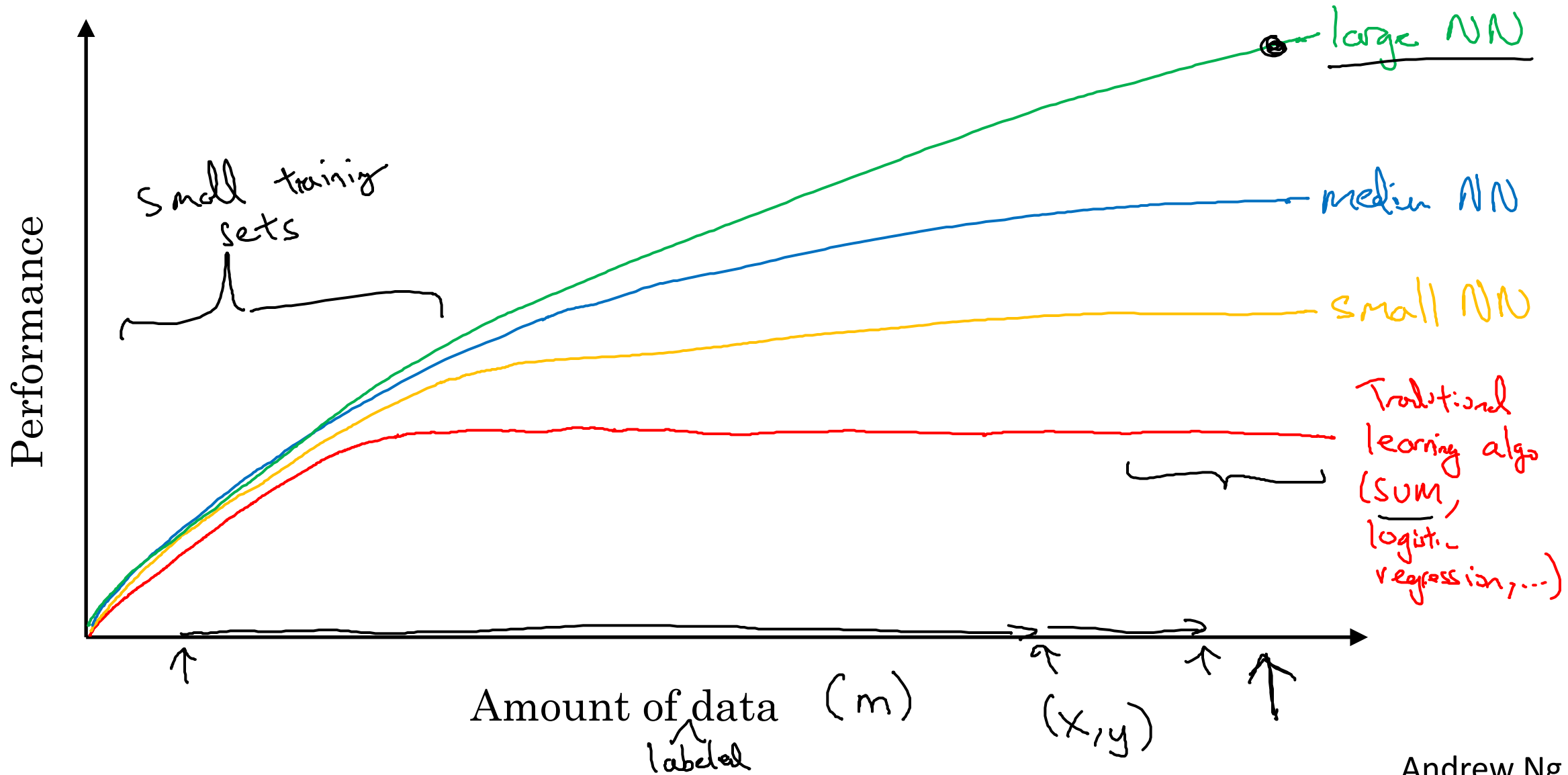


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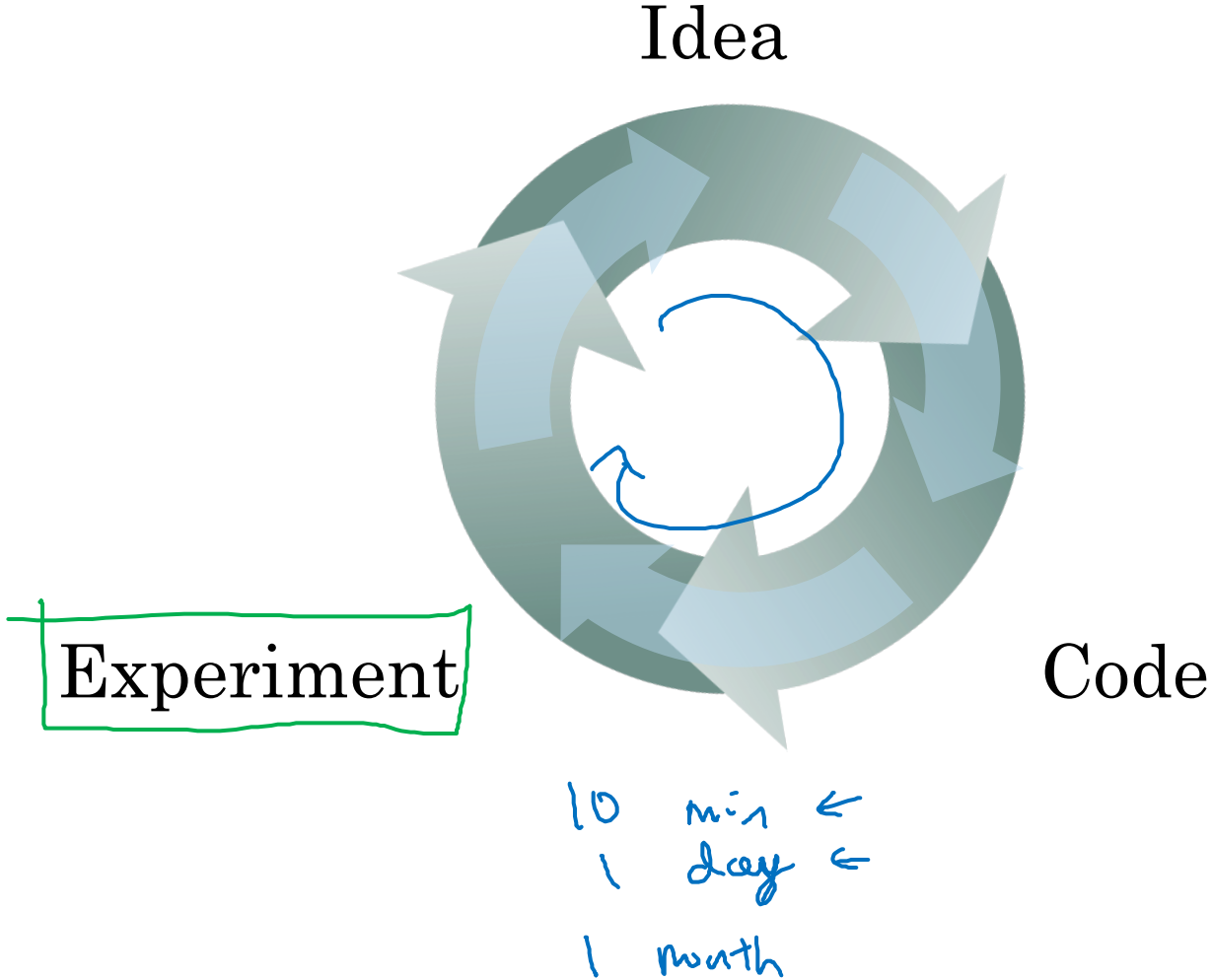
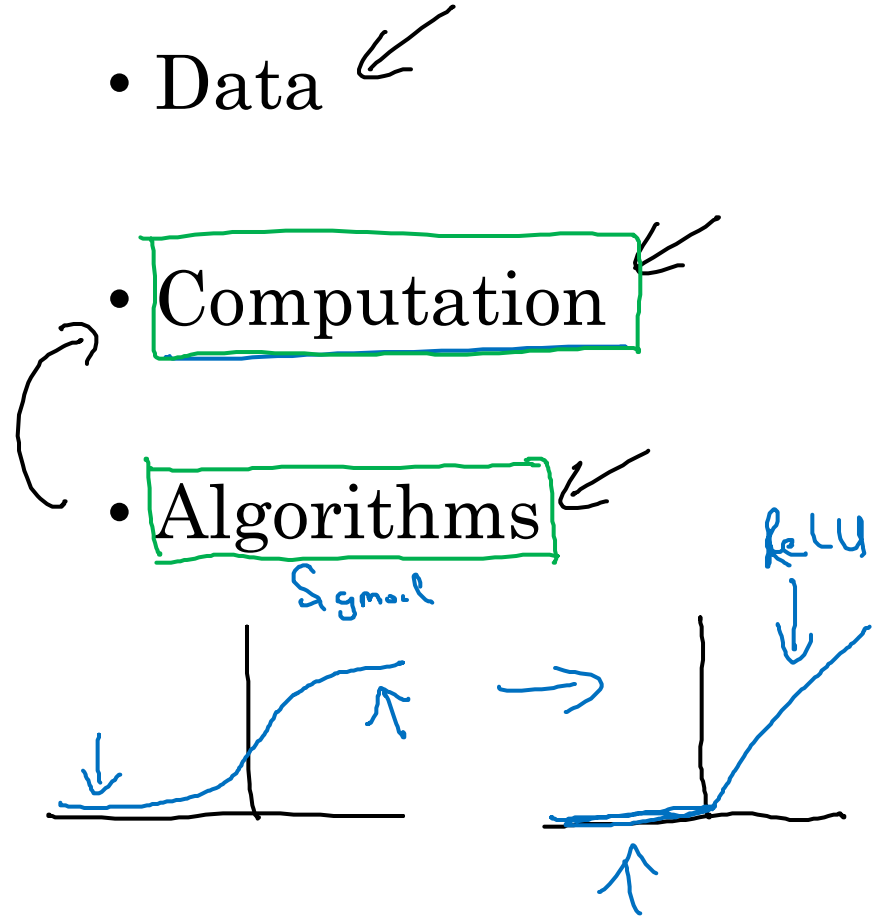
Introduction to Neural Networks

Why is Deep Learning taking off?

Scale drives deep learning progress



Scale drives deep learning progress





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Outline of this Course

Week 1: Introduction

Week 2: Basics of Neural Network programming

Week 3: One hidden layer Neural Networks

Week 4: Deep Neural Networks



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Supervised Learning with Neural Networks

Supervised Learning

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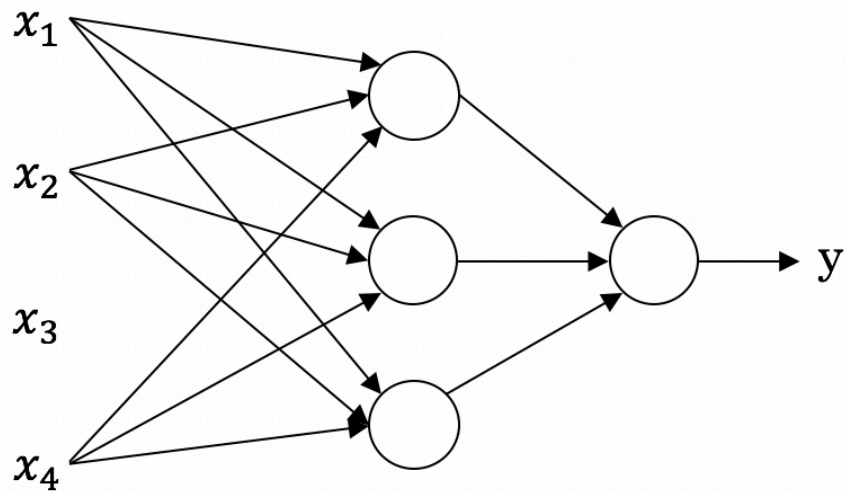
Standard
NN

CNN

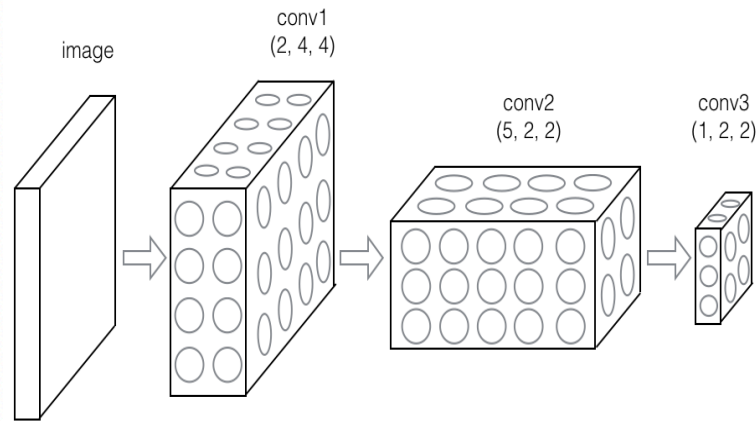
RNN

Custom/
Hybrid

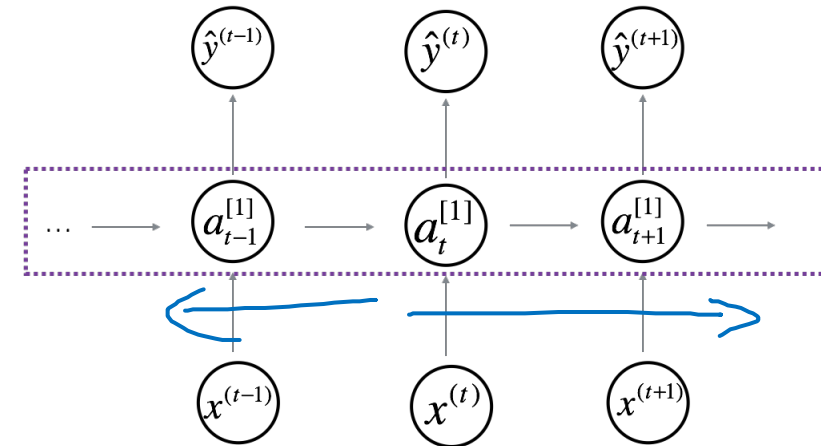
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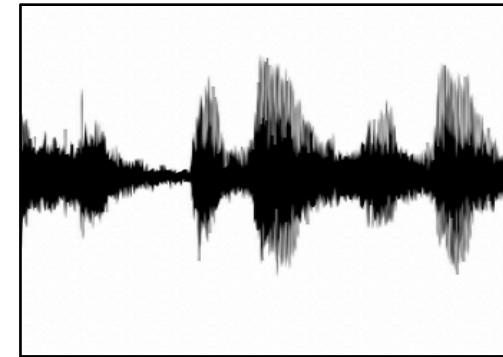
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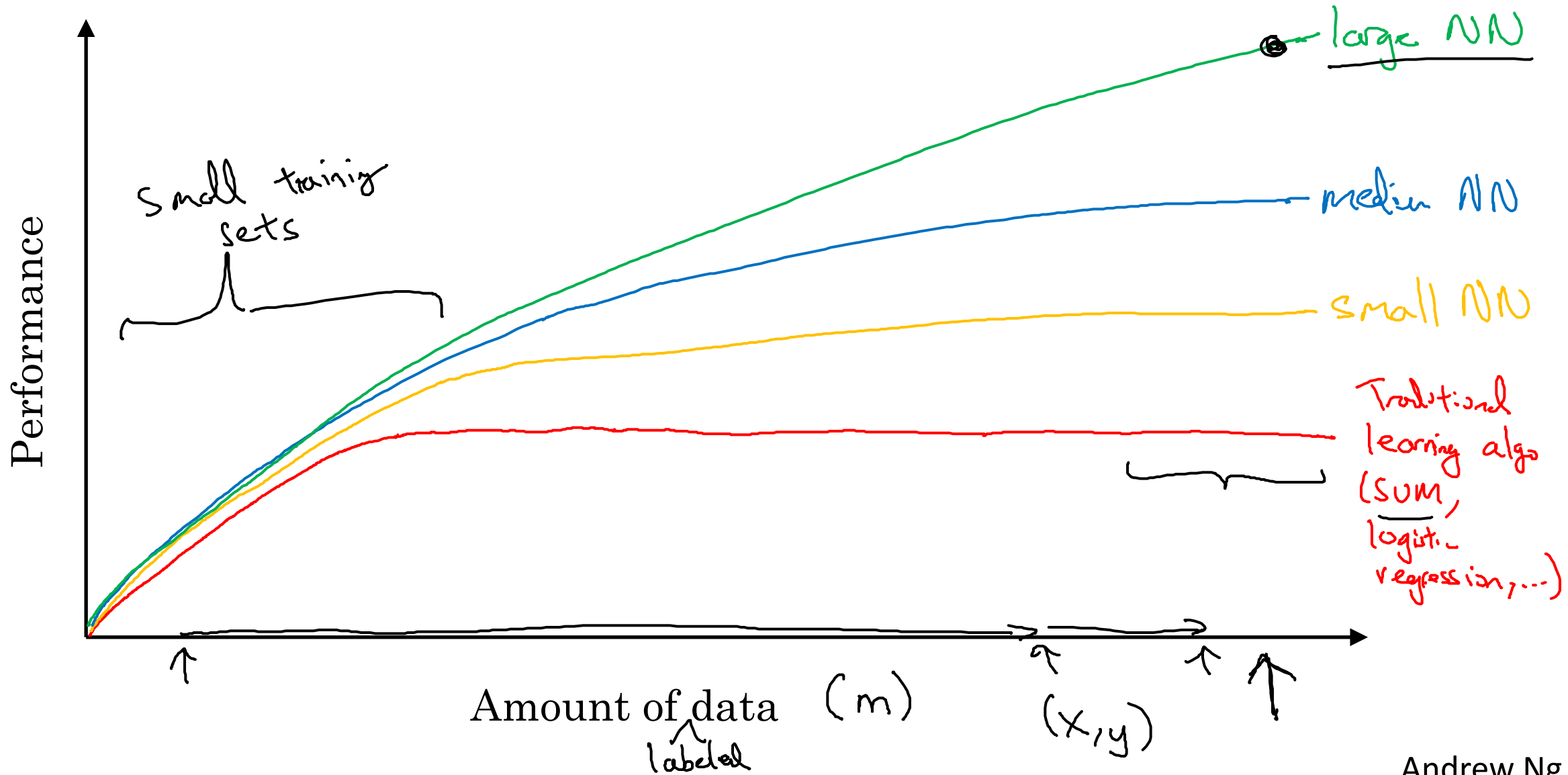


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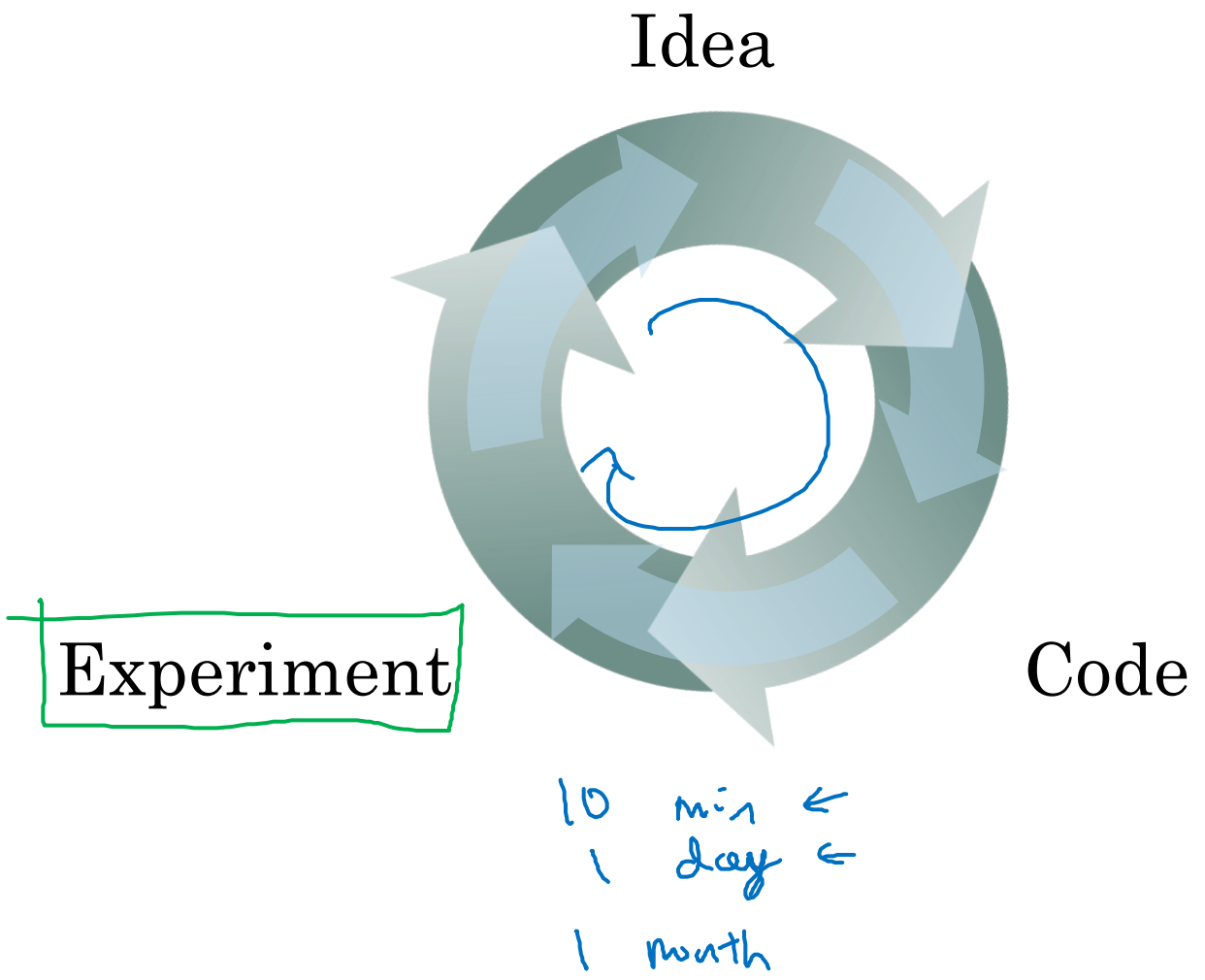
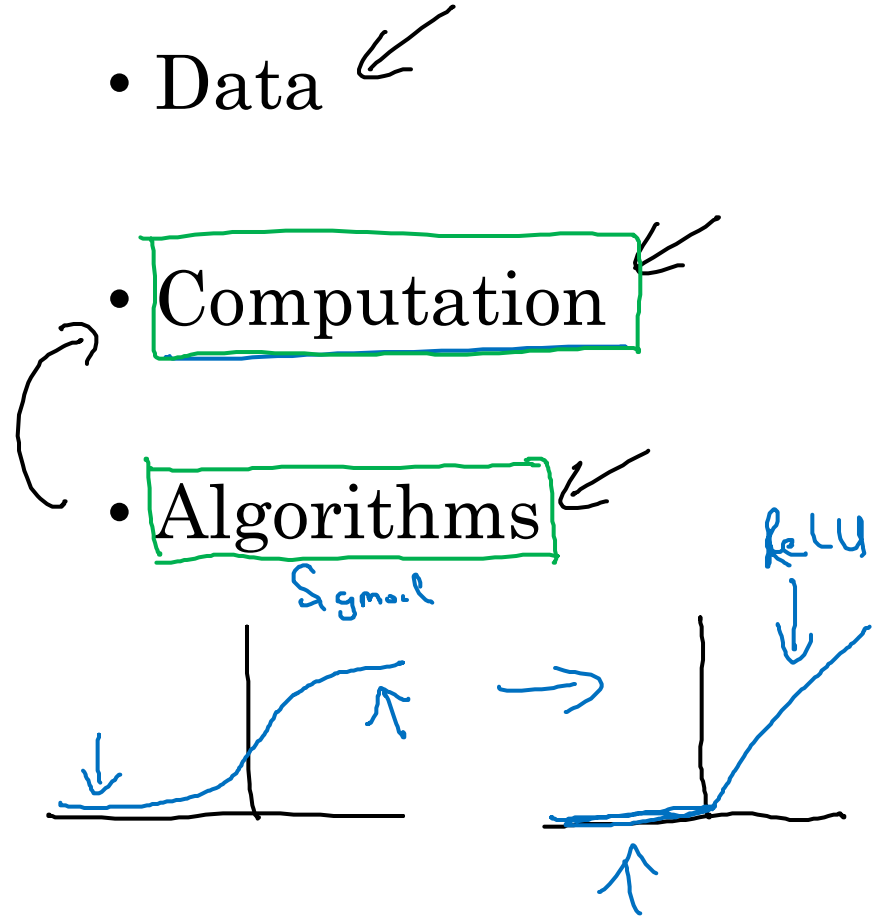
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