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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
4. Convolutional Neural Networks *CNN*
5. Natural Language Processing: Building sequence models

train / dev / test
end-to-end

RNN, LSTM

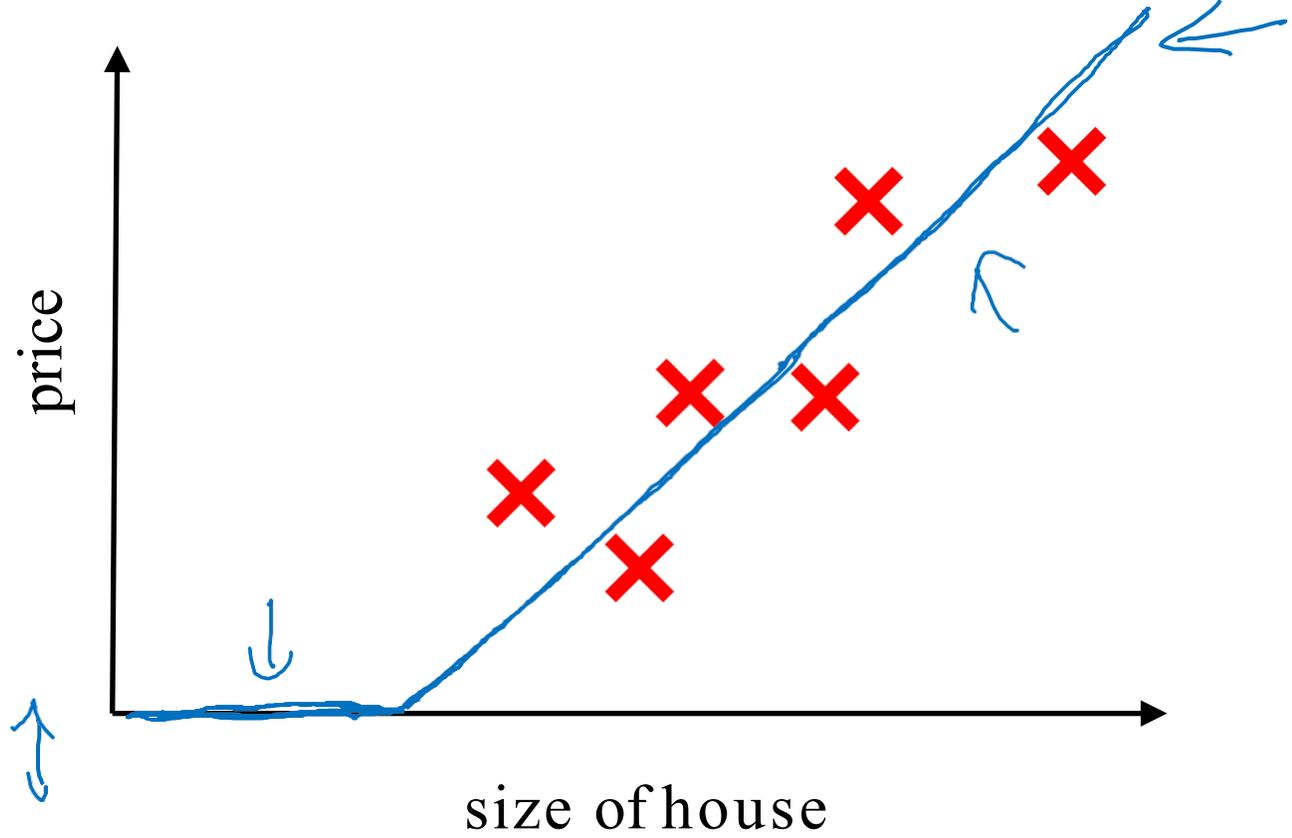


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Introduction to Deep Learning

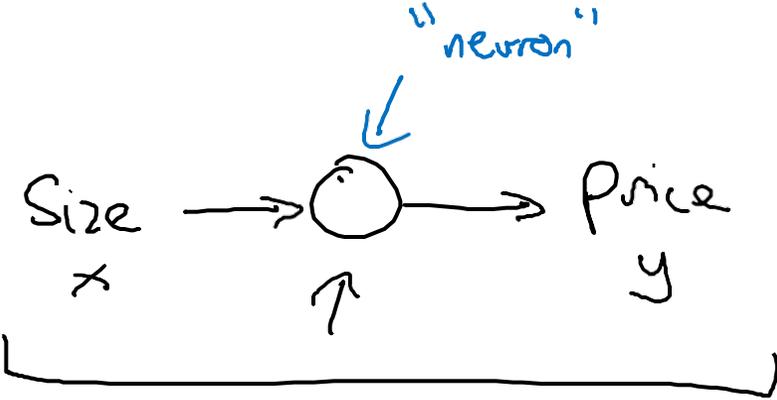
What is a Neural Network?

Housing Price Prediction

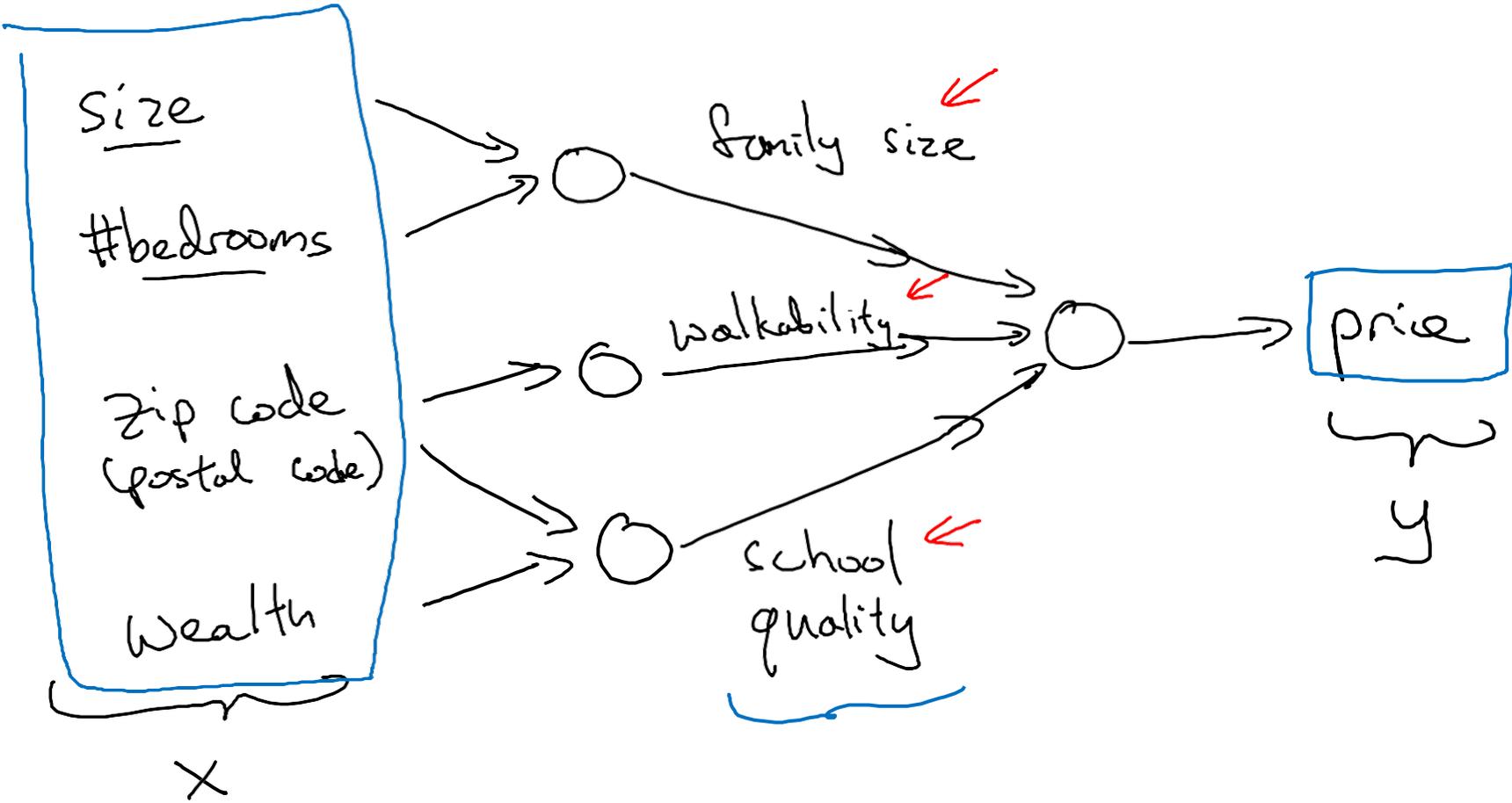


ReLU
Rectified
Linear
Unit

A small graph showing the ReLU function, which is zero for negative inputs and increases linearly for positive inputs. A blue arrow points to the slope of the function.

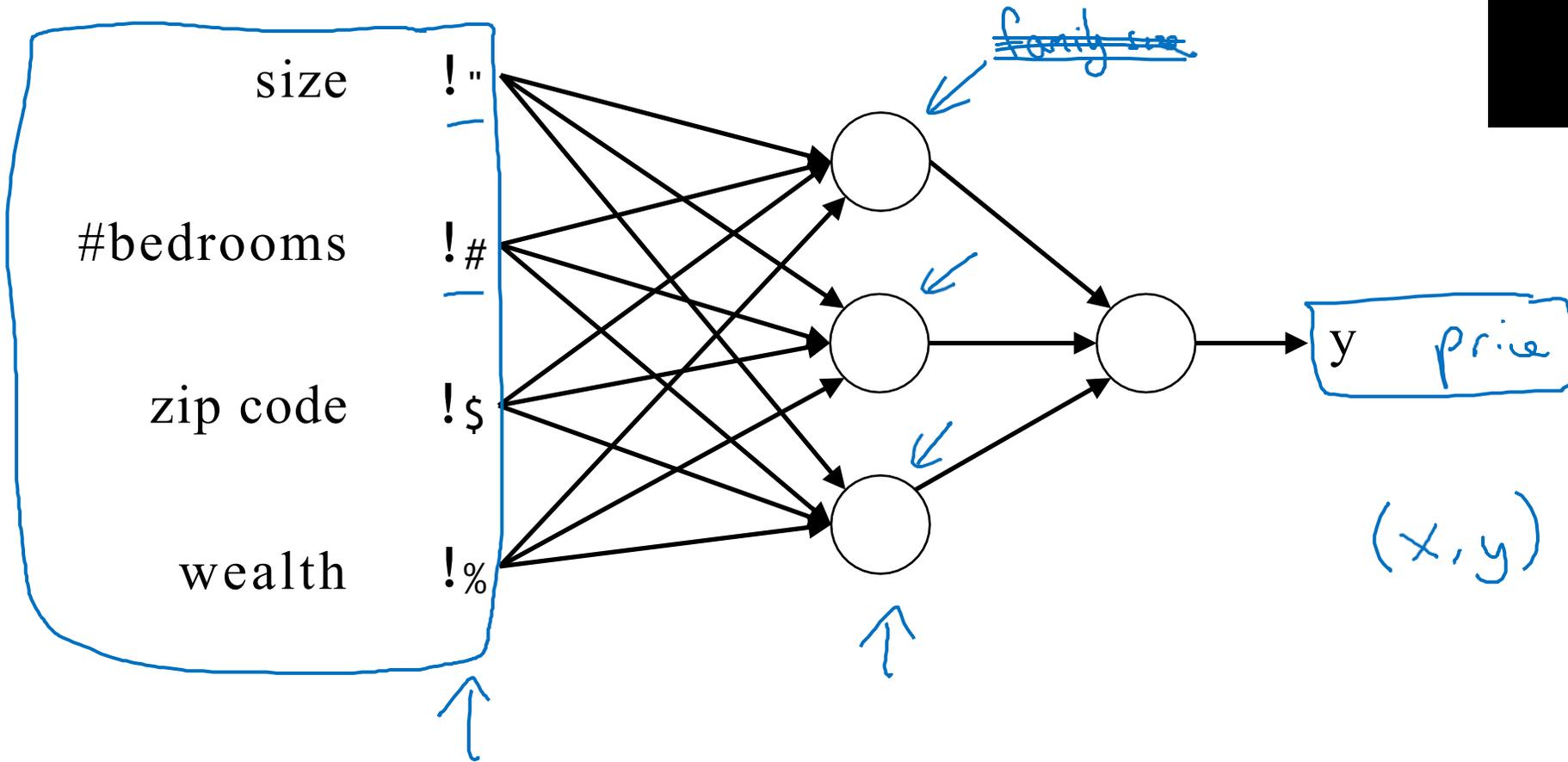


Housing Price Prediction



Housing Price Prediction

Drawing of
previous Image





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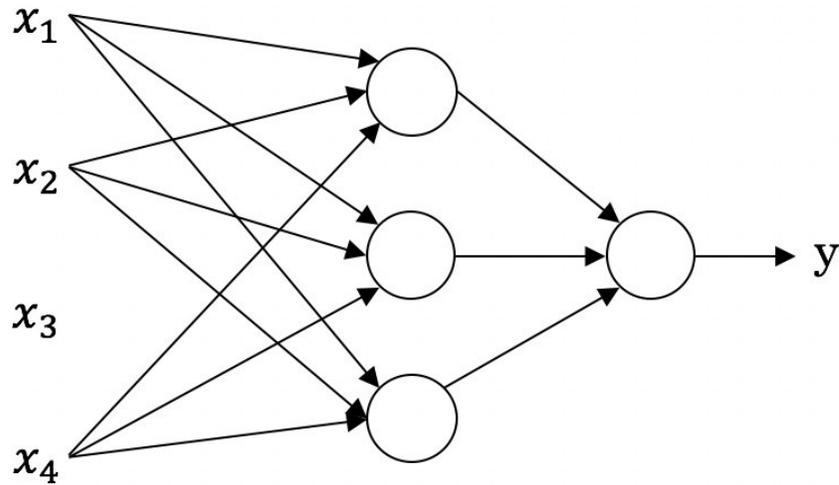
Introduction to Deep Learning

Supervised Learning with Neural Networks

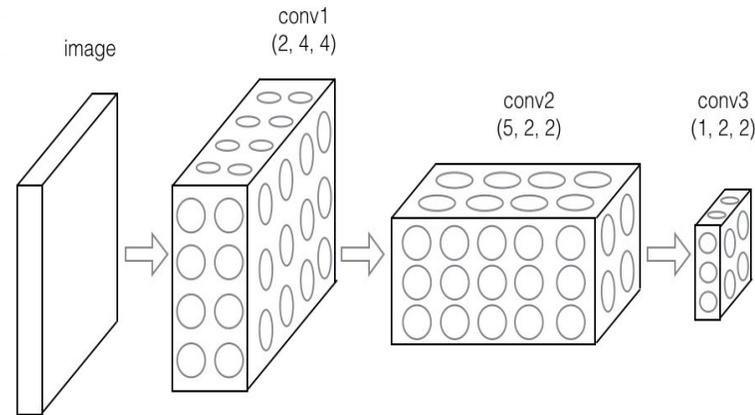
Supervised Learning

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>CNN</u>
<u>Audio</u>	Text transcript	Speech recognition } <u>RNN</u>
<u>English</u>	Chinese	Machine translation }
<u>Image, Radar info</u>	Position of other cars ↑	Autonomous driving } <u>Custom/ Hybrid</u>

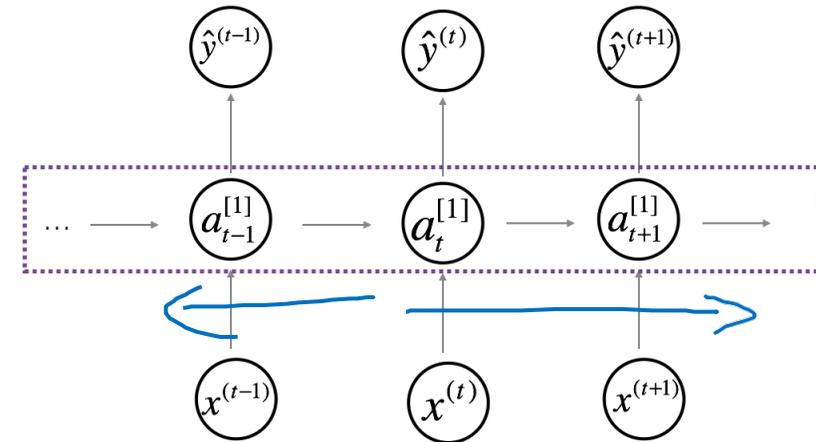
Neural Network examples



Standard NN



Convolutional NN



Recurrent NN

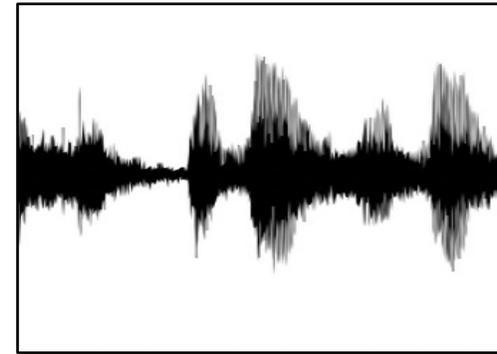
Supervised Learning

Structured Data

Size	#bedrooms	...	Price (1000\$)
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

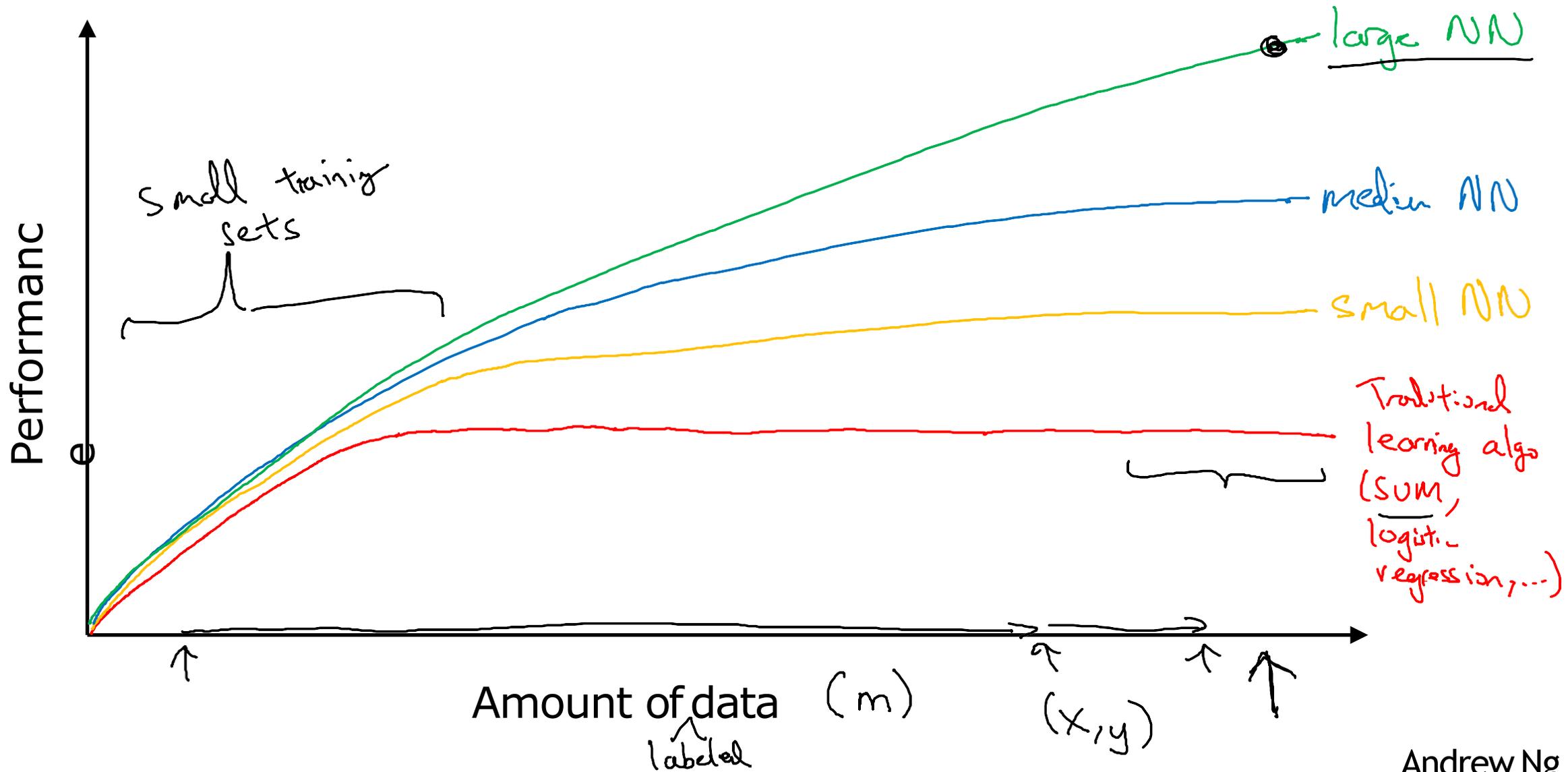


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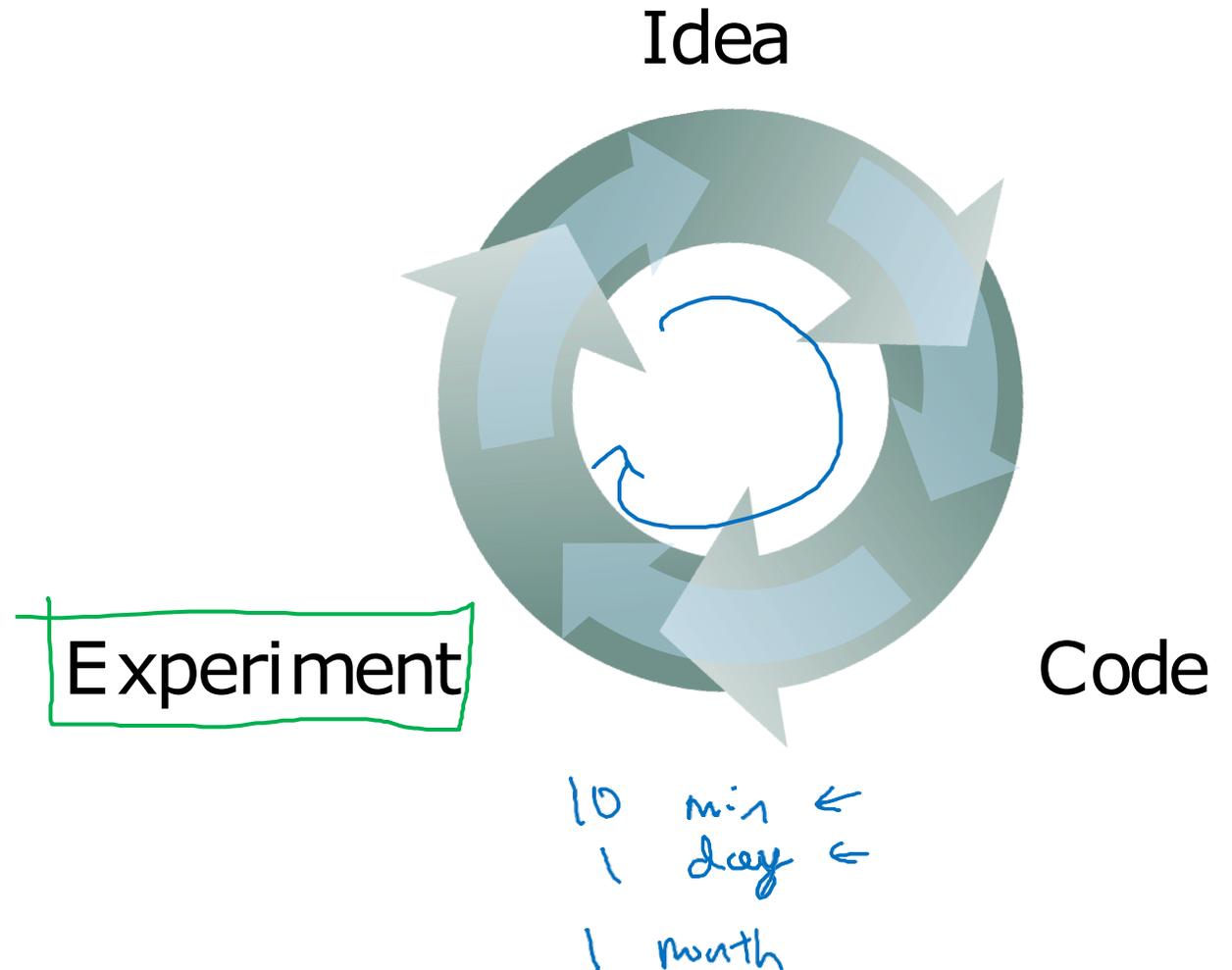
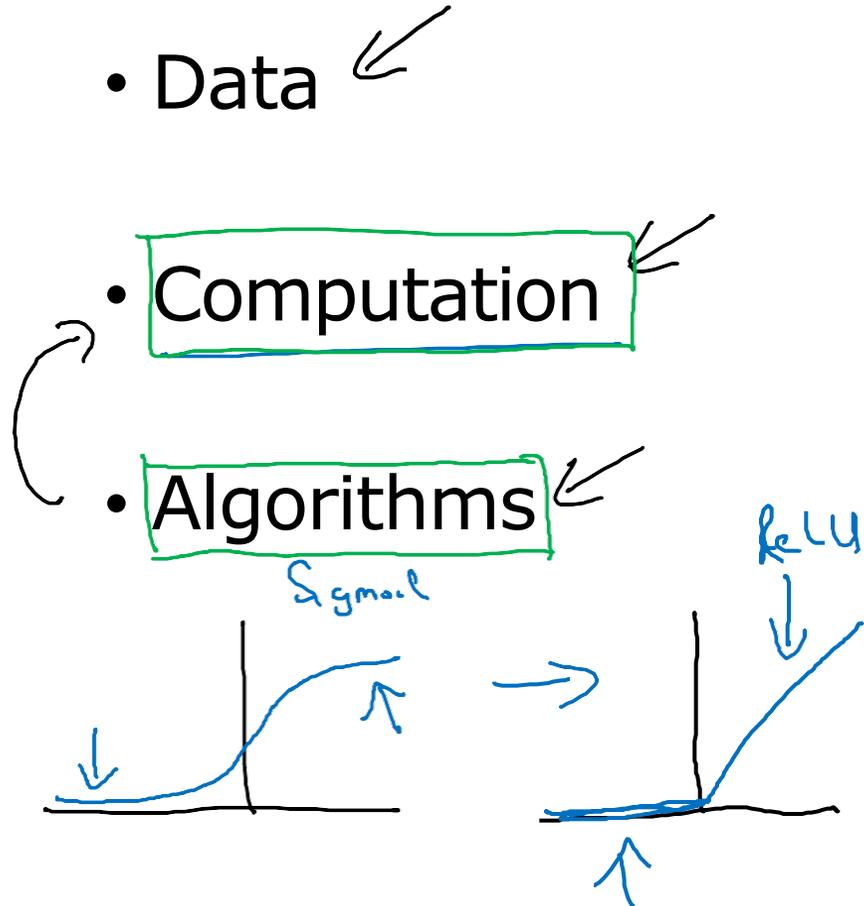
Introduction to Neural Networks

Why is Deep Learning taking off?

Scale drives deep learning progress



Scale drives deep learning progress





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Introduction to Neural Networks

About this Course

Courses in this Specialization

1. Neural Networks and Deep Learning ←
2. Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
3. Structuring your Machine Learning project
4. Convolutional Neural Networks
5. Natural Language Processing: Building sequence models

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