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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.

Andrew Ng

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
5. Natural Language Processing: Building sequence models

train/dev/test

end-to-end

CNN

RNN, LSTM

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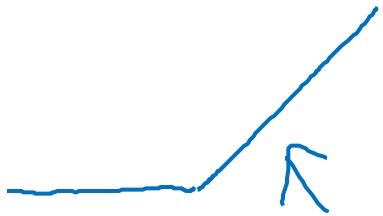
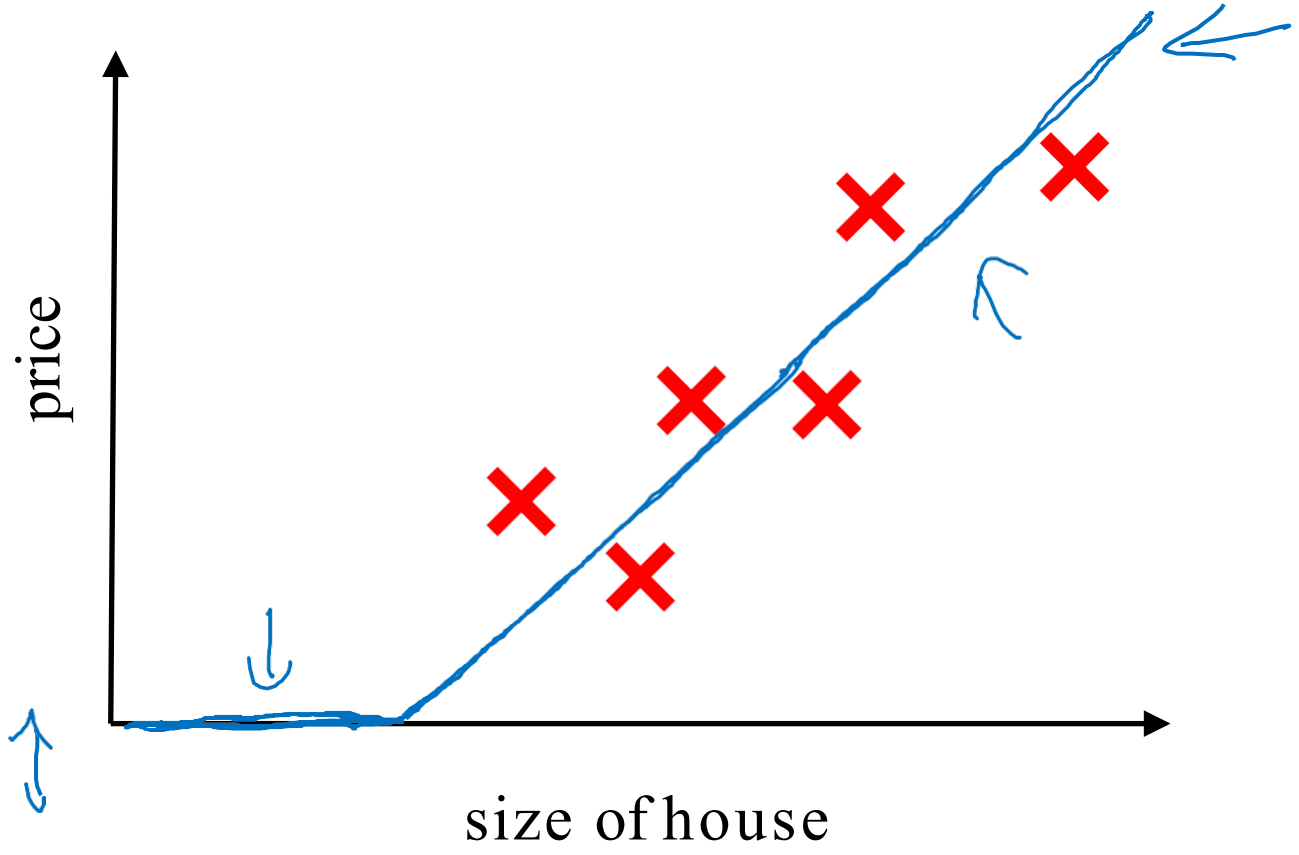
Introduction to Deep Learning

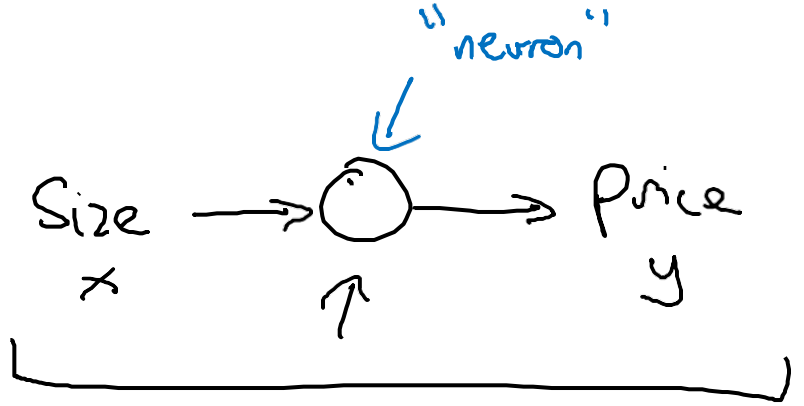
What is a Neural Network?

Housing Price Prediction

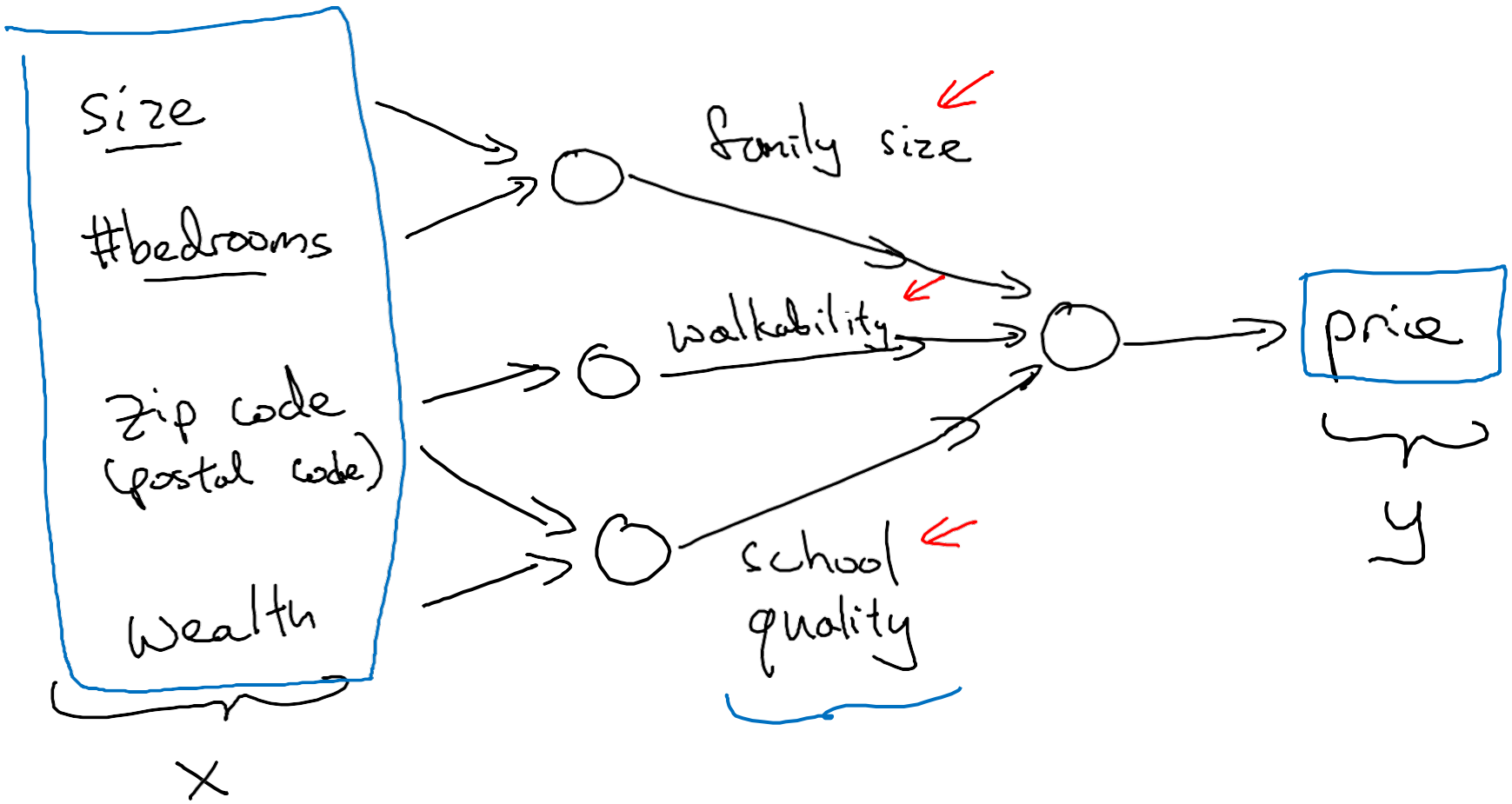


ReLU
Rectified
Linear
Unit



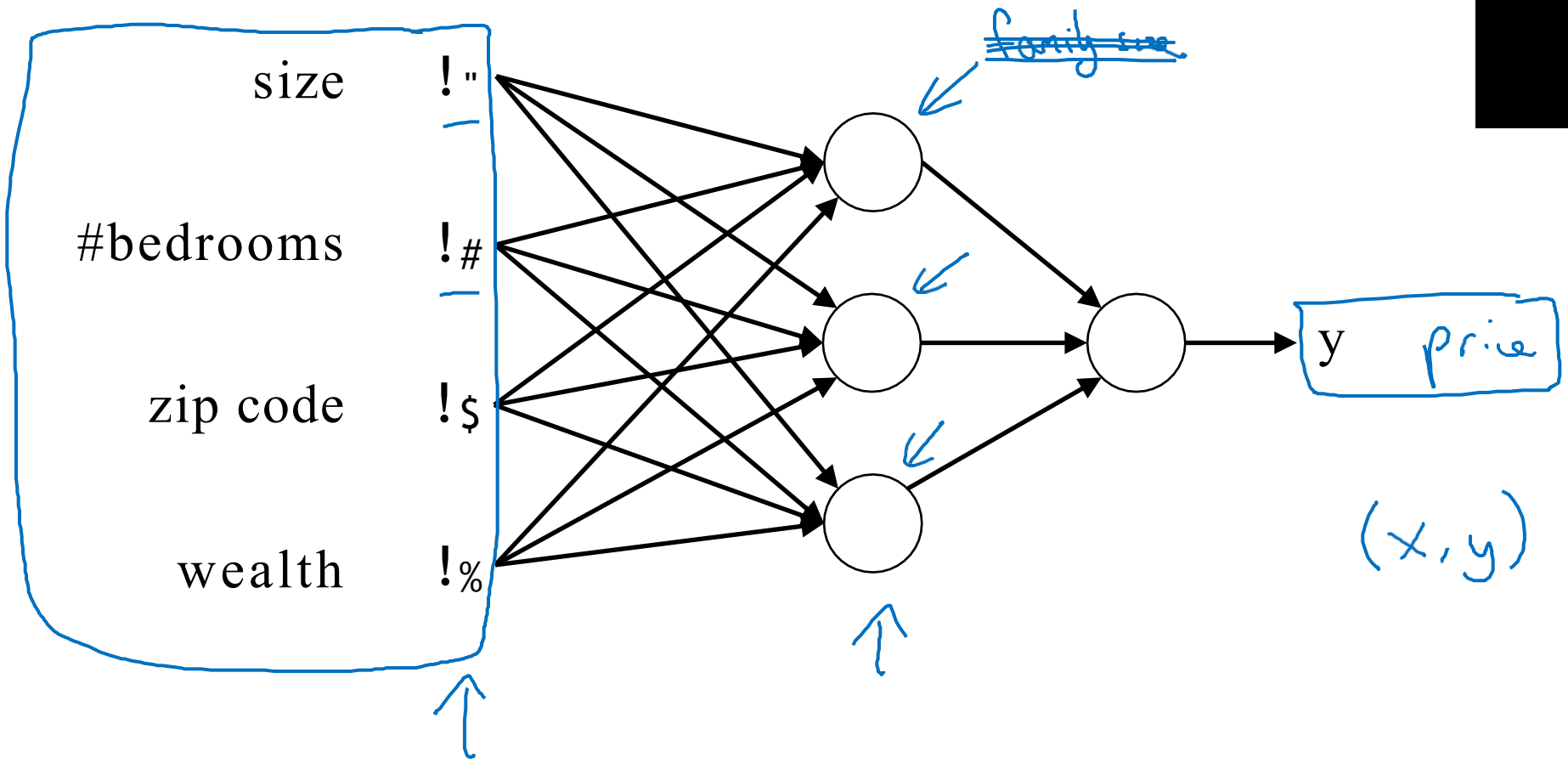


Housing Price Prediction



Housing Price Prediction

Drawing of previous Image



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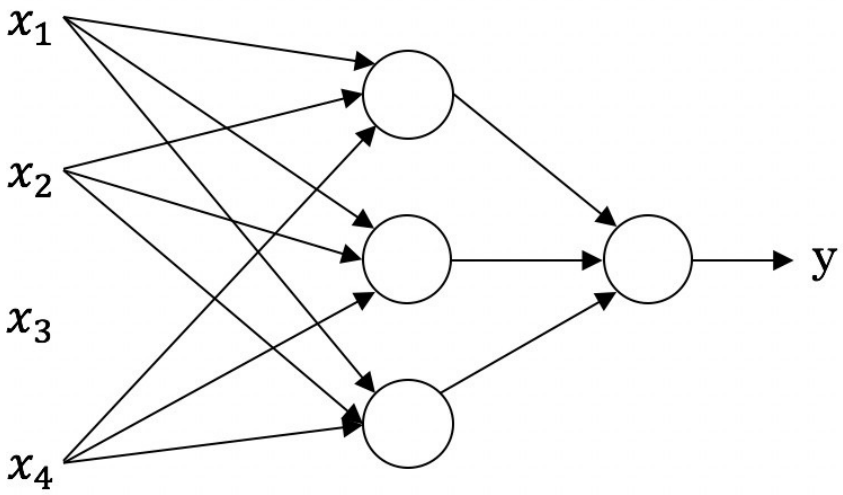
Introduction to Deep Learning

Supervised Learning with Neural Networks

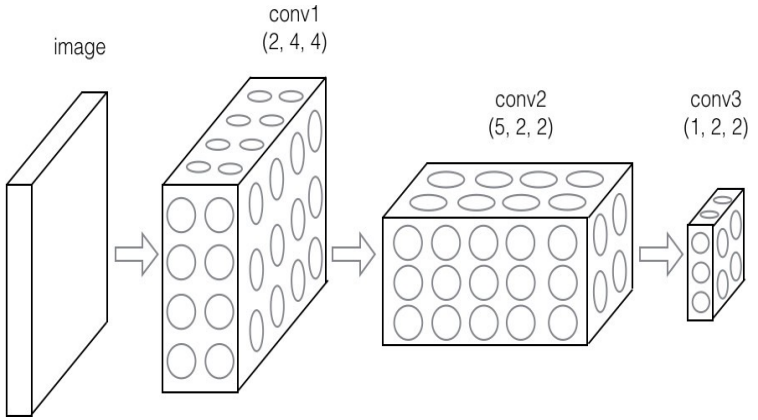
Supervised Learning

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

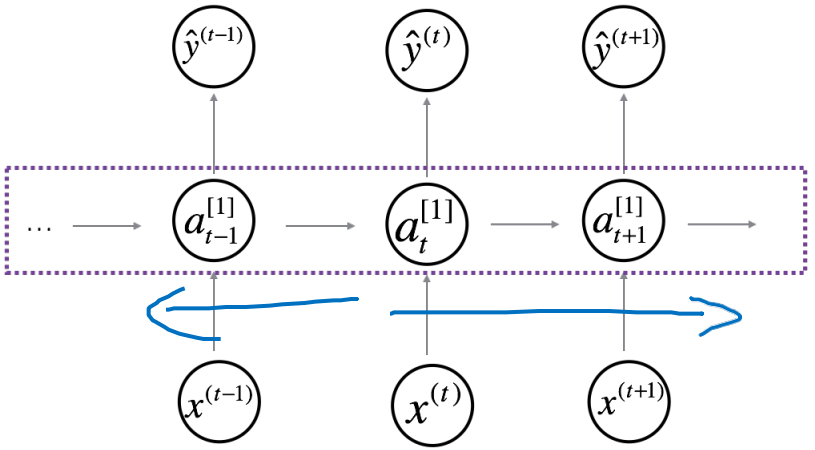
Neural Network examples



Standard NN



Convolutional NN



Recurrent NN

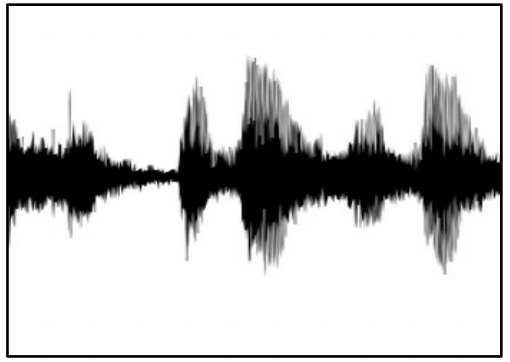
Supervised Learning

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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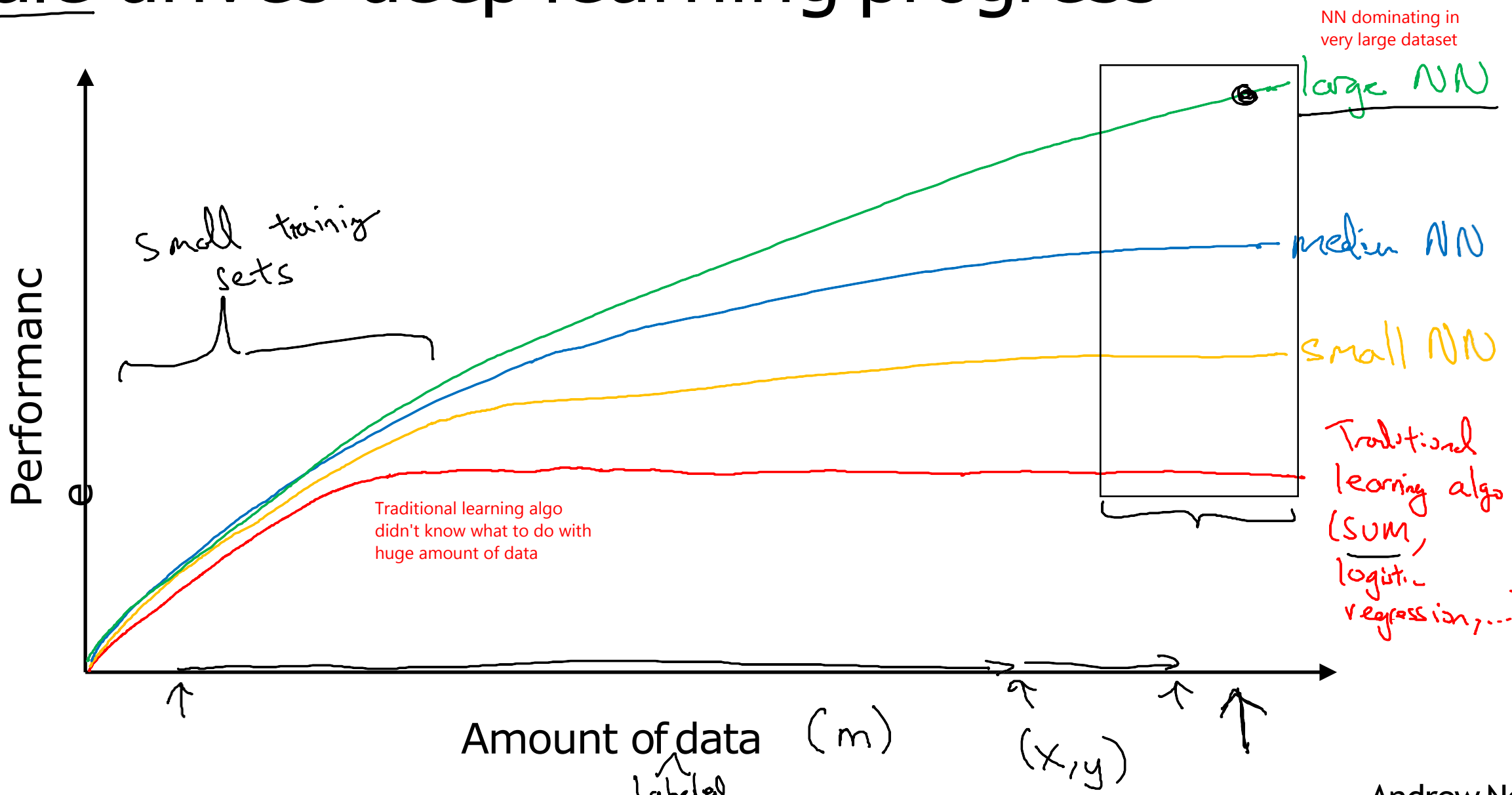
Introduction to Neural Networks

Why is Deep Learning taking off?

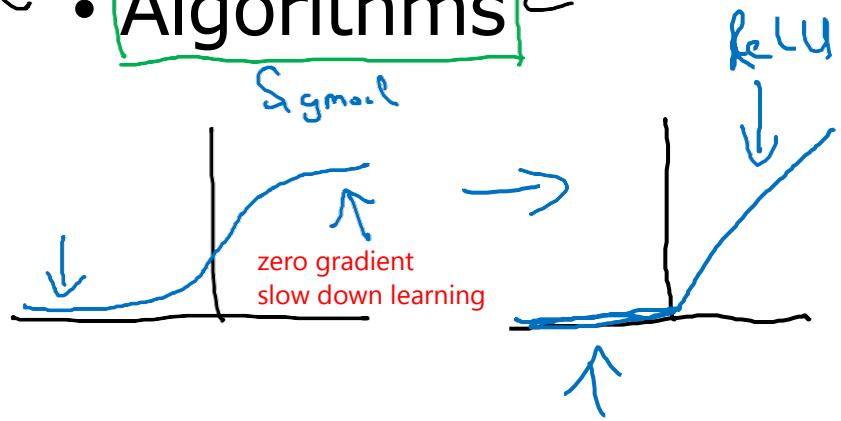
Scale drives deep learning progress



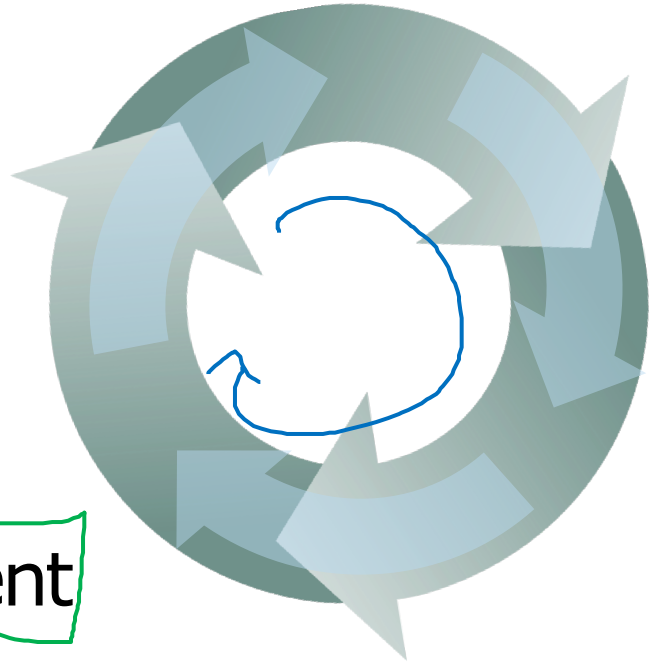
Andrew Ng

Scale drives deep learning progress

- Data
- Computation
- Algorithms



Idea



Experiment

Code

10 min
1 day
1 month

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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